Arkansas River Farms, LLC
Revised 1041 Permit Application Prowers County

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AMENDED APPLICATION FOR A PERMIT TO CONDUCT A DESIGNATED ACTIVITY OF STATE INTEREST OR TO ENGAGE IN DEVELOPMENT IN A DESIGNATED AREA OF STATE INTEREST

To: Permit Authority, Prowers County

Re: 1041 Application of Arkansas River Farms, 62A, 62 B, 118 and 141 ("Subject Farms").

From: Arkansas River Farms, LLC

Karl Nyquist
7991 Shaffer Pkwy, Suite 200
Littleton, CO 80127
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(303) 389-6777

Aaron Patsch
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Denver, CO 80202
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Lower Arkansas Water Management Association
Donald F. Higbee, Manager
310 South 6th Street
P. O. Box 1161
Lamar, Colorado 81052

Date Amended Application Submitted: May 3, 2019.

Date Received and Accepted as Complete:

1. Matter of State Interest.

The applicants request that a permit be issued for each of the items checked below:

A permit to conduct one or more of the following matters of state interest:

( ) Efficient Utilization of Municipal and Industrial Water Projects

(x) Development in Areas Containing or Having a Significant Impact upon Natural Resources of Statewide Importance

2. Proposed Activity or Development.

General description of the specific activity or development proposed:

The application amends the application submitted March 8, 2019 and involves both the Subject Farms and acquisition of additional augmentation supplies for LAWMA, as each is described below.

I. Arkansas River Farms-Subject Farms

Arkansas River Farms ("ARF") will convert four low intensity, water inefficient flood irrigated farms into dry-land farms. The Subject Farms are farms 62A, 62B, 118, and 141. ARF also purchased the water rights associated with Farm 63, but has not sought 1041 approval for this farm because it was dried up and the water was severed from that land prior to the adoption of the Prowers County 1041 regulations. ARF will trade the 904 Fort Lyon Canal Company ("FLCC Shares") used on the four Subject Farms and Farm 63 to the Lower Arkansas Water Association ("LAWMA") in exchange for LAWMA shares that can be used to augment well use ("LAWMA Shares"). ARF will use the LAWMA Shares as the augmentation water supply for wells used to develop a dairy in Holly, Colorado ("Holly Dairy"). The Holly Dairy has submitted its request for land use approval by a separate application.

The following paragraphs and Table 1 pertain to the Project.

A. On December 14, 2016, The Fort Lyon Canal Company ("Company") approved ARF's request to seek water court approval to add augmentation and replacement uses to the FLCC Shares ("FLCC Approval"). A copy of the FLCC Approval is attached as **Exhibit A**

B. For ARF to transfer the FLCC Shares to LAWMA, and for LAWMA to obtain water court approval of the required change of water rights, the FLCC Shares must be severed from the four Subject Farms and Farm 63 (Water was severed from Farm 63 prior to the adoption of the Prowers County 1041 regulations), the farms historically irrigated with the FLCC Shares.

C. The development cost for the Holly Dairy is estimated at approximately $25,000,000 and will likely occur over the next 12 months.

D. For the Subject Farms, zoning will remain agricultural and the uses will not materially change other than going from irrigated farming to dryland farming or pasture. As part of the LAWMA trade, ARF is required to develop a network of augmentation stations, recharge ponds and related equipment on certain of the Subject Farms and Farm 63 to return the FLCC water from the FLCC Shares that was once used on these farms back to the river. ARF spent approximately $400,000 in Prowers County to develop the part of the system infrastructure located in Prowers County, which infrastructure will stay in place perpetually and is operated by ARF for the benefit of LAWMA.

II. LAWMA

LAWMA will use the FLCC Shares in accordance with its Bylaws, including without limitation using water available to the FLCC Shares as an augmentation and replacement supply in LAWMA's decreed plan for augmentation, annual Arkansas River Replacement Plans pursuant to Rule 14 of the Amended Rules and Regulations Governing the Diversion and Use of Tributary Ground Water in the Arkansas River Basin ("Rule 14 plans"), Compact Compliance Plans pursuant to Rule 10 of the Compact Rules Governing Improvements to Surface Water Irrigation Systems in the Arkansas River Basin ("Rule 10 plans"), and approved substitute water supply plans ("SWSPs").

LAWMA is a non-profit corporation organized for the purpose of, among other things, providing a means for its members to continue to make groundwater diversions from wells and other structures with junior priorities and to continue to make surface water diversions from structures with junior priorities in the Arkansas River water rights regime.

LAWMA operates much like a typical share-based mutual ditch company. There are 27,566 shares of LAWMA common stock and 940.15 shares of LAWMA preferred stock issued and outstanding. At the ratio of 2.5 common shares to 1 preferred share, the 940.15 preferred shares equate to 2,350.375 common shares, for a total of 29,916.375 common share and common-share equivalents outstanding. Water available under LAWMA's purchased and leased water rights and under various operational agreements is pooled into an overall water portfolio that allows LAWMA members to make reliable use of their irrigation wells and other structures while LAWMA shareholders are also developing a marketable asset.

ARF owns 1,117 LAWMA common shares. ARF's 1,117 LAWMA common shares represent a total of 3.7% of the LAWMA common shares and common-share equivalents outstanding 1,117/29,916.375 = .037). ARF has transferred 2,500 of its previously owned LAWMA shares shares to the Holly Dairy.

LAWMA is governed by a seven-member elected board of directors ("LAWMA Board") that controls and manages the business and affairs of LAWMA. Currently all seven LAWMA Board members are farmers. The amount of fully consumable water provided by LAWMA to each member is based on the number of shares of common stock or preferred stock owned or controlled by that member. Shares can be sold and transferred upon approval of the LAWMA Board.

LAWMA augments approximately 736 wells and other structures ("LAWMA structures") in Lincoln, Otero, Elbert, Baca, Cheyenne, Kiowa, Bent and Prowers Counties. The LAWMA structures include 531 (approximately 72%) agricultural irrigation wells, 70 (approximately 9.5%) municipal wells, 77 (approximately 10.5%) commercial wells and the remaining 58 LAWMA structures are gravel pits, ponds and wells pumped for other uses. LAWMA will deliver approximately 33,077 acre-feet of augmentation and replacement water to the Arkansas River system under its 2019 augmentation plan and Rule 14 plan for the benefit of the LAWMA structures. Adding the FLCC Shares to its portfolio will allow LAWMA to increase the amount of fully consumable water that is allocated to each LAWMA common share, and therefore to increase the amount of LAWMA members' pumping and other diversions for irrigation and other purposes.

A copy of LAWMA's Bylaws is attached as **Exhibit B**

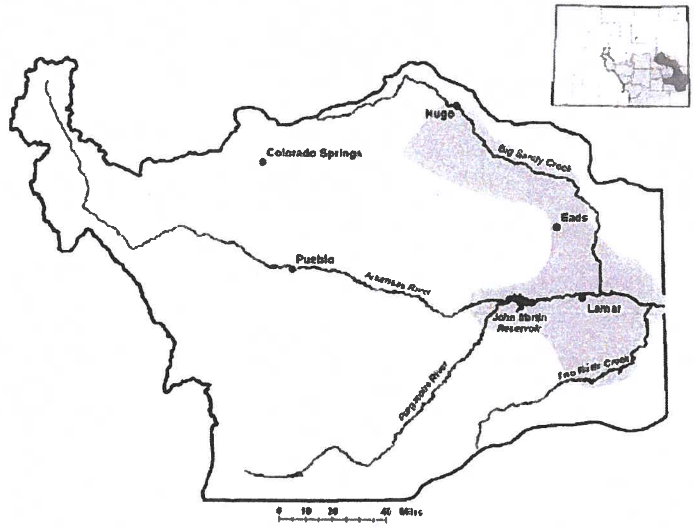


Figure 1. General Location Map Showing LAWMA's Service Area

3. General Description.

A general, non-legal description and the popular name, if any, of the tract of land upon which the activity or development is to be conducted:

<u>Arkansas River Farms-Subject Farms: 62A, 62 B, 118 and 141. The irrigated lands associated with the Subject Farms is set forth in the table below:</u>

Acreage of Subject Farms

Farm #	Reveg/Dryland Farming	Number of Former Irrigated Acres
62 A	Dryland Farming	190
62 B	Dryland Farming	(included in total for 62 A)
118	Dryland Farming	173
141	Dryland Farming	219
Total		582

4. Legal Description.

The legal description, including the acreage, of the tract of land upon which the development or the activity is to be conducted, by metes and bounds or by government survey description: (attach additional sheets if necessary):

See attached Exhibit C.

5. Owners and Interests.

Set out below the names of those persons holding recorded legal, equitable, contractual and option interests and any other person known to the applicant having an interest in the property described in paragraph 4, above, as well as the nature and extent of those interests for each person, provided that such recorded interests shall be limited to those which are recorded in the Prowers County Clerk and Recorder's Office, the land office of the Bureau of Land Management for this State, the Office of the State Board of Land Commissioners of the Department of Natural Resources, or the Secretary of State's Office of this State (attach additional sheets if necessary):

Property Owner and Owner of Recorded Legal Interests:

Arkansas River Farms, LLC
Aaron Patsch
1530 16th Street, Suite 300
Denver, CO 80202
aaronpatsch@rlholdings.com
(720) 723-2853

Arkansas River Farms is the owner of the farms described in paragraphs 3 and 4 above. ARF is a Colorado limited liability company whose address is 1530 16th Street, Suite 300, Denver, Colorado 80202. ARF has two members: Resource Land Holdings, LLC and New Arkansas River Farm, LLC. ARF has no affiliates. The evidence of authority is attached in Exhibit D.

ARF's applications and agreements will be signed by Aaron Patsch, but Karl Nyquist will be the ARF spokesman and negotiator along with Steve Sims, counsel for ARF.

Contact Information for Karl Nyquist

Karl Nyquist
7991 Shaffer Pkwy, Suite 200
Littleton, CO 80127
karl@cacompanies.com
(303) 389-6777

Future Owner of dry-up covenants on Subject Farms

Lower Arkansas Water Management Association
310 S. 6th Street
Lamar, CO 81052

ARF intends to convey the FLCC Shares formerly used for irrigation of the farms described in paragraphs 3 and 4 above and dry-up covenants for those farms to LAWMA before the end of 2019. LAWMA's applications and agreements will be signed by Bob Wilger. Don Higbee also will speak for LAWMA, along with Richard Mehren and Jennifer DiLalla, counsel for LAWMA.

Encumbrances

ARF has encumbered its interests on all affected properties and water rights shares through a security agreement with Rabo AgriFinance, a wholly owned subsidiary of Rabobank, a global, regulated financial institution that is rated Aa2 by Moody's, A+ by S&P Global, AA- by Fitch, and AA by DBRS. All encumbrances on the FLCC Shares will be released by ARF when the shares are conveyed to LAWMA.

6. Submission Requirements.

Submission requirements described in the Guidelines and Regulations for Areas and Activities of State Interest of Prowers County for each of the activities or areas checked in paragraph 1 above, are attached to this application. Those attachments are identified, by letter or number, and described by title below:

<u>Exhibit E Chapter 4 Submission Requirements</u>

7. Design and Performance Standards.

The attached analyses show that each of the design and performance standards set forth in the regulations for each of the activities or areas checked in paragraph 1 above, will be met. The individual analyses are identified by reference to the appropriate paragraph or section numbers corresponding to each standard in the Regulations.

<u>Exhibit F Chapter 4 Design and Performance Standards</u>

8. Additional Information Required.

Attach any additional information required by the Guidelines and Regulations.

<u>No further information is required by the Guidelines and Regulations.</u>

9. Duration of Permit.

The Applicants request a permit for a period an indefinite term.

10. Application Fee.

The required application fee shall be paid when set by the Permit Authority pursuant to Guidelines and Regulations for Areas and Activities of State Interest of Prowers County, 2.202 (3).

APPLICANT: Arkansas River Farms LLC

By: ______________________

Aaron M. Patsch, authorized representative
Resource Land Fund, IV, LLC, Managing Member

APPLICANT: Lower Arkansas Water Management Association

By: ______________________

Robert Wilger, Vice President

Note: Within ten (10) days following receipt of a completed application for a permit, the Permit Authority shall determine and set a fee in an amount necessary to cover the costs incurred in the review and approval of the permit application, including all hearings conducted therefor, and shall notify the applicant in writing of said fee and its amount. Not later than ten (10) days following receipt of such notice, the applicant shall present to the Permit Authority certified funds in the amount as set. Until the fee is paid to the Permit Authority, the application for a permit shall not be further processed.

10. Application Fee.

<u>The required application fee shall be paid when set by the Permit Authority pursuant to Guidelines and Regulations for Areas and Activities of State Interest of Prowers County, 2.202 (3).</u>

APPLICANT: Arkansas River Farms LLC

By: ________________________________

Aaron M. Patsch, authorized representative
Resource Land Fund, IV, LLC, Managing Member

APPLICANT: Lower Arkansas Water Management Association

By: Robert Wilger

Robert Wilger, Vice President

Note: Within ten (10) days following receipt of a completed application for a permit, the Permit Authority shall determine and set a fee in an amount necessary to cover the costs incurred in the review and approval of the permit application, including all hearings conducted therefor, and shall notify the applicant in writing of said fee and its amount. Not later than ten (10) days following receipt of such notice, the applicant shall present to the Permit Authority certified funds in the amount as set. Until the fee is paid to the Permit Authority, the application for a permit shall not be further processed.

BEFORE THE BOARD OF DIRECTORS
FORT LYON CANAL COMPANY

IN THE MATTER OF THE APPLICATION OF ARKANSAS RIVER FARMS, LLC AND THE LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

CHANGE OF WATER RIGHT BYLAW REVIEW

AMENDED DECISION OF THE BOARD OF DIRECTORS OF THE FORT LYON CANAL COMPANY

This matter comes before the Board of Directors ("Board") of the Fort Lyon Canal Company ("Company") upon the Application of Arkansas River Farms, LLC ("ARF"), a Colorado limited liability company and the Lower Arkansas Water Management Association ("LAWMA"), a Colorado nonprofit corporation, for consideration of ARF's request to change the place of use of certain shares of stock in the Fort Lyon Canal Company and to convey other shares to LAWMA in exchange for LAWMA common stock for use in replacing or augmenting stream depletions from structures in LAWMA's augmentation and replacement plans (the "Application"). ARF is the shareholder-applicant and LAWMA has an interest in the application as a "contract-applicant" under an agreement between ARF and LAWMA described below.

This Application is presented pursuant to the Company's Articles of Incorporation and Amendments Bylaws Rules and Regulations dated January 2003. Article IV Section 2 of the Bylaws provides:

> Relocation of water rights up or down the canal may be made, subject to approval by the Board of Directors, which approval may include terms and conditions to prevent injury.

Article V, Section 1 of the Bylaws provides in part:

> The Board of Directors shall approve the transfer of water to a tract of land which has not been historically irrigated only if the owner agrees to continue

> to comply with all of the Articles of Incorporation, Bylaws, Rules and Regulations of the Company now in effect, or as may hereafter be amended, and the owner obtain a final decree from a water court approving such transfer and containing in such decree a provision incorporating this bylaw.
>
> Each Stockholder desiring to change the type of use, place of use, time of use, point or means of diversion, storage or other change of said Stockholder's water shall make written request therefor to the Board of Directors. If in the opinion of the Board of Directors, such change may be made without injury to the canal, the Company, and other Stockholders, such request shall be granted, with such terms and conditions as may be necessary to prevent injury. However, all other Stockholders who are entitled to delivery of water at either the place from or to which delivery is changed shall be notified in writing of such request and shall have the right to participate in any meetings scheduled by the Board of Directors to consider such request. It is the current policy of the Board of Directors not to approve any transfer into or out of a shared headgate without the written consent of the other Stockholders using the headgate. In the event that the Board of Directors, in making any such determination as provided herein, shall require legal and/or engineering services, such expense shall be paid by the Stockholder making such request and the Board of Directors may require that all or part of the estimated cost thereof be paid to the Company prior to engaging such services by the Board of Directors. In such event the Board of Directors may, without penalty or liability, defer any such determination until such condition has been met. The determination by the Board of Directors shall be final, and shall not be subject to revision unless it is proven in a court of law having jurisdiction over water matters that such determination was arbitrary or capricious.

I. THE APPLICATION AND PROPOSED CHANGES

1. ARF Share Ownership.

ARF owns or controls 17,414.44 shares of Company stock. ARF acquired those shares of stock from Pure Cycle Corporation together with certain of the irrigated farms and dry-up covenants for non-acquired farms. Pure Cycle Corporation had acquired the shares and irrigated farm properties from High Plains A&M, LLC ("High Plains").

High Plains and other applicants (Wollert Enterprises, Inc., 136th and Colorado, LLC, and Magro LLC) had proposed a change of such shares that was reviewed by the Company's Board in November 2003 and resulted in a Decision of the Board dated December 8, 2003. That

Decision was ultimately submitted to the Water Court in Consolidated Cases No. 02CW183 and 03CW028 for review, but the applications in those cases were dismissed by the Water Court without decision on the appropriateness of the Board decision. Nevertheless, the proceedings for the High Plains application relate to the shares in the ARF application including, specifically, engineering analyses presented in the High Plains hearing regarding the Company's water rights and the shared laterals through which those water rights have been delivered, which remain relevant in this matter. Engineers for ARF, LAWMA, and the Company and others have relied upon engineering from the High Plains application in assessing the changes proposed by ARF.

The ARF share ownership equates to approximately 18% of the outstanding shares of Company Stock (17,414.44 / 93,989.4166). These shares are used to irrigate 12,754 acres. ARF Exhibit 25 Table 3. Two of these farms and farm tracts (150 shares) are in the Fort Lyon La Junta Division; 19 (3,039 shares) are in the Horse Creek Division; 30 (9,578.44 shares) are in the Las Animas Division; 14 (2,656 shares) are in the Limestone Division and 9 (1,990 shares) are in the Lamar Division. ARF also acquired one share from Pure Cycle Corporation that is not assigned to a specific farm.

2. Summary of Proposed Irrigation Transfers.

The Helton Report (ARF Exhibit 25) states that ARF will continue to use 9,839.44 shares for irrigation related purposes on farms under the Fort Lyon Canal, however ARF will make an inter-company transfer of some of its shares between its farms. ARF's plan identifies 7,636 shares for pivot irrigation, leaving a balance of 2,203.44 shares for use in Rule 10 Plans, flood irrigation, and future pivot development.

One purpose of the inter-company transfer is to modify ARF's irrigation systems on its Fort Lyon farms from flood irrigation to center pivots. ARF's modified irrigation system will utilize 15 center pivot systems and will irrigate approximately 4,772 acres with 7,636 shares. ARF will deliver the water to its farms by gravity into unlined forebays and then apply the water through the pivot systems. ARF Exhibit 25, Table 5 identifies the shares involved in the inter-company transfer to the ARF farms and pivot systems. The 7,636 shares associated with the changed ARF irrigation practices are referred to as the "ARF Pivot Shares."

In summary, the result of this portion of the ARF changes will result in the following assignments of shares to Company laterals and ARF farms for pivot systems:

Proposed pivot system no.	Farm No. or name	No. of shares	Current lateral(s)	Proposed lateral(s) for Pivot
1	5	147	59D	59B
	8b	100	60D or 64	59B
	9	140	59B	59B
	56	312	57F, 58 & 59A	59A
2	7	146	61	67 & 67D
	8a	83	60D & 64	67 & 67D
	31/47	230	65	67 & 67D
	32	120	69	67 & 67D
	46b	671	67, 66D & 68D	67 & 67D
	66	60	68	67 & 67D
3	11	90	75D	75D & 78
	12	96	78	75D & 78
4	24	210	82	82
	49	267	79, 80 & 81	82
5	20a	19	86	86
	46c	288	86	86
6	20b	553	90, 92 &92D	92
	46a	84	87	92
7	44	164	95	95

	52	238	95	95
8	35	376	95	95
	44	200	95	95
9	38	557	102 & 105D	105D
	67	144	108	108
10	6	8	108	105D
	38	502	102 & 105D	105D
11	22	143	101	101 & 105D
	34	196	101	101 & 105D
12	18	258	119	119
13	20b	224	90, 92 &92D	160
	39s	421	159 & 160	160
14	38	66	102 & 105D	187D
	C Tempel	144	187D	187D
15	6	135	108	225
	69	100	225	225
	D Lubbers W	144	225	187D
	Total	7,636		

The farm numbers and lateral designations are the same as those assigned by High Plains A&M, predecessor in interest to ARF, in the early 2000s and have been carried forward by ARF.

3. Summary of LAWMA Transfers.

ARF will transfer 7,509 Fort Lyon shares to LAWMA (the "LAWMA Trade Shares") in exchange for LAWMA shares ARF will use to replace or augment its stream depletions within LAWMA's augmentation and replacement plans. ARF and LAWMA are parties to an Amended and Restated Water Rights Exchange and Reimbursement Agreement dated April 29, 2016 (LAWMA Exhibit 48) addressing the transfer of the LAWMA Trade Shares by ARF (the "ARF-LAWMA Agreement"). The ARF-LAWMA Agreement also addresses conditions to be met by ARF in the revegetation or dry land farming of the farms associated with the LAWMA Trade Shares.

ARF is proposing that the 6,478 acres historically irrigated with the LAWMA Trade Shares will be permanently removed from irrigation and those lands will be either revegetated or dry land farmed ("LAWMA Dry-Up"). The LAWMA Dry-Up is listed in ARF Exhibit 30 and shown in ARF Exhibits 38 – 41. In addition to the LAWMA Trade Shares, ARF will also dedicate a total of 65 shares to the nine shared laterals from which shares are being removed. (ARF Exhibit 30.) The LAWMA Trade Shares will be delivered to several augmentation stations and recharge facilities. (ARF Exhibit 34.)

4. Unchanged Shares.

After the transfer of 7,636 ARF Pivot shares to the center pivot irrigation systems and transfer of the LAWMA Trade Shares to LAWMA for use in LAWMA's augmentation and replacement plans, and dedication of 65 shares to the shared laterals, ARF will retain 2,203.44 unchanged shares. These shares will continue to be used for irrigation on the current property or may in the future be included in subsequent request(s) for conversion to pivot irrigation or use in Rule 10 plans. These shares are identified as follows by reference to Company laterals and ARF Farms:

Farm No.	Shares for flood irrigation and other purposes	Current lateral(s)	Proposed lateral(s) for flood irrigation and other purposes
7	54	61	61
8a	17	60D & 64	60D & 64
11	48	75D	75D
12	48	78	78
18	56.2	119	119
20a	125	86	86
20b	242.52	90, 92 &92D	90 & 92D
22	80.2	101	101

Farm No.	Shares for flood irrigation and other purposes	Current lateral(s)	Proposed lateral(s) for flood irrigation and other purposes
26	112	66A	67 & 67D
31/47	58	65	65
34	218	101	101
38	171	102 & 105D	102 & 105D
44	8.08	95	95
46a	60	87	87
46b	130.04	67, 66D & 68D	67, 66D & 68D
49	197.4	79, 80 & 81	79 & 81
56	60	57F, 58 & 59A	57F, 58 & 59A
70	60	145D	145D
107A	288	237	237
117	62	37A	37A
140	108	52	52
Total	2,203.44		

5. Proposed Operation of Changes.

ARF and LAWMA will receive water delivered through the Fort Lyon Canal consistent with the Company's current and future delivery and rotation procedures for Company stockholders making direct use of Company water. Water stored in Company facilities will continue to be stored in existing facilities and consistent with the Winter Water Storage Program as determined by the Company. ARF and LAWMA will receive their pro rata portions of water supply under existing and future Company operating and management practices, consistent with other stockholders. The application does not propose the transfer of water to irrigate any tracts of land that have not been historically irrigated under the Company's system.

6. LAWMA Water Court Application.

LAWMA will file an application with the Division 2, Colorado Water Court to change the LAWMA Trade Shares to add augmentation and replacement as uses for these shares. Subject to satisfying the Conditions of Approval and Implementation of Decision requirements in sections V and VI, below, beginning in the 2017 irrigation season, the LAWMA Trade Shares will be available for use by LAWMA's shareholders for augmentation and replacement purposes under LAWMA's Rule 14 Plan, Rule 10 Plan, substitute water supply plans, or court-approved augmentation plans. The augmentation plan will also include several of ARF's wells. Except for Winter Water and water derived from the Fort Lyon Article III Storage account in John Martin Reservoir, the LAWMA Trade Shares may also be used to augment wells for non-agricultural purposes. Water diverted for such purposes will continue to be delivered through the Fort Lyon Canal and returned to the Arkansas River through augmentation stations or recharge facilities. (ARF Exhibit 34 and 35.) ARF may arrange for use of certain of the LAWMA Trade Shares to revegetate historically irrigated lands in exchange for a reduction in LAWMA's allocation of water to ARF's LAWMA shares.

ARF does not intend to submit its transfers of ARF shares to pivot systems within the Company's system to the Water Court.

II. PROCEDURAL HISTORY

ARF and LAWMA presented their Application to the Company in December of 2015. A hearing was scheduled for January 29, 2016. This hearing was postponed after certain shareholders requested additional time to review information from the Applicants as well as to address a perceived conflict of interest. Thereafter, a two-day hearing was held July 11 through

12, 2016 at Saint Mary's Hall in Las Animas, Colorado, moderated by H. Barton Mendenhall, licensed Colorado attorney retained by the Board, and before a certified court reporter, Karen Hathcock of Medina Court Reporting. All Company shareholders were provided notice of the hearing and access to the Application materials and responses and materials provided by other shareholders and the Company. All shareholders were provided an opportunity to address the Company during the hearing.

The following individuals presented to the Company at the hearing:

1. ARF presented its position through counsel, Steve Sims and Dulcinea Hanuschak of Brownstein Hyatt Farber Schreck, and several witnesses associated with the Company. In addition to counsel, those individuals included the following:
   A. Duane D. Helton, Consulting Engineer
   B. Brad Walker of AgSkill, Inc.
   C. Bill Grasmick, ARF employee
2. LAWMA presented its position through counsel, Richard Mehren of Moses, Wittemyer, Harrison and Woodruff, P.C. and in addition through Randy Hendrix of Hendrix Wai Engineering, Inc. formerly Slattery & Hendrix Engineering, LLC).
3. The Company presented its information through the following individuals:
   A. Amy Van Horn, FLCC Water Master
   B. William Tyner, Assistant Division Engineer, Colorado Water Division No. 2
   C. Karen Conrad, NRCS (retired)
   D. Michelle Nelson of AgriTech Consulting
   E. Bruce Kroeker, P.E. of TZA Water Engineers

F. John Faux, P.E. of TZA Water Engineers

4. Colorado Beef presented its positions though statements of counsel, William Caile of Holland & Hart, LLP and through Mary Presecan of Leonard Rice Engineers.

5. The Reeds and BLSH presented their position through Jason Brothers of Deere & Ault Consultants, Inc.

6. Curtis Tempel spoke on behalf of the Wiley Drainage District.

7. In addition, several shareholders asked questions of the various witnesses and/or made statements to the Board, including: Anita Pointon, Don McBee, Kim Siefkas, Joe Kasza, Mike Nicklos, and Ryan Hemphill.

Following the hearing, the Board received additional clarification that it had requested from ARF during the hearing regarding the headgate and farm locations of the Unchanged Shares. The Board then consulted on specific issues and questions with Bruce Kroeker and Michelle Nelson and also deliberated with legal counsel during several telephone meetings concerning the issues and evidence presented.

The Board issued its Decision on this matter on September 14, 2016. ARF and LAWMA requested revisions to the Decision, indicating that certain terms were unclear, were inconsistent with its proposed operations and the prospective obligations between ARF and LAWMA, and were legally objectionable. Pursuant to the Parties' Settlement Agreement dated December 14, 2016, in order to compromise and resolve those requests and objections and resolve concerns about compliance with the terms of Article V section 1 of the Bylaws, ARF and LAWMA filed a Complaint in the Water Court and obtained approval of the Amended Decision by Order entered December ___, 2016, Case No. 16CW___, District Court for Colorado Water Division No. 2.

III. Evidence Presented and Issues Considered

In addition to the evidence referenced and summarized in Section I above regarding the nature of the changes proposed by ARF, documents and testimony were received by the Board on several specific issues, as summarized below.

1. Transfers of ARF Pivot Shares.

ARF plans to continue irrigating some of its Fort Lyon farms with center pivots. ARF Exhibit 25, Table 5, summarizes the proposed locations for the 7,636 shares to be used in pivots. This consolidation of shares entails changes in the locations of delivery from the canal. FLCC Exhibit 25 provides a summary of the distances these shares are proposed to be moved up-ditch and down-ditch. It also indicates where the changed delivery location results in delivery to a different Division.

The delivery locations for the majority of the ARF Pivot Shares will not change or will change only slightly. However, the delivery locations for shares from three farms are proposed to be moved considerable distances down-ditch. A block of 224 shares is proposed to be moved from Farm 20b approximately 29 miles down-ditch to Farm 39s, resulting in deliveries that would be moved from the Las Animas Division to the Limestone Division. A block of 66 shares is proposed to be moved from Farm 38 approximately 35 miles down-ditch to the C. Tempel Farm, resulting in deliveries that would be moved from the Las Animas Division to the Lamar Division. A block of 135 shares is proposed to be moved from Farm 6 approximately 64 miles down-ditch to the Farm 69 and the D. Lubbers Farm, resulting in deliveries that would be moved from the Las Animas Division to the Lamar Division.

2. Historical Use of LAWMA Trade Shares.

Slattery & Hendrix Engineering LLC analyzed the historical use of the LAWMA Trade Shares. That analysis estimated the historical consumptive use of the LAWMA Trade Shares on each farm using components of the Hydrologic-Institutional (H-I) Model and engineering used in a previous change of Company shares by Colorado Beef in Case No. 08CW83, District Court, Water Division 2. (LAWMA Exhibits 1 through 41.)

LAWMA used a study period for developing volumetric limits from 1950 to the last year when the LAWMA Trade Shares were used for irrigation. This represents the period of record after construction of John Martin Reservoir and adoption of the Arkansas River Compact. The study period for developing return flow replacement obligations is 1979 to the last year when the LAWMA Trade Shares were used for irrigation. This represents the period of record after implementation of the Winter Water Storage Program.

LAWMA used records of diversions and reservoir deliveries compiled by the Division 2 Engineer's Office as part of the dataset used within the H-I Model with corrections based upon the FLCC annual reports in its historical use analysis. A summary of diversions and reservoir releases are summarized in Tables 9A – 9C of ARF Exhibit 25 and Tables 5 – 10 of LAWMA Exhibit 1. Canal losses, off-farm lateral losses, on-farm lateral losses, maximum irrigation efficiencies, crop irrigation requirements, and secondary evapotranspiration (SEV) values and other input parameters for the historical use analysis will be consistent with the parameters from the H-I Model and/or the engineering for the Colorado Beef case. The H-I Model parameters are shown on FLCC Exhibit 29.

Both Mr. Kroeker and Mr. Tyner testified that the Division Engineer's records used by Mr. Helton and Mr. Hendrix included records of diversions of water by the Fort Lyon Canal on behalf of the Amity Mutual Irrigation Company for delivery to the Kicking Bird Canal for delivery to Amity's Great Plains Reservoirs. These diversions for the Kicking Bird Canal need to be subtracted out. Mr. Tyner testified that he would modify the records of diversions to resolve this issue. Mr. Kroeker recommended that the LAWMA Water Court application for change of the LAWMA Trade Shares should use the corrected records of diversions that exclude diversions for delivery to the Kicking Bird Canal. The Board understands and acknowledges that use of corrected records of diversions that exclude diversions for delivery to the Kicking Bird Canal will result in changes to the Slattery & Hendrix Engineering LLC analysis of the historical use of the LAWMA Trade Shares.

The Board has considered the methodologies and parameters used in determining the historical use of the LAWMA Trade Shares and determined that the study periods used are representative of the historical use of the LAWMA Trade Shares and that use of the H-I Model parameters is appropriate for use in calculating the historical consumptive use of the LAWMA Trade Shares.

3. Replacement of LAWMA Trade Shares Return Flows.

LAWMA is required as part of the application to be filed with the Division 2 Water Court to demonstrate that the removal of farms from irrigation will not impair historical return flows to the Arkansas River. Historical return flows must be replaced in time, location and amount as needed to prevent injury. Failure to account for historical return flows could result in increased calls on the Company's water rights. ARF and LAWMA are proposing to replace historical return flows by delivery of the LAWMA Trade Shares through augmentation stations or recharge facilities. (ARF Exhibits 34 and 35).

ARF prepared a reach-by-reach comparison of projected LAWMA returns to the river attributable to the LAWMA Trade Shares versus historical return flows. (ARF Exhibit 36). This analysis is based on average monthly diversions and deliveries into the Fort Lyon Canal during water years 1979-2014.

This analysis shows negative credits in some winter months (November – March) but when all five winter months are summed, the result is positive credits in each river reach during the winter period. However, this result may be optimistic for two reasons. First, the analysis is based on average year diversions and deliveries and projects deliveries to shareholders in all twelve months. The records show that winter deliveries are not common; thus the projection of future returns under the plan may be overstated for winter periods in some years. This issue is likely to be the subject of analysis in the Water Court's determination of the application to change the LAWMA Trade Shares and the Board takes no position on this issue.

Second, the comparison shown in Tables 10A – 10E assumes SEV will not need to be replaced, thereby reducing the historical return flow replacement obligations. It is not detailed in the Helton Report exactly how much the historical return flows were reduced for SEV. Based on the individual farm water budget summaries shown on Tables 17 – 55 of the Hendrix Report, the SEV reduction applied to off-farm lateral loss, on-farm lateral loss, and tail water totals 358 acre-feet per year on average. In other words, the historical farm return flow replacement requirement in Tables 10A – 10E may be underestimated by 358 acre-feet overall. There was testimony that SEV is a component of the H-I Model and, thus, is a legal component of water use and consumption to be factored into the determination of required return flows. There was discussion by some witnesses as to whether the inclusion of an SEV factor in determining historical return flows and future return flow obligations is legally appropriate. The Board concludes that the legality of the use of an SEV component will be a subject of the Water Court application for the change of the LAWMA Trade Shares and the Board takes no position on this issue.

4. Transfers of LAWMA Trade Shares.

The LAWMA Trade Shares are proposed to be consolidated for delivery at 13 laterals and the Horse Creek Augmentation Station to be returned to the Arkansas River via either augmentation stations or recharge facilities. The water to be delivered at the proposed locations will include both the historical consumptive use and the return flow replacement obligations attributable to the LAWMA Trade Shares. ARF Exhibit 35 summarizes the locations where the LAWMA Trade Shares are proposed to be delivered in the future for return to the river. This consolidation of shares entails changes in the locations of delivery from the canal to laterals. Moving the point of delivery from the canal can have impacts on seepage loss and/or impacts on flow control. Moving the point of delivery down-ditch can increase seepage loss as the water is carried a greater distance. Conversely, moving the point of delivery up-ditch could result in less seepage loss. However, that savings may be negated if the canal is checked up to the same elevation regardless of the flow rate. Moving the point of delivery down-ditch can result in canal capacity problems, depending on the situation. Alternatively, moving the point of delivery up-ditch can result in lower velocities in the intervening reach. There was no evidence presented that any of the transfers of water involved in the application would cause operational issues for the company. Therefore, the Board does not impose any terms or conditions in this Decision on the requested and approved points of delivery either in an up-ditch or down-ditch direction.

FLCC Exhibit 24 summarizes the changes in delivery locations proposed for the LAWMA Trade Shares. Some of the blocks of shares are proposed to be moved a large distance, more often than not, in the up-ditch direction. 346 shares are proposed to be moved from Farms 22 and 23 in the Las Animas Division approximately 19 miles up-ditch to the Horse Creek Augmentation Station, in the Horse Creek Division. A block of 144 shares is proposed to be moved from Farm 37 approximately 19 miles up-ditch to the Farm 132/133 Augmentation Station, resulting in deliveries that would be moved from the Limestone Division to the Las Animas Division.

Water delivered from two of the augmentation stations will be conveyed to the Arkansas River through the McClave Drain and the Riverview Drain. Water delivered to one of the recharge sites will accrue to the Wiley Drain. Deliveries through the Wheatridge Lateral augmentation station will need to cross the Amity Canal. The Board considered presentations from Jason Brothers on behalf of the Reeds and BLSH who urged the Board to adopt terms and conditions concerning use of the drains. The Board also heard from Mary Presecan for Colorado Beef concerning use of the Riverview Drain. The Board further heard from Bruce Kroeker about use of the Amity Canal. The Board heard opposing statements from Duane Helton and from Bill Tyner that characterized the drains as natural streams that could be used by any water user. Mr. Helton also suggested that ARF would obtain an agreement with Colorado Beef to use the Riverview Drain, but that it should not need an agreement with the Amity Canal to use the structure by-passing the Amity Canal. The Board takes no position on the legal issues concerning the use of drains and crossing of the Amity Canal. However if the water court determines that Applicants need to obtain agreements to use these drains, laterals or the Amity Canal, the Board requires ARF to obtain any agreement required by the water court.

5. Effects of Transfers on FLCC Divisions' Share Allocations.

The changes in share distribution between FLCC Divisions due to ARF's proposed changes in delivery locations for LAWMA Trade Shares and for ARF Pivot irrigation shares is shown in the table below.

Division	Current Shares	ARF Proposal	Change
La Junta	2,151.20	2,002.20	-149.00
Horse Creek	13,289.28	13,784.28	495.00
Las Animas	21,634.53	21,006.53	-628.00
Limestone	25,772.80	26,066.80	294.00
Lamar	31,141.60	31,129.60	-12.00
Total	93,989.41	93,989.41	0.00

There was no evidence presented that any of the transfers of water involved in the application would cause operational issues for the Company, except for the needed recognition of ARF's participation in the Horse Creek Augmentation Station, which is discussed below.

6. Effects on Use of Shared Laterals

ARF is removing the LAWMA Trade Shares from ten shared laterals. ARF Exhibit 30 and FLCC Exhibit 26. The ARF Pivot irrigation shares are only being removed from laterals in which ARF is the only user. Moving shares out of laterals leaves fewer shares to bear the same seepage loss. Where ARF proposes to move shares out of laterals shared with non-ARF shareholders, ARF has proposed to leave shares in the lateral commensurate with their pro-rata historical lateral loss.

The historical lateral loss (and thus the number of shares to be left in these laterals) was determined by Mr. Helton using the results of the calculations made previously by Helton & Williamsen for the High Plains A&M et. al. Bylaw Hearing, or were calculated using the same methodology. The lateral loss was calculated based on the lateral dimensions, the texture of the soils and the amount of water delivered through the lateral. Mr. Helton used the Moritz Equation for the calculations.

The Company's engineers, TZA Water Engineers, has reviewed the procedures used by Mr. Helton and compared this methodology to the Worstell Method, an alternative methodology used for ditch loss calculations. They concluded that the methodology used by Mr. Helton provides a conservatively high estimate of lateral seepage and is appropriate for use.

ARF proposes to leave a total of 65 shares in shared laterals to compensate for lateral loss. ARF Exhibit 30. The Board therefore concludes that dedication of these shares to the shared laterals is an appropriate condition to protect those shareholders from bearing additional water loss as a result of the removal of the LAWMA Trade Shares from the shared laterals. ARF Exhibit 30 shows the relationship of shared laterals and ARF share assignments for lateral losses. ARF represented at the hearing that it would not seek to remove those shares from the shared laterals until ARF is the only remaining shareholder using the lateral.

The number of ARF shares to be delivered to these laterals for compensation for removal of ARF shares therefrom, and their relationship to specific laterals, are as follows:

Current Shared Lateral	Shares to be left in Shared Lateral
17	1
57	1
101	7
112	34
122	4
147	1
150	5
159	9
193D	3
Total	65

(ARF Exhibit 30.)

At the hearing, ARF discussed its efforts to obtain consent agreements from users of the shared laterals and the fact that discussions had been ongoing. In some cases, agreements had been rejected or in some instances agreements may be pending. The Board policy identified above is to the effect that the Board will not approve transfers affecting shared laterals without the unanimous consent of users of the lateral. At the same time, there was no evidence presented by users of the shared laterals or others as to injury from ARF's removal of water from shared laterals pursuant to the application and the continued delivery of shares for lateral losses as discussed above, or from the introduction of additional water into laterals. In the absence of any rationale presented to show that there would be injury from ARF's proposal regarding shared laterals, the Board will not apply a policy requiring unanimous consents from users of shared laterals as a condition of approval of the application.

7. Non-Shared Laterals.

An issue was raised by a shareholder that an ARF-only lateral is proposed to be removed from service in a transfer of all of the ARF shares delivered in that lateral to the other intended uses under the application. The result would be that an unused lateral and associated easement would continue to burden the landowner's property unless the lateral is legally abandoned by ARF. This issue does not relate to the Company's ability to deliver water to shareholders after the ARF change or to other shareholders' ability to receive water delivery through a shared lateral. Rather, it presents a troublesome property issue associated with the existence of either a deeded or prescriptive easement for a lateral ditch on lands that are not serviced from that lateral. The Board concludes that it does not have jurisdiction under the Bylaws referenced above to address this property situation because it does not affect a water supply related injury to the Company or its shareholders. ARF representatives indicated in response to this concern that they intended to abandon laterals when conditions for their change have been achieved and there is no remaining need for future use of that lateral.

8. Revegetation of Historically Irrigated Lands.

ARF will permanently retire 6,478 acres historically irrigated by 7,574 shares. (ARF Exhibits 30, and 38 - 41.) Of these, 7,509 shares constitute the LAWMA Trade Shares and 65 shares will be left in shared laterals as discussed above. The irrigated acreage of these farms and farm tracts in 1985 as indicated in the Division 2 GIS files totals 6,478 acres. ARF is proposing that these lands to be removed from irrigation will either be dry-land farmed or revegetated.

ARF presented testimony from Brad Walker and Bill Grasmick on the viability of revegetation and dry-land farming of historically irrigated lands. The Board also received testimony from Michelle Nelson and Karen Conrad concerning such matters. The Board determines that in order to have an acceptable probability of success, ARF must conduct its dry-land farming on the LAWMA Dry-Up in adherence with the principles set forth in Exhibit A.

The Board further determines that any LAWMA Dry-Up lands that are dry-land farmed must also comply with the Colorado Weed Management Act, Article 5.5 of Title 35, C.R.S. all other state and local laws concerning control of noxious weeds and control of soil erosion caused by wind dust and may not grow alfalfa or other highly water consumptive species.

For LAWMA Dry-Up lands that are revegetated instead of being dry-land farmed, Mr. Grasmick and Ms. Nelson stated that the cost to revegetate would be between $200 and $300 per acre. Thus the total cost would therefore be between $1,295,600 and $1,943,400, presuming initial efforts are successful. To provide financial surety for that obligation, the Board determines that ARF should, obtain a form of financial security that the Company may rely upon if it chooses to take over the obligation to successfully revegetate or convert to dry-land farming, the LAWMA Dry-Up removed from irrigation. The form of financial security shall be in an amount sufficient to provide $250 per acre of land revegetated.

ARF stated its intent to reserve 500 of its 2,203.44 unchanged Fort Lyon shares to be used to aide in revegetation of the 6,478 acres of the LAWMA Dry-Up. ARF indicated, through Mr. Grasmick, that those 500 shares have a market value of approximately $1,700,000 and ARF suggested that value should minimize the security requirement for its revegetation obligations. But ARF also does not intend a permanent commitment of those shares and would only use them for revegetation for a few years, if at all. Thus, the "market" value of shares for sale is not a guiding consideration in assessing a security requirement. Nevertheless, the Board recognizes value in the reservation of those shares for revegetation use and it reduced the bond amount from $300/acre to $250/acre to reflect the reasonable value of the reserved water.

ARF will give new dry-up covenants to LAWMA or assign existing dry-up covenants to LAWMA for the lands to be removed from irrigation, and those dry-up covenants will be recorded in the county in which the respective farm is located. The owner of any LAWMA Dry-Up may continue to irrigate portions of the LAWMA Dry-Up with ground water pumped by wells as long as any such irrigation with ground water is treated as sole-source pumping and is fully augmented under LAWMA's augmentation plan or other augmentation plan approved by the Water Court for Water Division No. 2, or any substitute water supply plan or replacement plan approved by the Colorado State Engineer. In addition, the owner of any LAWMA Dry-Up may irrigate portions of the LAWMA Dry-Up with FLCC shares not part of this application and not previously used on the LAWMA Dry-Up proposed to be irrigated ("New FLCC shares"); provided, however, that the dry-up covenant for any LAWMA Dry-Up prohibits the owner from performing such irrigation in a way that reduces the consumptive use credit attributable to the LAWMA Trade Shares under the terms and conditions of the Administrative Proceedings and any decree entered in the Water Court Change Case. If any dry-up covenant for the LAWMA Dry-Up is more restrictive on the owner of the LAWMA Dry-Up or more protective of LAWMA than this Decision, then the terms and conditions of the dry-up covenant shall control.

ARF will ensure that the land removed from irrigation complies with all terms and conditions included in the *Kansas v. Colorado* Operating Procedures for Administration of Parcels Claimed for Augmentation Credit. These include the requirement for a physical separation between any irrigated portion of a parcel and the dry-up portion unless the Division Engineer gives prior approval, that parcels formerly containing alfalfa or alfalfa-grass stands must be deep tilled or chemically killed, and that dry-up parcels must be monumented in accordance with specific standards.

The Board finds that revegetation can affect shareholders who continue to farm and irrigate fields adjacent to, or in the vicinity of lands to be removed from irrigation. Without appropriate conditions and active implementation of revegetation, the dry-up of historically irrigated lands can spread weeds, result in blowing dirt, wind erosion and other consequences to adjoining farmers. Therefore, the Board determines that reasonable terms and conditions shall be included in any water court decree changing the LAWMA Trade Shares no less restrictive than those included in Exhibits A and B. The Board considers these terms and conditions as satisfactory to comply with the requirements of section 37-92-305(4.5) C.R.S. and the Board will not seek more restrictive terms in the decree from the District Court for Water Division 2, authorizing the change of the LAWMA Trade Shares ("LAWMA Change Case"). These terms and conditions also are consistent with the terms and conditions imposed by the Board in the High Plains A&M et al. Bylaw Hearing and in the JBS Five Rivers Cattle Feeding LLC d/b/a Colorado Beef Bylaw Hearing, and the Board determines that they are reasonable.

IV. APPROVAL OF APPLICATION

The Application to transfer shares of Company stock to the ARF Center pivot systems and to LAWMA for its uses, and as presented to the Board and described herein, is approved.

1. Unless it is expressly specified to the contrary in this Decision, ARF's obligations and LAWMA's obligations under this Decision and Approval are separate and distinct, such that ARF is not responsible for meeting LAWMA's obligations and LAWMA is not responsible for meeting ARF's obligations hereunder. ARF and LAWMA have

assigned responsibilities between them as stated in the ARF-LAWMA Agreement and the Board does not intend to change, vary, modify or be bound by any of the assigned responsibilities of the ARF-LAWMA Agreement. Where this Decision recognizes a joint obligation for ARF and LAWMA not recognized in the ARF-LAWMA Agreement, the Board agrees that it will first seek to enforce the obligation against ARF and the Board will not seek to enforce the obligation against LAWMA unless and until ARF defaults in its obligation.

2. Of ARF's 17,414.44 shares, 7,636 shares will be delivered to ARF's 15 proposed pivot irrigation systems in the following amounts and at the following laterals:

Pivot system no.	Farm No. or name	No. of shares	Current lateral(s)	Lateral(s) for Pivot
1	5	147	59D	59B
	8b	100	60D or 64	59B
	9	140	59B	59B
	56	312	57F, 58 & 59A	59A
2	7	146	61	67 & 67D
	8a	83	60D & 64	67 & 67D
	31/47	230	65	67 & 67D
	32	120	69	67 & 67D
	46b	671	67, 66D & 68D	67 & 67D
	66	60	68	67 & 67D
3	11	90	75D	75D & 78
	12	96	78	75D & 78
4	24	210	82	82
	49	267	79, 80 & 81	82
5	20a	19	86	86
	46c	288	86	86
6	20b	553	90, 92 &92D	92
	46a	84	87	92
7	44	164	95	95
	52	238	95	95

Pivot system no.	**Farm No. or name**	**No. of shares**	**Current lateral(s)**	**Lateral(s) for Pivot**
8	35	376	95	95
	44	200	95	95
9	38	557	102 & 105D	105D
	67	144	108	108
10	6	8	108	105D
	38	502	102 & 105D	105D
11	22	143	101	101 & 105D
	34	196	101	101 & 105D
12	18	258	119	119
13	20b	224	90, 92 &92D	160
	39s	421	159 & 160	160
14	38	66	102 & 105D	187D
	C Tempel	144	187D	187D
15	6	135	108	225
	69	100	225	225
	D Lubbers W	144	225	187D
	Total	7,636		

3. ARF will transfer the 7,509 shares associated with irrigation of the farms described below to LAWMA. The 6,478 acres historically irrigated with the LAWMA Trade Shares will be permanently removed from irrigation and the historically irrigated farms will be revegetated or dry-land farmed. On or before March 1 of each year, ARF shall notify the Board of the LAWMA Dry-Up that will be removed from irrigation, and of those parcels removed from irrigation, which parcels will be revegetated and which will be dry-land farmed and the number of the LAWMA Trade Shares to be used in replacing or augmenting stream depletions from LAWMA's augmentation and replacement plans. Because the removal of the LAWMA Dry-Up from irrigation is permanent, the obligation to notify the Board under this term and

condition is limited to a one-time notice for each parcel unless the owner of the parcel irrigates the parcel using New FLCC shares or changes the use of the parcel from revegetation to dry-land farming or changes the use from dry-land farming to revegetation. However, in the event that ARF determines that its efforts to dry-land farm the LAWMA Dry-Up lands are not successful, it will give a second notice when it converts those lands from dry-land farming to revegetation.

Farm No.	**Location**	**FLCC Shares**	**Current FLCC gate(s) & lateral(s)**	**1985 irrigated acreage**	**Net shares to ARF & LAWMA use**
3	SE4 30-23-54	83	17	75	82
40	29 & 30-23-54	67	17E	61	67
60	11 & 14-23-54	133	27	99	133
57	SW4 6-23-53	83	34	61	83
61	23 & 26-22-53	111	57		110
61	23 & 26-22-53	144.5	57B		144.5
61	23 & 26-22-53	144.5	57D	179	144.5
13	29-22-52	188	74 & 75	101	188
23	31-22-51	245	100	144	245
22*	31-22-51	108	101	73	101
59	28-22-51	144	112	63	144
21	SE4 20-22-51	196	112	56	162
19	E2 17-22-51	288	114D & 115	155	288
33	27 & 34-22-51	108	122	61	104
36	SW4 14-22-51	212	125	134	212
2	SE4 23-22-51	144	126	100	144
1	25 & 26-22-51	204	126	140	204
27	26 & 35-22-51	660	126	306	660
14	19-22-49	75	148	94	75
132/133	36-22-50	265	145	182	265
15	31-22-49	219	145	268	219
41	SE4 24-22-50	80	147	115	79
58	18-22-49	121	150	144	116
37	E2 10-22-48	144	177	142	144
54s	SE4 19-22-49	80	148	156	80
14	19-22-49	43	148	54	43

Farm No.	Location	FLCC Shares	Current FLCC gate(s) & lateral(s)	1985 irrigated acreage	Net shares to ARF & LAWMA use
39n	W2 12-22-49	200	159	228	191
127	SW4 19-22-48	72	162	71	72
65	SE4 25-22-49	144	162	155	144
42	28-22-48	166	166	82	166
64	32 & 33-22-48	224	166	160	224
B Coen	26 & 27-22-48	144	181	162	144
53	27 & 34-22-48	170	181	140	170
25	11-22-48	322	182 & 182D	453	322
30n	NW4 1-22-48	88	187&188	134	88
85	SE4 26-21-48	144	193D	149	141
110	11-21-48	152	201E	213	152
114	11-21-48	144	201E	229	144
63a	33-21-47	213	223D	269	213
63b	10-22-47	144	230	218	144
63c	3-22-47	122	230G	123	122
63b	10-22-47	144	230G	147	144
141	NW4 17-22-46	224	259	219	224
118	16-22-46	230	259	173	230
62 & 62a	S2 17-22-46	237	259	190	237
Total		7,574		6,478	7,509

4. ARF will dedicate 65 shares to nine shared laterals from which shares are being removed as follows:

Current Shared Lateral	Shares to be left in Shared Lateral
17	1
57	1
101	7
112	34
122	4
147	1
150	5
159	9

193D	3
Total	65

5. ARF's remaining 2,203.44 shares will remain unchanged and will continue to be used for irrigation on the current properties or may in the future be included in subsequent request(s) for conversion to pivot irrigation or use in Rule 10 plans. Up to 500 of these shares may be used to revegetate those lands permanently removed from irrigation. On or before March 1 of each year, ARF shall notify the Board where these shares will be used. These shares are identified as follows:

Farm No.	**Shares for flood irrigation and other purposes**	**Current lateral(s)**	**Proposed lateral(s) for flood irrigation and other purposes**
7	54	61	61
8a	17	60D & 64	60D & 64
11	48	75D	75D
12	48	78	78
18	56.2	119	119
20a	125	86	86
20b	242.52	90, 92 &92D	90 & 92D
22	80.2	101	101
26	112	66A	67 & 67D
31/47	58	65	65
34	218	101	101
38	171	102 & 105D	102 & 105D
44	8.08	95	95
46a	60	87	87
46b	130.04	67, 66D & 68D	67, 66D & 68D
49	197.4	79, 80 & 81	79 & 81
56	60	57F, 58 & 59A	57F, 58 & 59A
70	60	145D	145D
107A	288	237	237
117	62	37A	37A
140	108	52	52

Farm No.	Shares for flood irrigation and other purposes	Current lateral(s)	Proposed lateral(s) for flood irrigation and other purposes
Total	2,203.44		

V. CONDITIONS OF APPROVAL

Subject to Section VI.2 below, the Company will deliver Company water to ARF and LAWMA pursuant to the changes approved in this Decision, provided the following terms and conditions are implemented.

1. ARF shall pay the Company's costs incurred in processing and reviewing the Application, including legal and engineering fees, board of director fees, and costs of the hearing including court reporter incurred from the date the request was first presented to the Company on December 8, 2015. As of the date of this Decision, ARF has reimbursed such costs incurred through September 2016.
2. ARF, as a stockholder, and LAWMA, upon acquiring ownership of the LAWMA Trade Shares, shall be subject to and continue to comply with all of the Company's Articles of Incorporation, Bylaws, Rules and Regulations of the Company now in effect, or as may be hereafter amended.
3. The following obligations will apply to shared laterals.
   A. ARF shall provide the Company with copies of any Consents for Relocation of FLCC Shares received from the other stockholders on shared headgates. Those Consents and any agreements between ARF and stockholders on shared headgates shall not be changed, modified or varied by any provision of this Decision.

B. ARF shall notify the Company in advance of the dates on which it or LAWMA first will remove water from or add water into a shared lateral.

C. If any Company stockholder that did not sign a Consent for Relocation of FLCC Shares and that receives water from a shared lateral that ARF and/or LAWMA has either removed water from or added water into contends that their delivery of water has been adversely affected by ARF's or LAWMA's operations, that stockholder may file a complaint with the Company. Any such complaint shall identify the reasons for the concern as specifically as possible. Any complaint shall be filed with the Company within three years after (i) ARF has given the Company notice under subsection V.3.B above, and (ii) ARF or LAWMA removed water from or added water into the subject shared lateral for three irrigation seasons (which are periods of March 15 through November 14 for purposes of this process). The Board will collect such evidence as it deems necessary. The standard for the Board to apply on any decision concerning a stockholder complaint regarding a shared lateral, is whether the number of shares ARF left in the shared lateral is the primary cause for any reduction in the amount of water the stockholder has received on its shares compared to the amount of water the stockholder received for its shares prior to ARF removing its shares from the shared lateral. If, applying this standard, the Board determines that the stockholder has received less water than it did prior to ARF removing its shares from the shared lateral, it will impose upon ARF conditions it deems necessary to prevent such injury, including but not limited to requiring ARF to provide additional shares to the shared lateral.

D. If, pursuant to a complaint filed with the Company in accordance with section V.3.C above, the Board determines that the capacity of a shared lateral must be enlarged to prevent injury, ARF will be responsible to obtain the consent of the other users of such shared lateral as well as from the owner(s) of land upon which the shared lateral crosses. If the other users of such shared lateral or the owner(s) of land upon which the shared lateral crosses, unreasonably withhold their consent, the Board may waive this consent provision.

E. If, pursuant to a complaint filed with the Company in accordance with Section V.3.C above, the Board determines that the capacity of a headgate must be enlarged to prevent injury. ARF will be responsible to obtain the consent of the owner(s) of the headgate. If the owner(s) of the headgate unreasonably withhold their consent, the Board may waive this consent provision.

F. Subject to the terms of the Consents for Relocation of FLCC Shares and agreements with stockholders for use of the shared laterals from which ARF Pivot Shares or LAWMA Trade Shares are either removed or added, ARF shall pay its obligated assessments to incorporated lateral companies and shall continue to pay its proportionate share of expenses for unincorporated laterals.

G. With respect to those shared laterals for which ARF is unable to obtain Consents for Relocation of FLCC Shares, ARF will leave the number of FLCC shares specified on ARF Exhibit 30, as indicated in Section IV.4, above, in each particular shared lateral.

H. When ARF is the only remaining shareholder using such laterals, those shares will no longer be needed to protect shared lateral owners from increased seepage losses.

ARF may then reclaim those shares and use them for all purposes consistent with the FLCC water rights decrees and bylaws, including any needed additional transfer applications.

4. ARF shall be responsible for needed modifications within the FLCC system and operations that result from the changes approved in this Decision, and shall operate under the FLCC delivery procedures.

   A. ARF will be responsible for the costs for resetting division boxes and for installing any new canal turnout gates and measurement boxes required by ARF, which shall be done in cooperation of Company management. ARF shall reimburse the Company within fifteen days from the Company's invoicing for the costs and expenses incurred by the Company.

   B. ARF shall be responsible for the construction of all augmentation stations required for implementation of the changed uses of the LAWMA Trade Shares, including reconstruction of the existing Horse Creek Augmentation Station ("Horse Creek"). Construction of Horse Creek shall be implemented as set forth in a separate agreement between the Board and ARF and as stated in said agreement, it shall be accomplished at times that do not interfere with the Company's deliveries to other Company stockholders. All other augmentation stations used by ARF and LAWMA are not located on FLCC property, not part of the Company canal, located on ARF owned or controlled property down gradient of the Company measuring devices and that are designed for use by LAWMA and ARF are known as Private Augmentation Stations ("PAS"). ARF shall construct, own and operate the PAS.

C. ARF shall submit to the Company Request for Relocation Certificates for all shares to be changed and the Company shall approve such requests as provided in this Decision.

D. ARF and LAWMA shall receive water under their shares pursuant to the Company's operating practices as existing or may be modified in the future, with all direct flow water continuing to be diverted into the Fort Lyon Canal and delivered through the existing rotation procedure or future procedures duly adopted and implemented by the Company. All stored water shall be continued to be stored and regulated in Company facilities or existing authorities.

E. ARF, as a stockholder, and LAWMA, upon acquiring ownership of the LAWMA Trade Shares, shall continue to pay all assessments on their respective shares as provided by the Company.

F. ARF shall reimburse the Company for any costs incurred by the Company for additional water accounting requirements associated with the change of water rights for the LAWMA Trade Shares, the Winter Water Storage Program, or any other accounting attributable to ARF's operations.

G. Upon completion of the augmentation station(s), resetting any division boxes and installing any new canal turnout gates and measurement boxes that are necessary for the delivery of certain of the LAWMA Trade Shares for the changed uses approved in this Decision the changed uses of those LAWMA Trade Shares may be implemented.

5. If the Water Court determines that ARF and/or LAWMA need to use the facilities owned by third parties to implement their operations approved herein or the anticipated LAWMA Water Court Decree, ARF shall be solely responsible to obtain agreements.
   A. ARF shall be responsible to obtain any needed agreements for use of facilities owned by third parties on the McClave Drain, May Valley Drain, Riverview Drain, Wiley Drain, and Pleasant Valley Drain and make any necessary improvements to such facilities assure the safe conveyance of water deliveries to the Arkansas River. Whether such agreements are needed or such improvements are necessary will be decided by the Water Court within the LAWMA change of water rights case.
   B. ARF shall be responsible to obtain any necessary agreement with the Amity Mutual Irrigation Company or other parties to pass water delivered through the Wheatridge Lateral augmentation station to the Arkansas River. Whether such agreements are needed or such improvements are necessary will be decided by the Water Court within the LAWMA change of water rights case.
6. ARF shall be responsible for all administrative approvals of changed operations of the ARF Irrigation Shares. LAWMA shall be responsible for all administrative approvals of changed operations of the LAWMA Trade Shares.
   A. LAWMA shall obtain approval of a Rule 10 Plan or Plans from the Colorado Division of Water Resources for all ARF Fort Lyon farms that are converted from flood irrigation to a pivot irrigation system.
   B. ARF and/or LAWMA may request approval of use of the LAWMA Trade Shares pursuant to a temporary change of water right and/or in a substitute water supply plan

pursuant to section 37-92-308, C.R.S, or other expedited administrative application approved by the Colorado Division of Water Resources, including without limitation an Arkansas River Replacement Plan pursuant to Rule 14 of the Amended Rules and Regulations Governing the Diversion and Use of Tributary Ground Water in the Arkansas River Basin ("Rule 14 Plan"), which approval shall be no less restrictive than the terms of this Decision.

7. LAWMA shall obtain a court decree from the District Court for Water Division 2, authorizing the change of the LAWMA Trade Shares ("LAWMA Change Case") requested by this Application containing terms and conditions no less restrictive than the relevant terms contained in this Decision.

    A. The Company may participate as an Opposer in such case to ensure that the terms of this Decision are complied with and that the change does not result in injury to the Company's water rights. The Company will be responsible for its own engineering and attorney's fees and costs incurred in such water court proceedings.

    B. LAWMA shall file a copy of this Decision with the Water Court.

    C. LAWMA's change of use of the LAWMA Trade Shares shall be based on a farm-by-farm historical use analysis using the H-I Model canal loss, on farm and off farm lateral losses, secondary evapotranspiration and farm efficiency factors as identified in the Slattery & Hendrix Engineering LLC report. (LAWMA Exhibit 1.)

    D. If the Company does not participate in the water court case as an objector LAWMA will provide the Company with a copy of any proposed decree(s) circulated to objectors or submitted to the Water Court.

E. If the Water Court imposes terms and conditions that are more restrictive than those contained herein, those more restrictive terms will control.

F. Any final decree entered by the Water Court approving the change of the water rights for the LAWMA Trade Shares shall contain dry-up, revegetation and dry-land farming standards that are no less restrictive than the standards set forth in Exhibits A and B of this approval.

8. ARF shall install and maintain such measuring and recording devices as required and approved by the Division Engineer in each drain or lateral serving an augmentation station.

9. Upon the removal of irrigation water from each LAWMA Dry-Up parcel, such parcel shall be subject to this Decision's requirements to be revegetated or converted to dry-land farming. The revegetation or conversion to dry-land farming shall be done in the manner described in Exhibits A and B, which are incorporated into this Decision by this reference.

   A. ARF shall have ten (10) years from the date irrigation water is removed from a parcel of LAWMA Dry-Up to obtain a Certificate of Completion for that parcel of the LAWMA Dry-Up.

   B. ARF shall seek recommendations from the Bent and Prowers and/or Otero County Conservation Districts for methods to use to implement dry-land farming and revegetation.

   C. Prior to removal of a LAWMA Dry-Up parcel from irrigation, ARF will give notice to the Company that provides: i) the identity of the parcel(s) to be removed from irrigation; ii) a statement of whether the parcel(s) will be revegetated or dry-land farmed.

D. Upon the removal of lands from irrigation, ARF shall allow dry-land farming on no more than sixty five percent (65%) of the ARF owned LAWMA Dry-Up lands. As to the thirty five percent (35%) of the ARF owned LAWMA Dry-Up lands not dry-land farmed, ARF shall either revegetate, re-irrigate, or convert the dried up farms to non-agricultural uses including but not limited to gravel mines. ARF owned LAWMA Dry-Up lands do not include approximately 2,000 acres of non-ARF owned farms that are subject to dry-up covenants. Those farms may be dry-land farmed or revegetated as provided for in the recorded dry-up covenants.

E. ARF will obtain security in an amount equal to the number of acres historically irrigated by any LAWMA Dry-Up farm removed from irrigation multiplied by $250 (number of acres in farm removed from irrigation X $250 = required security amount) to secure its obligation to successfully revegetate or convert the farm to dry-land farming. The security shall be in a form reasonably acceptable to the Company.

F. ARF shall reserve 500 of its 2,203.44 unchanged Fort Lyon shares to be used to aide in revegetation of the LAWMA Dry-Up. These 500 shares shall be released to ARF after it receives Certificates of Completion for eighty percent (80%) of the LAWMA Dry-Up.

G. Once ARF obtains a Certificate of Completion for any particular parcel of the LAWMA Dry-Up, the security for that parcel shall be released consistent with the terms of the security.

H. Once ARF obtains a Certificate of Completion for any parcel of the LAWMA Dry-Up, FLCC shall have no further oversight of the farming or land management practices on that parcel other than set forth in the Company's By-laws.

I. If ARF has not completed revegetation or converted any LAWMA Dry-Up to dry-land farming within ten years of the parcel being removed from irrigation the Board, in its discretion, may withdraw and employ from the security such funds as may be necessary to carry out the revegetation work for such parcel, up to an amount equal to the number of acres not certified as complete times $250. In lieu of drawing on the security, the Company may bring an action against ARF for injunctive relief or damages for ARF's failure to adhere to the revegetation or dry-land farming provisions of this Decision. The Company shall provide ARF a reasonable time to cure of no less than one irrigation season for any deficiency identified by the Company prior to requesting withdrawal from the security or filing a civil action.

J. To the extent that successful establishment and maintenance of revegetation of the LAWMA Dry-Up may require water for an interim period, ARF shall provide such water at its cost. Potential sources of such water may include but are not limited to the following: (i) ground water that is treated as sole-source pumping and is fully-augmented under LAWMA's augmentation plan or other augmentation plan approved by the Water Court for Water Division 2, or any SWSP or Arkansas River replacement plan approved by the State Engineer; (ii) water available to other Fort Lyon Canal Company shares owned by Arkansas River Farms; and/or (iii) water available to certain of the Fort Lyon Shares, repaid to LAWMA in the form of an equivalent reduction in allocation to the LAWMA Trade Shares (e.g., if the water available to all 82 Fort Lyon Shares historically used on the Farm No. 3 Dry-Up is required to establish and maintain revegetation, LAWMA would not allocate water to 82 of the LAWMA Shares during that irrigation season). LAWMA will make the determination as to whether water is required for an interim period to establish and maintain revegetation based on the opinion of its consulting expert in agronomy.

K. In the event that the owner of any LAWMA Dry-Up desires to continue to irrigate portions of the LAWMA Dry-Up with ground water pumped by wells, the Company acknowledges that nothing in this Decision is intended to preclude the owner from continuing to irrigate the LAWMA Dry-Up with ground water, as long as any such irrigation with ground water is treated as sole-source pumping and is fully augmented under LAWMA's augmentation plan or other augmentation plan approved by the Water Court for Water Division No. 2, or any substitute water supply plan or replacement plan approved by the Colorado State Engineer. If any dry-up covenant for the

LAWMA Dry-Up is more restrictive on the owner of the LAWMA Dry-Up or more protective of LAWMA than this Decision, then the terms and conditions of the dry-up covenant shall control.

L. In the event that the owner of any LAWMA Dry-Up desires to irrigate portions of the LAWMA Dry-Up with FLCC shares not part of this application and not previously used on the LAWMA Dry-Up Lands proposed to be irrigated ("New FLCC shares"), the Company acknowledges that nothing in this Decision is intended to preclude the owner from doing so, as long as any such irrigation with New FLCC shares has been approved by the Board if required by the By-laws. If any dry-up covenant for the LAWMA Dry-Up is more restrictive on the owner of the LAWMA Dry-Up or more protective of LAWMA than this Decision, then the terms and conditions of the dry-up covenant shall control.

10. Additional Terms and Conditions. The following terms and conditions shall apply to the removal of the LAWMA Dry-Up from irrigation and subsequent revegetation of such lands.

A. ARF shall maintain drainage ditches on each of the dry-up farms until revegetation is complete. This includes spraying and burning weeds on a regular basis on drainage ditches and laterals.

B. ARF will apply herbicide to reasonably control noxious weeds as identified pursuant to the Colorado Noxious Weed Act in Article 5.5 of Title 35, C.R.S.

and such as may be amended on of the dry-up farms until revegetation is complete.

11. ARF and/or LAWMA may request approval of use of the LAWMA Trade Shares pursuant to a temporary change of water right and/or in a substitute water supply plan pursuant to section 37-92-308, C.R.S, or other expedited administrative application approved by the Colorado Division of Water Resources, including without limitation a Rule 14 Plan, which approval shall be no less restrictive than the terms of this Decision.

VI. Implementation of Decision

1. ARF or LAWMA may propose an agreement to the Company to implement terms and conditions of this Decision. Such an agreement shall be proposed and negotiated by ARF, LAWMA, and the Company within 180 days of this date; otherwise, the terms and conditions of the Decision shall apply without an implementing agreement. Such agreement shall not modify the substantive requirements of any of the terms and conditions and shall be binding on the changed ARF Irrigation Shares and LAWMA Trade Shares if applicable, and it shall bind ARF and LAWMA as necessary for implementation of the agreement.
2. Unless another specific remedy or cure period is provided for in this Decision or in the Water Court decree for LAWMA's change of use of the LAWMA Trade Shares, in the event a condition of this Decision is not met because ARF has not met one of its obligations or LAWMA has not met one of its obligations hereunder, the Company may provide written notice to ARF or LAWMA that it is in violation of such specified term and condition, along with the Company's evidence of such violation. ARF or LAWMA,

as relevant, shall have seven (7) days from the date of such notice to correct the violation. ARF's failure to correct a violation of its specified obligations hereunder will result in non-delivery of water to the number of ARF Irrigation Shares that are directly related to and affected by such violation. LAWMA's failure to correct a violation of its specified obligations hereunder will result in non-delivery of water to the number of LAWMA Trade Shares that are directly related to and affected by such violation. The Board's withdrawal of the security described in section V.9.E in the manner described in V.9.I shall constitute an election of remedies to not utilize the non-delivery of water remedy set for in this section for violation of the terms and conditions concerning revegetation or conversion to dry-land farming.

3. The findings, terms and conditions set forth in this Board Decision are considered to be severable in the event any findings, terms and conditions are not approved by the Water Court.
4. This Board Decision shall benefit and be binding on ARF and all successors in ownership of the ARF Irrigation Shares with respect to ARF's specified rights and obligations hereunder.
5. This Board Decision shall benefit and be binding on LAWMA and all successors in ownership of the LAWMA Trade Shares with respect to LAWMA's specified rights and obligations hereunder.
6. The Board requires that there shall be a covenant running with the LAWMA Dry-Up Land that is owned by ARF that is recorded in the county in which each such farm is located. Any Certificate of Completion issued by the Water Court shall also be recorded

in the county in which each such farm is located, which certificate shall indicate that the obligation to revegetate or convert to dry-land farming has been accomplished and no longer burdens such farm.

7. This Decision replaces and supersedes the September 14, 2016 Decision of the Board. The Board has carefully considered all evidence presented to the Board, and believes this is a fair and reasonable Amended Decision implementing the relevant Company Bylaws. The Board's decision was approved by the Board by vote of four Directors in favor and one Director opposed.

Dated: December 20, 2016

By the Board:

By Phil Hemphill
Its President

By Dale L Mauch
Its Secretary

EXHIBIT A

REVEGETATION AND DRY-LAND FARMING CERTIFICATION PROCESS

The Board finds that reasonable revegetation and dry-land farming terms and conditions should be imposed for the LAWMA Dry-Up. Decision at Section III 8. Nothing in this Exhibit A is intended to conflict with, vary or modify the findings made in the Decision. To the extent that there is a conflict between the terms of this Exhibit and the Decision, the Decision controls.

A. Definitions

1. Acceptable for Farms where Revegetation will occur means:

    a. Any field that meets the criteria for Classes VI or VII using the Revegetation Classification Schedule in Exhibit B.

    b. Certain fields may never reach Classes VI or VII, nonetheless, if the Annual Report determines a particular field has been revegetated as far as can be reasonably expected, such field will be Acceptable if noxious weeds and/or erosion of the soil caused by wind is adequately controlled in a manner consistent with state and local law.

    c. Any Field successfully converted to Dry-land Farming shall be Acceptable.

    d. Any Field upon which buildings, grain storage facilities, railways or railroad facilities, oil and gas facilities, wind power generation facilities, power transmission facilities, pump houses, recharge facilities, augmentation stations, feed yards, roads, reservoirs, drains, impervious surfaces or other facilities or structures on a Farm that will adequately control noxious weeds and/or erosion of the soil caused by wind, shall be classified as Acceptable.

    e. Any Field that is irrigated as allowed under the Decision term and conditions 9 K, or L shall be classified as Acceptable.

2. Acceptable Farms where Dry-land Farming will occur means:

    a. The farm has been planted to a dry-land crop or is in a fallow period following a dry-land crop; the crop was planted and farmed without irrigation water, such that it is dependent solely upon precipitation to meet crop water requirements; if other dry-land farming in the region is producing crops, the farm also is producing a dry-land crop with weeds adequately controlled and that controls soil erosion from wind in a manner consistent with state and local law; and minimum crop residue after harvesting a dry-land crop is as described below, and the crop residue is left on the parcel until the parcel is prepared for the next rotation of planting; provided, however, that this requirement for crop residue does not prevent a farmer from controlling weeds by mechanical tillage of the parcel or using other acceptable methods of weed control that do not disturb the residue on the surface. For grain crops, such as winter wheat or milo, this shall include a minimum crop residue of at least thirty percent (30%) determined by the step-point method. For hay or forage crops, crop stubble shall measure at least five inches (5") with row spacing no more than thirty inches (30").

b. Recommended best management practices for Farms designated to be Dry-land Farmed shall include the following.

  i. The management of annual precipitation to produce commodities or forage for livestock warranting a reasonable expectation of ongoing profits.

  ii. Weed control methods on crop land may include conservation tillage, mowing or chemicals to manage harvested crop residue to reduce evapotranspiration of soil moisture and maintain ground cover to minimize soil erosion by wind or water.

  iii. Conservation tillage is achieved by the use of non-inversion tillage equipment such as chisels, field cultivators, sweeps, vertical tillage, no-till planters or strip till planters to maximize harvested crop residue ground cover over thirty percent (30%) or more of the entire field.

A Farm designated to be Dry-land Farmed will be deemed Acceptable even in the absence of the above-described recommended best management practices, as long as the requirements in Section 2.a above have been met for that Farm.

3. Dry-land Farming means the establishment and maintenance of dry-land farming practices with weeds adequately controlled and that controls soil erosion from wind in a manner consistent with state and local law. Dry-land farming practices include: No-Till Dry-land Farming and Minimum-tillage Dry-land Farming.

4. Farm means the parcels of land used for agricultural purposes which will be permanently removed from irrigation as described in the Decision.

5. Field means a portion of the LAWMA Dry-Up within any Farm.

6. Minimum tillage Dry-land Farming means management of farming operations which seeks to minimize impacts from tilling through the use of a sweep plow, strip-till, or similar technology. Additionally, a farmer may rely on herbicides to control weeds. Both contact and residual herbicides may be used. Periodic fallowing and crop rotation may be used to stabilize the crop yields and allow the soil to rest.

7. No-till Dry-land Farming means a system of planting seeds into untilled soil by opening a narrow slot, trench or band, of sufficient width and depth to obtain proper seed coverage. As no soil tillage is utilized, a farmer must rely on herbicides to control the weeds. Both contact and residual herbicides may be used. Periodic fallowing and crop rotation may be used to stabilize the crop yields and allow the soil to rest.

8. Percentage of Completion is the total dry-up acres for a farm classified as Acceptable divided by the total number of dry-up acres for a Farm as shown in the Annual Report, multiplied by 100.

9. Revegetation means the establishment of native grasses or such other self-sustaining (under the conditions prevailing on the land) suitable dry-land ground cover with weeds adequately controlled. Dry-land ground cover does not include alfalfa or other similar deep rooted phreatophytes. Revegetation of the LAWMA Dry-Up may include, but is not limited to, the following activities:

    a. Class I Fields. Seeding, irrigation, herbicide application and mowing;

    b. Class II Fields. Herbicide application and mowing;

    c. Class III Fields. Spot seeding and irrigation, herbicide application, mowing and grazing;

    d. Class IV-A Fields. Spot seeding and irrigation, herbicide application and mowing;

    e. Class IV-B Fields. Herbicide application, mowing and grazing;

    f. Class V Fields. Spot herbicide application and grazing.

    g. Spot seeding and irrigation of any Class I through V fields if determined to be necessary for revegetation as fields matriculate through the classifications.

    h. Continuation of appropriate revegetation activities.

    i. Controlling weeds in a manner consistent with state and local law on all fields.

B. Annual Report.

1. On or about December 1 of every year ARF shall submit a report to the Board and the Water Court that provides information about the LAWMA Dry-Up Farms <u>that have been removed from irrigation</u>. The Annual Report shall provide the following information:

    a. The number of the Farm and the year that irrigation water first was removed.

    b. Whether the Farm is being Revegetated or Dry-land Farmed.

    c. The total number of acres that were dried-up.

    d. The Percentage of Completion for the Farm.

    e. The approximate annual precipitation that fell on the Farm, which may be estimated based on the average of published local weather station data.

f. If the Farm was not Dry-land Farmed, the efforts undertaken in the preceding year to Revegetate the dried-up acreage, including without limitation, the seeding rate, type and composition of blend by percentage and date planted, information about herbicides or pesticides applied and information about efforts to control erosion of the soil caused by wind.

g. If the farm was Dry-land Farmed, the efforts undertaken in the preceding year to convert the Farm to Dry-land Farming, including information about tilling practices, the planting and fallowing rotation, the crops planted, and the acres fallowed; information about herbicides or pesticides applied; information about efforts to control erosion of the soil caused by wind; information about the amount of crops harvested or the number of animal units grazing the land; and information about the amount of crops planted and harvested by other Dry-land farmers in the area during the preceding year;

h. If the farm was Dry-land farmed, whether the crop is a grain crop or a hay/forage crop. If the crop is a hay/forage crop, the expert also will determine and record the stubble height in inches and the distance, in inches, on which the hay/forage crop was planted.

i. Whether water was used to assist in Revegetation or conversion to Dry-land Farming and if so describe the water used in amount and method of application.

j. Whether any other factors occurred that had a negative impact on efforts to Revegetate or convert to Dry-land Farming.

k. Classification of the lands pursuant to the chart in Exhibit B. ARF shall notify the Board prior performing an annual inspection of the Farms to determine the classification. The Board may, at its election and cost, send its own Expert along with the ARF Expert to review the classification and progress toward completion of the Farms included in the Annual Report.

l. Whether a Field has been revegetated as far as can reasonably be expected and thus whether such Field will be considered Acceptable.

m. If an Annual Report has been filed on the Farm in past years, how the conditions on the Farm compares to past years.

n. If a Farm is recommended for a Certificate of Completion, the Annual Report shall also contain representative photographs of the Farm depicting how the Farm has been Revegetated or converted to Dry-land Farming.

o. Whether the Farm is eligible for issuance of a Certificate of Completion.

C. Certificate of Completion. The criteria for issuing a Certificate of Completion for Revegetated land and lands converted to Dry-land Farming shall be:

1. Certificate of Completion may only be issued for an entire Farm.

2. Revegetation: Any Farm that has 90% Percentage of Completion shall be granted a Certificate of Completion.

3. Dry-land Farming: Any Farm where 90% of its Fields were used for one full crop rotation cycle (two years crop production, one year fallow with appropriate stubble and weed control) in accordance with the standards described in Section A.2.a above and with adequate control of weeds and wind-caused soil erosion in a manner consistent with state and local law shall be granted a Certificate of Completion.

D. Review of Annual Report and Dispute Resolution.

1. ARF shall pay the reasonable expenses of an expert retained by the Board (Board Expert) to review any Annual Report that recommends that a Farm is eligible for a Certificate of Completion.

2. The Board Expert shall approve or reject the Annual Report that recommends that a Farm is eligible for a Certificate of Completion, no later than January 15.

   a. If the Board Expert approves the Annual Report, FLCC shall not oppose Water Court approval of a Certificate of Completion for any Farm for which the Annual Report recommends issuance of a Certificate of Completion.

      i. Any FLCC stockholder on their own behalf and not on behalf of the FLCC, may separately oppose Water Court approval of a Certificate of Completion for any Farm in which the Annual Report recommends issuance of a Certificate of Completion.

   b. If the Board Expert does not approve an Annual Report that recommends that a Farm is eligible for a Certificate of Completion, ARF's Expert and the Board Expert, no later than February 1, shall consult and attempt to reach a consensus, which consensus may modify, or add terms to the recommendation contained in the Annual Report.

   c. If the experts do not reach consensus on whether a Farm is eligible for a Certificate of Completion, then the recommendation may be withdrawn by ARF or Water Court approval of the Certificate of Completion may be requested, which may be opposed by FLCC.

   d. The Water Court shall rule upon any contested request for approval of a Certificate of Completion, whether FLCC or a FLCC stockholder is the opposer.

      i. Any appeal of the Water Court's decision on a request for approval of a Certificate of Completion shall follow the normal rules and procedures for appeal of a water matter.

EXHIBIT B

REVEGETATED LAND CLASSIFICATION METHODOLOGY

CLASS I Full seeding and irrigation needed, either first seeding or reapplication of seeding. Desired plants scarce or absent.

CLASS II Seeding and irrigation completed. Stand undetermined. Usually this will occur at the beginning of the second growing season following seeding.

CLASS III Stand is variable. Part of the field has an adequate stand and part does not. Plants may be juvenile plants to well developed mature plants. More than 10% of field with an inadequate stand on areas exceeding one acre in size. Plant frequency of desirable plant on deficient areas is less than 10%. Such deficient areas will require reseeding.

CLASS IV-A Stand is inadequate, frequency is less than 10% but plants are fairly well distributed over field. Field may need reseeding.

CLASS IV-B Stand is inadequate; frequency is between 10% to 15%. Plants are uniformly distributed over the field. No further seeding then recommended as the stand is expected to develop.

CLASS V Stand appears adequate but root system is undeveloped. There are 10% to 15% or more desired plants per count. Good potential for stand establishment. Generally found after the first growing season but possibly the second growing season.

CLASS VI Stand adequate. Plants well rooted. Desirable plant frequency range 15% to 20%, no deficient areas larger than one acre in size over 90% of the field. This may occur following second growing season but more likely after the third growing season and beyond.

CLASS VII Stand adequate. Plants well rooted with vigorous top growth. Desirable Plant frequencies are 20% to 30% or more over 90% of the field. No deficient areas larger than one acre in size. Generally occurring the third growing season and beyond.

BYLAWS

OF

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

[Adopted September 10, 1998; Amended November 8, 2002; Amended October 12, 2004; Amended July 12, 2006; Amended September 8, 2006; Amended August 13, 2007; Amended February 10, 2009; Amended February 9, 2016; Amended August 8, 2017]

ARTICLE I
OFFICE AND AGENT

Section 1. The corporation shall maintain a registered office and a registered agent.

Section 2. The registered office and registered agent may be changed by the Board of Directors ("Board") by delivering to the secretary of state for filing a statement of change that sets forth the following:

A. The corporation's corporate name;

B. The street address of its current registered office;

C. If the registered office is to be changed, the street address of the new registered office;

D. The name of its current registered agent;

E. If the registered agent is to be changed, the name of the new registered agent and the new registered agent's written consent to the appointment; and

F. That after the changes are made, the street addresses of its registered office and the business office of its registered agent will be identical.

ARTICLE II
MEMBERS AND SHAREHOLDERS

Section 1. Membership Required for Allocation of Water. A LAWMA membership is required for allocation, to a "LAWMA Structure" as defined in this Article II, of a portion of the water available to the corporation's water rights or a portion of any other water controlled by the corporation. A holder of a LAWMA membership is referred to herein as a "member."

Section 2. Application for Membership. The Board may accept new memberships upon application submitted in such form as determined by the Board and upon the following conditions:

A. Applicant's well, gravel pit, surface diversion, or other structure requiring augmentation or replacement ("Augmented Structure") is located within the State of Colorado and is so situated as to be able to be served by the corporation's water court approved plan(s) for augmentation, annual replacement plan approved by the State Engineer for Water Division No. 2 pursuant to Rule 14 of the Amended Rules and Regulations Governing the Diversion and Use of Tributary Ground Water in the Arkansas River Basin, effective June 4, 1996 (including any amendments) ("Rule 14 plan"), or any LAWMA-operated Compact Compliance Plan pursuant to Rule 10 of the Compact Rules Governing Improvements to Surface Water Irrigation Systems in the Arkansas River Basin in Colorado ("Rule 10 plan") (collectively, "Augmentation Plan") without adverse impact thereon, such determination to be made by the Board in its sole discretion; or Applicant's proposed point of delivery for direct use of water available to the corporation's water rights or other water controlled by the corporation ("Direct Delivery Point") is located within the State of Colorado and is able to be served by the corporation's water rights or other water controlled by the corporation without adverse impact thereon, such determination to be made by the Board in its sole discretion; and

B. Augmented Structures and Direct Delivery Points are referred to collectively as "LAWMA Structures" herein; and

C. A member shall hold one membership for each LAWMA Structure, and shall register each such LAWMA Structure with the corporation; and

D. For each membership, the member shall pay a fee to be determined by the Board from time to time; and

E. The member shall pay the costs, including without limitation costs for engineering and legal consulting services, incurred by the corporation to add the Augmented Structure to the corporation's Augmentation Plan or to change or administer the corporation's water rights as needed for delivery of water to the Direct Delivery Point ("Reimbursable Costs").

(1) The Reimbursable Costs include, without limitation, all costs associated with the following: any Water Court proceeding or administrative proceeding necessary to amend the Augmentation Plan on a temporary or permanent basis to include the Augmented Structure; any Water Court proceeding or administrative

proceeding necessary to allow for direct delivery of water at the Direct Delivery Point; review of the member's proposed substitute water supply plan ("SWSP") in which LAWMA shares will be used; review of the member's past plan for augmentation, replacement plan, or SWSP in which the Augmented Structure was augmented with water from a source other than LAWMA shares; and the preparation, review, or amendment of any lease, contract, or other such document in connection with membership in the corporation; and

(2) At the time of the Board's approval of the application for a membership for a LAWMA Structure, the member shall enter into a reimbursement agreement with the corporation to provide for payment of the Reimbursable Costs; and

F. New members may be issued shares of stock in the corporation in accordance with Article VI, Section 9 of these bylaws. Nothing in these bylaws precludes the transfer or lease of shares of stock from a current shareholder to a new member, subject to approval of such transfer as described in Article VI, Section 2 below; and

G. The Board may adopt rules and regulations to guide the determination of whether to approve new memberships.

<u>Section 3.</u> <u>Membership and Classes of Stock</u>.

A. <u>Members</u>. There will be one class of members.

B. <u>Shareholders</u>. Those members who satisfy one of the qualifications set forth in Subsection (1) or (2) of this Article II, Section 3.B, and who are issued or hold Preferred Stock or Common Stock will be shareholders in addition to being members.

A. Upon approval of the Board and upon such terms and conditions as are necessary to prevent injury to the corporation, any person or entity may be issued stock and become a shareholder.

B. Any person or entity that acquired, through purchase, gift, foreclosure, or otherwise, shares of stock from a shareholder and whose transfer of such stock has been approved as provided in Article VI, Section 2 below, may be issued stock upon the surrender of the acquired stock, and upon such issuance will become a shareholder.

C. A person or entity will cease to be a shareholder upon the approved transfer to another of all shares of stock owned by that person or entity. Cessation of shareholder status under this section does not and will not release such person or entity from any liability or obligation incurred as a shareholder and not discharged or satisfied as of the date of cessation.

C. Non-Shareholder Members. All members who are not shareholders will nevertheless be full members, designated as "non-shareholder members," for all purposes other than distribution of benefits and burdens on stock.

A. For non-shareholder members, all rights and obligations relating to LAWMA's provision of water for augmentation of LAWMA Structures or for delivery to a Direct Delivery Point must be established by written contract between the non-shareholder member and the corporation. Solely for purposes of this provision, non-shareholder members who rent stock will be treated as shareholders upon submitting acceptable proof of the rental of such stock.

B. The Board may add or revise membership classes and the rights and obligations associated therewith from time to time by amendment of these bylaws.

Section 4. Dues and Fees. The corporation shall assess membership dues and fees. The Board shall determine the amount of proposed membership dues and fees each year and shall present said proposed dues and fees to the membership for approval at any annual meeting or special meeting called for that purpose. Membership fees and dues require the approval of a majority of a quorum of all members entitled to vote, either present at the meeting or by proxy. Dues and fees will become due thirty (30) days after the date of billing. The Secretary shall give written notice to each member of the amount of dues and fees and the time when the same will be due, which notice the Secretary shall give by delivering the notice personally to each member or mailing the notice to the address of the member as shown by the books of the corporation.

Section 5. Transfer of Membership. Any membership in this corporation may be transferred with approval of the Board in accordance with these bylaws and such rules as may be adopted from time to time by the Board.

Section 6. Suspension and Termination of Membership. Any membership in this corporation may be suspended or terminated for non-payment of dues and/or fees, or for non-compliance with the conditions of membership or any water court decree or administrative approval that governs operation of the corporation's water rights and Augmentation Plan.

A. Suspension and renewal for non-payment. Dues and/or fees not paid by March 1 of each year will result in suspension of the membership for which such dues and/or fees were assessed, and all rights attendant to that membership will be suspended unless and until the membership is renewed. To renew a suspended membership, the member shall pay the full amount of unpaid dues and/or fees, together with a 20% penalty on such amount.

B. Termination for non-payment. Dues and/or fees not paid for one year following their due date will result in termination of the suspended membership for which such dues and/or fees were assessed, and all rights attendant to that membership will be terminated. To avoid termination of a suspended membership, the member shall pay, prior to March 1 of the year following the original non-payment, the full amount of unpaid dues and/or fees for the delinquent year, together with a 20% penalty, and the dues and/or fees assessed on the membership for the next year. If such payment has not been made prior to March 1 of the year following the delinquent year, the suspended membership will be terminated, and a new application will be required for a membership for the LAWMA Structure for which the terminated membership was held. Before termination of a membership in accordance with this Article II, Section 6, the Board shall give not less than thirty (30) days' prior written notice to the member of the impending termination and the reasons therefor, and an opportunity for the member to be heard, orally or in writing, not less than ten (10) days before the effective date of the termination.

ARTICLE III
MEETINGS AND VOTING

Section 1. Annual and Regular Meetings. A meeting of the members and the shareholders shall be held annually at a place and time to be stated in or fixed in accordance with a resolution of the Board. In addition, regular meetings of the members and shareholders may be held at a place and time to be stated in or fixed in accordance with a resolution of the Board.

Section 2. Special Meetings. Special meetings of the members and shareholders may be called at any time by the President, or by a majority of the Board. The President, or in his absence the Vice President, shall call a special meeting upon the written petition of one-third of the members of the corporation.

<u>Section 3.</u> <u>Notice</u>. Written notice of each annual, regular, and special meeting shall be given by mailing a copy of such notice, properly addressed and first class postage prepaid, to each member and each shareholder not less than ten (10) days nor more than thirty (30) days prior to the date of said meeting. The record date for determining the members and shareholders entitled to notice of a meeting and those entitled to vote at a meeting shall be determined by the Board and shall be no more than sixty (60) days and no less than ten (10) days before notice is mailed. A list of members and shareholders who are entitled to notice of, and to vote at, the meeting shall be prepared and made available for inspection in accordance with the provisions of the Colorado Revised Nonprofit Corporation Act, as amended. Notice shall be mailed to each member's and each shareholder's last known address according to the corporation's records. The notice shall state the place, date, and time of the meeting, the purpose of the meeting, and a description of any matter or matters that must be approved by the members and shareholders or for which the members' and shareholders' approval is needed.

<u>Section 4.</u> <u>Quorum</u>. Fifteen percent (15%) of the votes entitled to be cast on a matter constitutes a quorum of that voting group for action on that matter. If such a quorum is not present at a meeting at which the matter will be placed to a vote, either in person or by proxy, the meeting may be adjourned by a majority of those present, provided that such meeting may not be adjourned for a period to exceed sixty (60) days for any one adjournment.

<u>Section 5.</u> <u>Voting</u>. The voting rights of the members and shareholders of the corporation shall be as follows:

A. <u>Shareholders</u>. Shareholders shall have one vote for each share of Common Stock and two and five-tenths (2.5) votes for each share of Preferred Stock standing in the shareholder's name on the books of the corporation, in addition to one vote for each membership held by such shareholder, as provided below. Shareholders have two and five-tenths (2.5) votes for each share of Preferred Stock because the Board has determined, based on analysis and recommendations from the Company's consulting engineers, that a share of Preferred Stock may be issued to a shareholder upon surrender to the corporation of two and five-tenths (2.5) shares of Common Stock (see bylaw Article VI, Section 9). The differential voting rights for Common and Preferred Stock are intended to ensure that a shareholder does not suffer a reduction in voting rights when Common Stock is converted to Preferred Stock, and may be changed by the Board from time to time to maintain the relationship between Common and Preferred Stock as allowed by bylaw Article VIII.

B. Members. Each member shall have one vote for each LAWMA Structure owned and for which a membership is held.

Voting by proxy shall be permitted. Cumulative voting shall be prohibited. Unless otherwise provided in these bylaws or in the articles of incorporation of the corporation and to the extent consistent with the Colorado Nonprofit Corporation Act, as amended, any matter requiring approval of the members and shareholders shall require approval by a majority of a quorum of the members and shareholders present at a regular or special meeting or by proxy.

ARTICLE IV
DIRECTORS

Section 1. Board of Directors. The Board shall consist of seven (7) shareholders of the corporation to be elected at the members' and shareholders' annual meeting or adjourned annual meeting and shall be the seven receiving the highest number of votes cast in favor of their election.

Section 2. Term of Directors. The directors shall be elected for staggered terms of three (3) years.

Section 3. Compensation. The Board and the officers of this corporation other than the Secretary or Treasurer shall serve without compensation as such directors or officers, but any such director or officer may be reimbursed for actual expenses incurred in the performance of his duties or in the attendance at any regular or special meetings of the Board.

Section 4. Meetings. Regular meetings of the Board shall be held at such a time and place as the Board shall determine. Special meetings of the Board may be called by the President or by two (2) or more directors. The Secretary's oral notice to the directors of special meetings, at least two (2) days prior to the special meeting, shall be sufficient. A majority of the number of directors in office immediately before the meeting begins shall constitute a quorum for the conduct of business.

Section 5. Powers and Duties of the Board of Directors. The Board shall exercise the following powers:

A. To act for and in behalf of the corporation in any manner not prohibited by statute or by the articles of incorporation of the corporation.

B. To control and supervise the business affairs and management of the corporation, and to hire and employ such labor and other employees as may be necessary and advisable to carry out the purposes of the corporation.

C. To elect the officers of the corporation, and to adopt and procure a corporate seal for the corporation.

D. To authorize and approve the issuance of, and to issue, shares of Common Stock and Preferred Stock in the corporation;

E. To make rules and regulations and set policies for the transaction of the business of the corporation, and for the control, management, and distribution of water by the corporation.

F. To prescribe the form of applications for membership and to approve or reject all such applications.

G. To levy assessments on stock, dues, and fees at such times and in such amounts as to the Board shall deem necessary, and to provide for the manner of receiving and collecting such assessments, dues, and fees and to enforce the collection thereof.

H. To approve or reject any transfer of membership or the rights associated therewith, and to approve or reject any transfer of stock.

I. To provide for the maintenance of accurate records and books of account for the affairs and business of the corporation, and to cause regular audits to be made at least once each year.

J. To approve and direct all disbursements out of the funds of the corporation and to borrow money as it may be necessary upon the credit and for the benefit of the corporation, said indebtedness to be approved in the form of a resolution duly recorded in the minutes of the directors' meeting.

Section 6. Specific Powers Relating to the Administration of the Corporation's Water Rights and Augmentation Plan, and to the Allocation of Water. In recognition of the variability in water availability to the corporation's water rights in different years and under different hydrological circumstances, the Board shall have exclusive authority to determine the allocation of water to Common Stock and to Preferred Stock each year. The Board shall also have exclusive authority over all aspects of operation of facilities and water accounts of the corporation. The Board may adopt rules to provide further detailed guidance with respect to such administration and allocation.

Section 7. Vacancies. Vacancies among the directors and the officers of this corporation shall be filled for the unexpired term by majority vote of the Board.

ARTICLE V
OFFICERS

Section 1. Officers of the Corporation. The officers of this corporation shall be a President, Vice President, Secretary, and Treasurer. The Secretary and the Treasurer may be the same person. The President and Vice President shall be elected from the Board. The Secretary and Treasurer need not be members, shareholders or directors of this corporation. All officers shall serve for a term of one (1) year or until successors are duly elected and qualified; election of officers of the Board shall be held immediately after each annual meeting of the members and shareholders.

Section 2. Duties and Powers of the President. The President shall preside at all meetings of the Board and meetings of the members and shareholders; and shall sign all stock certificates, bonds, deeds, leases, encumbrances, notes, contracts, or other instruments of writing made or entered into by or on behalf of the corporation. The President shall exercise a general supervision over the business of the corporation and shall have all the power and perform all of the duties usually incident to the office of President of similar associations.

Section 3. Duties and Powers of the Vice President. The Vice President shall perform all of the functions and duties associated with the office of the President in the absence of the President, or in the case of his inability or refusal to act. The Vice President shall perform such additional duties as the Board may prescribe.

Section 4. Duties and Powers of the Secretary. The Secretary shall perform all duties usually incident to the office of Secretary of a corporation. He shall keep the minutes of all members' and shareholders' meetings and all directors' meetings, and have the custody of all minutes, records, and other papers and documents of the corporation. He shall provide notice of members' and shareholders' meetings and meetings of the Board as provided by these bylaws. He shall provide written notice of proposed membership dues and fees as described in Article II, Section 4 above, and of proposed annual assessments as described in Article VI, Section 4 below. He shall attest by his signature and affix the corporate seal to all stock certificates, contracts, and conveyances requiring the same. He shall prepare and keep an accurate stock ledger and all other proper books of record and of account of the business of the corporation, and such other books and records as the Board may prescribe. He shall make such reports to the Board of all his accounts and doings as may be required by the Board. Said accounts may also be made to the members and the shareholders if required by the Board. If required by the Board, the Secretary shall furnish a bond satisfactory to the Board for the satisfactory performance of his duties, the cost of which shall be borne by the corporation.

Section 5. Duties and Powers of the Treasurer. The Treasurer shall perform all duties usually incident to the office of Treasurer of a corporation. He shall collect assessments and other sums due to the corporation. He shall safely keep all money and funds of the corporation and disburse the same only on orders signed by the President. He shall keep such financial records and accounts as will accurately reflect the finances and assets of the corporation, and shall report the same to the shareholders at each annual meeting and to the Board upon request. If required by the Board, the Treasurer shall provide a bond in the amount determined by the Board at the cost of the corporation.

Section 6. Manager or Superintendent. In addition to the officers above named, the Board may authorize the appointment of a manager or a superintendent, who may or may not be a director, member or a shareholder of this corporation. The duties, authority, and compensation of such manager or superintendent shall be as determined by the Board.

ARTICLE VI
STOCK, CERTIFICATES AND TRANSFERS

Section 1. Classes of Stock. There shall be two classes of stock, Common Stock and Preferred Stock. Preferred Stock will be identified as such on the face of the stock certificate.

Section 2. Transfer of Stock. No transfer of stock shall be allowed without approval of the Board. The Board may adopt rules governing approval of said transfers. A shareholder proposing to transfer his stock in this corporation, whether to a shareholder, non-shareholder, member, or non-member of this corporation, or from one LAWMA Structure to another LAWMA Structure, shall make a written request to the Board for approval of the transfer. If, in the opinion of the Board, the transfer may be made without injury to the corporation, the corporation's water rights and other replacement water sources, or to other members, or to the integrity or administrability of the corporation's water rights or Augmentation Plan, the Board shall approve the transfer and any such approval shall include terms and conditions deemed necessary by the Board to prevent such injury. The proposed transferee shall pay the corporation's engineering and legal costs associated with evaluating the proposed transfer. It is the policy of the corporation to encourage the free transferability of stock as much as consistent with the foregoing principle. Therefore, a transfer of stock from one well to another well both of which divert from the Valley Fill Aquifer and surficial aquifers along the Arkansas River below John Martin Dam to the Colorado-Kansas stateline, as generally delineated on the map attached to the Amended Rules and Regulations Governing the Diversion and Use of Tributary Ground Water in the Arkansas River Basin, Colorado effective June 4, 1996, will be presumed to be without injury unless the Board determines otherwise based on the unique facts of any particular circumstance. The corporation shall not be liable for revegetation of land or weed control on land from which shares of stock have been transferred. In the event of a transfer of shares by any person, bank, or institution which is a creditor of a shareholder, as part of a foreclosure or exercise of a security interest on a loan or financing where the person, bank, or institution does not use the services of the corporation, such transfer will be presumed to be without injury unless rebutted on the facts of any particular circumstance. The subsequent assignment and transfer of such shares of stock to a third party shall require Board approval as required by these bylaws. The decision of the Board with respect to any proposed transfer shall be final and shall be transmitted to the requesting shareholder in writing.

Section 3. Surrender of Certificate and Assignment for Transfers. No transfer of stock certificates shall be made on the books of the corporation except upon surrender of the duly endorsed original, duplicate or temporary duplicate stock certificate and the written assignment of the person to whom the same was issued, or in the case of his death, the written assignment of his personal representative.

Section 4. Assessments. The Board shall determine the assessment proposed to be levied on the stock of the corporation for the ensuing year and shall present the question of making the assessment to the members and shareholders at an annual meeting or a special meeting called for that purpose.

A. If the members and shareholders vote in favor of making such assessment, the Board shall levy same.

B. If the members and shareholders fail to hold such a meeting or fail to make or authorize any assessment within ninety (90) days after the close of the corporation's fiscal year, the Board shall have the power to make any such assessment at any regular or special meeting called for that purpose.

C. All assessments will become due thirty (30) days after the date of billing. Assessments paid later than sixty (60) days after billing will require the additional payment of a 20% penalty. The Secretary shall give written notice to each shareholder of the amount of each assessment and the time when the same will be due, which notice the Secretary shall deliver personally to each shareholder or mail to the address of the shareholder as shown by the books of the corporation. If any shareholder fails to pay such assessment, including any penalty, within ninety (90) days after the assessment is due, his stock shall be forfeited to the corporation. Forfeited stock may be sold by the corporation.

Section 5. Effects of Non-Use on Membership Suspension or Termination. Stock shall not be forfeited due to non-use, but it may be forfeited for non-payment of assessments. If a membership is terminated pursuant to Article II, Section 6 of these bylaws, stock owned by that member will not be forfeited as long as assessments continue to be paid in accordance with the requirements of this Article VI.

Section 6. Duplicate Stock Certificates. The Board may order a duplicate stock certificate to be issued in place of any stock certificate of the corporation alleged to have been lost, mislaid, or destroyed, but in every such case, the owner of the lost, mislaid, or destroyed stock certificate shall comply with the provisions of the Ditch and Reservoir Companies Act as codified at Title 7, Article 42, Colorado Revised Statutes, as amended.

Section 7. Temporary Duplicate Stock Certificates. The Board may order a temporary duplicate stock certificate to be issued in place of any stock certificate of the corporation alleged to have been lost, mislaid, or destroyed if the owner of the lost, mislaid, or destroyed stock certificate provides a bond to the corporation, with security, to be approved by the Board on such sum as the Board may determine and direct, as indemnity against any loss or claim that the corporation may incur by reason of issuance of the temporary duplicate stock certificate.

A. So long as the shareholder complies with all of the obligations and requirements of the corporation's articles of incorporation, bylaws, policies, and rules, and so long as no contrary claim of interest or ownership in the subject stock is made to the corporation, a temporary duplicate stock certificate issued by the Board in accordance with Section 7 (A) of this Article VI shall be valid until all of the requirements of the Ditch and Reservoir Companies Act for the issuance of duplicate stock certificates have been satisfied by the shareholder and a duplicate stock certificate has been issued by the corporation in accordance with the provisions of the Ditch and Reservoir Companies Act.

B. Upon compliance with the provisions of the Ditch and Reservoir Companies Act and surrender of the temporary duplicate stock certificate issued pursuant to Section 7 (A) of this Article VI, a duplicate stock certificate shall be issued by the corporation to the shareholder to replace the temporary duplicate stock certificate and original stock certificate alleged to have been lost, mislaid, or destroyed, and the bond provided to the corporation as indemnity against any loss or claim the corporation may have incurred by reason of the issuance of the temporary duplicate stock certificate shall be released.

Section 8. Possession of Stock Certificate. Possession of a stock certificate shall not be regarded as evidence of ownership of the same unless it appears on the stock book of the corporation that said stock certificate was issued or duly transferred to the holder of the same. The Board may, in its discretion, refuse to issue a stock certificate, temporary duplicate stock certificate, or duplicate stock certificate except upon the order of a court having jurisdiction in such matter.

Section 9. Issuance of Shares of LAWMA Stock. No issuance of shares of stock shall be permitted without the approval of the Board. The Board may adopt rules governing approval of the issuance of shares of stock.

A. If in the opinion of the Board the issuance of shares of stock may be made without injury to the corporation, the corporation's water rights and other replacement water sources, or other members, or to the integrity or administrability of the corporation's water rights and its Augmentation Plan, the Board may approve the issuance of shares of stock to the member, and any such approval and issuance of shares shall include terms and conditions deemed necessary by the Board to prevent such injury. Such terms and conditions shall be referenced on the face of the stock certificate.

B. A share of Preferred Stock may be issued to a shareholder upon the shareholder's surrender to the corporation of two and five-tenths (2.5) shares of Common Stock; or, upon the Board's determination, a share of Preferred Stock may be issued upon the conveyance to LAWMA of water equivalent to two and five-tenths (2.5) shares of Common Stock. This conversion ratio of shares of Common Stock to Preferred Stock is called the "Preferred Stock Conversion Ratio." The Preferred Stock Conversion Ratio may be changed from time to time upon the Board's advisement by the corporation's consulting engineer, but such change may be accomplished only by amendment of these bylaws as provided for herein.

C. The Secretary shall record, on the face of each share certificate representing Preferred Stock, the Preferred Stock Conversion Ratio in effect on the date of issuance of such certificate.

D. Shares of Common Stock may be issued to a shareholder upon the shareholder's surrender to the corporation of shares of Preferred Stock. The number of shares of Common Stock that will be issued in exchange for surrender of shares of Preferred Stock will be determined by the Preferred Stock Conversion Ratio that was in effect at the time the shares of Preferred Stock were issued to the shareholder. By way of example and not by way of limitation, if a share of Preferred Stock is issued to a shareholder under the Preferred Stock Conversion Ratio of 2.5 to 1, then the surrender of that share of Preferred Stock in exchange for Common Stock would yield 2.5 shares of Common Stock, regardless of when the surrender of Preferred Stock is made.

E. The person or entity requesting the issuance of shares of stock shall pay all of the corporation's legal and engineering costs associated with evaluating and implementing the proposed issuance of shares of stock. The decision of the Board as to whether shares of stock will be issued shall be final and shall be transmitted in writing to the person or entity requesting the issuance of shares of stock.

ARTICLE VII
USE OF WATER

Section 1. The Board shall set policies and procedures for and make all decisions regarding use of the water rights and facilities owned or controlled by the corporation, including without limitation the timing and location of releases or deliveries of water available to the corporation's water rights, replacement of depletions, and retention of water in carryover storage, in accordance with applicable state laws and regulations and with the water court decrees and any administrative approvals governing operation of the corporation's water rights and Augmentation Plan.

Section 2. The Board shall annually allocate water to each share of stock in the corporation, with such allocation expressed as the amount of fully consumable water available per share. This allocation will include the preferred allocation to holders of Preferred Stock set forth in the corporation's articles of incorporation. Such allocation shall be made no later than April 1 of each year, and written notice of the allocation shall be provided to each shareholder. The notice shall also state the maximum amount of water that can be diverted by each LAWMA Structure to which the shareholder has dedicated shares of Common Stock or Preferred Stock ("Noticed Maximum Diversion"). A supplemental allocation or a reduction in allocation may be made at any time by the Board at its sole discretion. The amount of water allocated in each year shall be determined with due regard for current year needs and availability and for future year possible needs and availability.

Section 3. The Board may adopt rules to provide general guidance, but in recognition of the difficulty of anticipating all hydrological and water management situations, the Board shall retain the right to make exceptions or alterations to such rules in any particular year, including, without limitation, situations in which the water rights owned or controlled by the corporation are insufficient to allow for the Noticed Maximum Diversion by LAWMA Structures in a given year. Such rules may include a requirement that diversions from LAWMA Structures be curtailed, and may provide for procedures to enforce such curtailment. No member, whether shareholder or non-shareholder, shall be entitled to divert water in excess of the Noticed Maximum Diversion for a particular LAWMA Structure, or to cause depletions in excess of the allocation to the shares dedicated to that LAWMA Structure, unless a supplemental allocation is made or that member has rented additional sources of replacement water, including rental of the allocation then remaining to stock owned by other shareholders. Such rental sources and the use thereof must be first approved by the Board.

Section 4. Provision of Replacement Water to Members with Water Uses That Are Non-Curtailable. Depletions that may not reasonably and practically be shut down by cessation of pumping or other diversion ("Non-Curtailable Depletions") must be augmented only with Preferred Stock. Depletions attributable to certain types of Augmented Structures, including without limitation gravel pits, wells that are used to provide water for industrial, commercial, municipal, or domestic uses, and bedrock wells, are presumed to be Non-Curtailable Depletions.

Section 5. Use of LAWMA Stock for Augmentation or Replacement Purposes. It is the policy of the corporation that LAWMA stock may be used for augmentation or replacement purposes only within the LAWMA Augmentation Plan as defined in Article II, Section 2.A of these bylaws. However, the Board understands that, in certain limited circumstances, the use of LAWMA stock for augmentation purposes may be needed temporarily under a substitute water supply plan approved by the State Engineer pursuant to C.R.S. § 37-90-137(11) or § 37-92-308.

A. Upon water court approval of a LAWMA augmentation plan that includes a LAWMA Structure then operating pursuant to a temporary substitute water supply plan, the member shall promptly terminate such temporary plan.

B. LAWMA stock may not be used for augmentation or replacement purposes within a decreed plan for augmentation, Rule 14 plan, or Rule 10 plan operated by any entity other than LAWMA.

Section 6. Use of LAWMA Stock for Direct Use. It is the policy of the corporation that water allocated to LAWMA stock may be delivered to a Direct Delivery Point and used directly, rather than for augmentation or replacement purposes, only upon the prior written approval of the Board, which may grant or deny such approval in its sole discretion based on consultation with the corporation's consulting engineer and legal counsel.

A. Any member requesting direct use of water allocated to LAWMA stock following delivery to a Direct Delivery Point shall, as part of such request, enter into a reimbursement agreement with the corporation requiring the member to pay for all of the corporation's expenses associated with the Board's evaluation of the proposed direct delivery and direct use. Those expenses will include, but are not limited to, all expenses incurred by the corporation for engineering and legal review of the proposed direct delivery and direct use, as part of the corporation's determination of whether such use may be made in accordance with state law and with water court decrees and any administrative orders governing operation of the corporation's water rights and Augmentation Plan.

B. The Board shall deny any request for direct use of LAWMA stock following delivery of water to a Direct Delivery Point if, in the Board's determination made in the Board's sole discretion, such use would (i) cause injury to the corporation, the corporation's water rights and other replacement water sources, or to other members, or to the integrity or administrability of the corporation's water rights or Augmentation Plan; or (ii) violate the terms and conditions of any water court decree or administrative order governing use and administration of the corporation's water rights or Augmentation Plan; or (iii) result in an undue administrative burden on the corporation, including with respect to accounting.

C. Delivery of water to a Direct Delivery Point may be made and administered only by the corporation. Members and shareholders are prohibited from calling for water directly from ditch companies in which the corporation holds water rights.

Section 7. Use of Preferred Stock. Preferred Stock may be used directly or for augmentation of all types of water uses, including but not limited to irrigation use.

Section 8. Measurement and Reporting Obligations. LAWMA members shall make all gauge and meter readings necessary to document diversions from and depletions attributable to the LAWMA Structures. Members shall provide copies of all such records, calculations and accounting to LAWMA monthly or on a more frequent basis if requested by LAWMA or required by the water court, the State Engineer, the Division Engineer for Water Division No. 2, or the water commissioner.

ARTICLE VIII
AMENDMENT

These bylaws may be amended by a majority vote at any meeting of the Board. Except as provided in this Article VIII, these bylaws may also be amended by a majority vote of the members and shareholders at any annual meeting or at any special meeting called for that purpose. Notwithstanding the foregoing, the voting rights of shareholders set forth in Article III, Section 5.A. may only be amended by either (1) a majority vote at any meeting of the Board, which vote is supported by a determination, after consultation with LAWMA's consulting engineers, that the voting rights of shareholders need to be modified due to a corresponding change under bylaw Article VI, Section 9, in the number of shares of Common Stock that are required to be surrendered to the corporation for the issuance of each share of Preferred Stock; or (2) a vote of at least two-thirds of a quorum of the Preferred Stock, present or by proxy, voting together as a single class and at least two-thirds of a quorum of the Common Stock, present or by proxy, voting together as a single class at any annual meeting or at any special meeting called for that purposes. If an amendment is adopted by vote of the members and shareholders, it may not thereafter be altered by a majority of the Board until after the next meeting of the members and shareholders.

I hereby certify that the foregoing are the bylaws of Lower Arkansas Water Management Association as adopted by the directors at their meeting of August 8, 2017.

ATTEST:

Donald F. Higbee

Secretary

Exhibit C
ARF Farms Legal Description

1. Farm 62A is located in the SE ¼ and the E ½ of the SW ¼ of Section 17, Township 22 South, Range 46 West, in Prowers County, Colorado.
2. Farm 62 B is located in the S ½ of Section 17, Township 22 South, Range 46 West, in Prowers County, Colorado.
3. Farm 118 is located in the NW ¼ of Section 16, Township 22 South, Range 46 West in Prowers County, Colorado.
4. Farm 141 is located in the NE ¼ and portions of the NW ¼ of Section 17, Township 22 South, Range 46 West in Prowers County, Colorado.

ARKANSAS RIVER FARMS, LLC
MANAGING MEMBER'S RESOLUTION

THE UNDERSIGNED, being the AUTHORIZED REPRESENTATIVE of **RESOURCE LAND FUND IV, LLC** ("the Company"), hereby unanimously resolves that:

1. Arkansas River Farms, LLC is a Colorado limited liability company and has been validly created and is existing and in good standing under the laws of the State of Colorado. The Company is the Managing Member of Arkansas River Farms, LLC. The Managing Member has the power to act for Arkansas River Farms, LLC, in any way necessary to obtain any 1041 permit approval required by Bent, Prowers and Otero Counties.

2. The Company has been validly created and is existing and in good standing under the laws of the State of Colorado.

3. The Company hereby authorizes **AARON M. PATSCH** to negotiate, make, sign, execute and deliver any documents necessary for 1041 permit approval.

4. This Resolution is pursuant to and consistent with the Bylaws and Articles of Organization of the Company, and does not contravene the Bylaws, Articles of Organization, or any contract to which the Company is a party or any judgment or decree by which the Company is bound.

5. The foregoing resolution and acts has been duly adopted by the Authorized Representative of the Company at a meeting held on October 13, 2017 duly convened at which a quorum was present and acting.

6. The acts of **AARON M. PATSCH** in the foregoing regards are and shall be ratified and approved in all respects, without limitation, and this Resolution is in full force and effect as of the date of this certificate.

7. The person named below is the Authorized Representative of the Company, and the specimen signature above his name is his true signature.

THIS THE 13th day of October, 2017.

Susan Wengler
Notary Public

SUSAN WENGLER
Notary Public
State of Colorado
Notary ID # 20124071314
My Commission Expires 11-07-2020

Witness

AARON M. PATSCH, Authorized Representative of Resource Land Fund IV, LLC

Exhibit E
Chapter 4 Development in Areas with Natural Resources of Statewide Importance

Submission Requirements

Arkansas River Farms ("ARF"), 62A, 62 B, 118 and 141 will be referred to as the "Subject Farms" ARF also owns the water rights formerly used to irrigate Farm 63, but the former owner of those water rights, severed them from the land prior to adoption of the Prowers County 1041 regulations and therefore Farm 63 is not part of this 1041 application.

(1) An abstract of the proposal indicating the scope and need for the major development;

See the Application paragraph 2.

(2) Preliminary review and comment on the proposal by the appropriate agency of the Colorado Department of Natural Resources and/or the Colorado Department of Public Health & Environment, as applicable;

<u>N/A</u>

(3) For the purpose of assisting in evaluation of the applicant's selected development alternative only, a listing of alternative development and general degree of feasibility of each or, at the option of the applicant, the environmental analyses, assessments and statements developed under any required review pursuant to the National Environmental Policy Act (NEPA);

<u>ARF bought the Subject Farms and water rights from Pure Cycle Corporation in a block. No similar-sized block of farms is available for purchase so no alternatives were considered. No NEPA review is required for the Project because no federal action is involved.</u>

(4) Proponents of proposal:

(a) Names and addresses of all interests proposing the activity.

(b) Name and qualifications of the person(s) responding to the requirements detailed in these Regulations.

(a) Arkansas River Farms, LLC
1400 16th St., Suite 320
Denver, CO 80202

Lower Arkansas Water Management Association
310 S. 6th Street
Lamar, CO 81052

(b) Counsel for ARF
Steve Sims
410 17th St., Suite 2200
Denver, CO 80202

Counsel for LAWMA
Richard Mehren
2595 Canyon Blvd, Suite 300
Boulder, CO 80302

ARF Representatives
Aaron Patsch
1400 16th St., Suite 320
Denver, CO 80202

Karl Nyquist
7991 Shaffer Pkwy, Suite 200
Littleton, CO 80127

LAWMA Representative
Donald F. Higbee
(same address as LAWMA)

(5) Scope of proposal:

(a) Describe the source and rights for any water subject to transfer by decree as a part of the development, including a copy of the transfer decree;

I. Source of Water

The Subject Farms and Farm 63 have been irrigated in the past with 904 shares ("FLCC Shares") in the Fort Lyon Canal Company ("Company"). Water from the Subject Farms and Farm 63 will be transferred off the farms for LAWMA's use. LAWMA will file a change of water right application for the FLCC Shares in the next 12 months. The Company diverts water from the following sources:

1. The Fort Lyon Company owns three direct-flow water rights originally decreed in the District Court for Bent County, Colorado, on April 8, 1905, and more particularly described as follows: The first water right is for 164.64 cubic feet per second ("cfs") from the Arkansas River with an appropriation date of April 15, 1884. The second water right is for 597.16 cfs from the Arkansas River with an appropriation date of March 1, 1887. The third water right is for 171.20 cfs from the Arkansas River with an appropriation date of August 31, 1893. These water rights total 933 cfs.

2. The Fort Lyon Company also owns water rights to divert and store water in Horse Creek and Adobe Creek Reservoirs. These water rights were decreed in the District Court for Bent County, Colorado, on November 8, 1928, and are summarized in Table 2 below.

Table 2
Storage Rights – Horse Creek Reservoir and Adobe Creek Reservoir

Identification of Water Right	Amount	Source	Appropriation Date
Horse Creek Reservoir Original Construction	2,000 cfs 840 cfs 1,466 cfs 11,400 af	Horse Creek Arkansas River Arkansas River	Aug. 15, 1900 Jan. 25, 1906 Mar. 1,1910
Horse Creek Reservoir	840 cfs 5,000 cfs 1,466 cfs	Arkansas River Horse Creek	Jan. 25, 1906 Dec. 20, 1907

1st Enlargement	15,487 af	Arkansas River	Mar. 1, 1910
Horse Creek Reservoir 2nd Enlargement	5,000 cfs 840 cfs 1,466 cfs 1,113 af	Horse Creek Arkansas River Arkansas River	Jun. 12, 1908 Jun. 12, 1908 Mar. 1, 1910
Adobe Creek Reservoir Original Construction	8,631 cfs 840 cfs 1,466 cfs 61,575 af	Adobe Creek Arkansas River Arkansas River	Jan. 25, 1906 Jan. 25, 1906 Mar. 1, 1910
Adobe Creek Reservoir Enlargement	8,631 cfs 840 cfs 1,466 cfs 25,425 af	Adobe Creek Arkansas River Arkansas River	Dec. 29, 1908 Dec. 29, 1908 Mar. 1, 1910

3. Additionally, the Fort Lyon Company owns two water rights associated with Thurston Reservoir, a/k/a Thurston Lake, as follows: The first water right is for storage of 1,515 acre-feet ("af") of water in Thurston Reservoir, with said water diverted from the Arkansas River into the FLCC main canal at a rate of up to 355.20 cfs. This water right was originally decreed for Prince Reservoir in the District Court for Bent County, Colorado, on April 8, 1905. The water right was conditionally transferred to Thurston Reservoir in 1972 in Case No. W-27, Water Division 2, and made absolute in 1979 in Case No. 79CW085, Water Division 2. The second water right is a direct-flow water right for the Thurston Pipeline, which was decreed in Case No. W-27, Water Division 2, to divert 25 cfs from Thurston Reservoir into the FLCC's main canal, with an appropriation date of July 15, 1969. The source of water is Thurston Lake, a/k/a Thurston Reservoir, whose water is accumulated from springs in said lake, seepage flowing into the lake from all sides thereof, waste water from a canal of the Fort Lyon Company, rainfall, and waste water flowing in the lake from land of owners adjoining the lake; said water is not tributary to any natural stream of the State of Colorado. In Case No. 83CW119, Water Division 2, 6.68 cfs of the 25 cfs decreed to the Thurston Pipeline was made absolute, and in Case No. 10CW69, Water Division 2, the remaining 18.32 cfs was made absolute.

4. In addition to its direct-flow and storage rights described above, the Fort Lyon Company owns, controls, and/or operates the water rights and water supply agreements summarized in Table 3 below.

Table 3
FLCC - Other Water Rights and Water Supply Agreements

Identification of Water Right	Case Number	Amount	Storage/Source
Amity Mutual Irrigation Company – Queens Reservoir	80CW019 89CW076	5,483 af	Queen Reservoir Horse Creek Reservoir Adobe Creek Reservoir John Martin Reservoir
John Martin Reservoir Change	79CW160 79CW161 80CW051	Cumulative 5,000 af	Horse Creek Reservoir Adobe Creek Reservoir Queen Reservoir
Change in Diversion Point	79CW178	933 cfs	Horse Creek Reservoir Adobe Creek Reservoir John Martin Reservoir
Winter Water Storage	84CW179	38,160 af of the first 100,000 af	Horse Creek Reservoir

Program		and 38.16% of all water over 103,106 af	Adobe Creek Reservoir Thurston Reservoir
John Martin Reservoir Exchange	90CW047	Absolute: flow rate 544 cfs, annual limit 15,288.95 af Conditional: 606 cfs	John Martin Reservoir
John Martin Operating Plan 1980	Arkansas River Compact Administration April 24, 1980	20,000 af	John Martin Reservoir
Fryingpan-Arkansas Project		Varies depending on hydrologic conditions	
Informal Basis	Periodically the FLCC works with other area canals to increase water availability to shareholders		

The foregoing identification of the Fort Lyon Company's water rights is based on the Parties' current information and is not intended to exclude any other water rights that the Fort Lyon Company may own or control.

II. <u>Location of dry-up farms and numbers of associated FLCC Shares involved</u>:

<u>The FLCC Shares historically have been used under the Fort Lyon Canal. The Subject Farms are located generally between Prowers County Road 3 and 10. ARF owns Farms 62A, 118 and 141 and holds recorded assignments of dry-up covenants for farm 62B. **Exhibit G**. The Applicants also attached a sample of a representative dry-up covenant as **Exhibit H** that ARF intends to convey to LAWMA for Farms 62A, 118 and 141 when the FLCC Shares are conveyed to LAWMA.</u>

(b) Describe existing water utilization including historic yield from rights and use by category such as agricultural, municipal and industrial and supply obligations to other systems; and

<u>Under its 2019 augmentation plan and Rule 14 plan, LAWMA will deliver approximately 33,077 acre-feet of augmentation and replacement water to the Arkansas River system. Of the approximately 736 LAWMA structures augmented under the augmentation plan and Rule 14 plan in 2019, 531 (approximately 72%) are agricultural irrigation wells, 70 (approximately 9.5%) are municipal wells, 77 (approximately 10.5%) are commercial wells and the remaining 58 structures are gravel pits, ponds, and wells pumped for other uses. None of the FLCC Shares that are the subject of this application will be diverted for direct municipal use. The Rule 14 plan and supporting reports are in **Exhibit I.**</u>

(c) Provide a description and sufficiently detailed engineering plans and specifications, prepared by a registered professional engineer, of the proposed construction of structures, buildings and improvements associated with the project and the financial, environmental and social impacts thereof on the community or surrounding areas within the development area and source development area.

<u>The engineering plans and specifications are attached as **Exhibit** J,</u>

Exhibit K concerns financial impacts, the response to criterion 6 below addresses the lack of environmental impacts and there are no social impacts.

(6) Environmental impact analysis:

(a) Land Use:

(i) Provide a map (at an appropriate scale) detailing existing land uses of the development area which may be impacted. The land use map should include, but not necessarily be restricted to the following categories: residential, commercial, industrial, open space, outdoor recreation, agricultural, forest land and water bodies (surface and subsurface);

Please see **Exhibit L**.

(ii) All immediately affected public land boundaries should be indicated on the map. Potential impacts of the proposed development upon public lands will be visually illustrated on the map as well as described in textual form;

There are none.

(iii) Specify whether the proposed development conforms to this County's planning policies, including, without limitation, the Prowers County Master Plan;

The development conforms to the County’s planning policies, including the Master Plan, Goals 2, 3 and and objectives 3.3 and 3.4.

(iv) Describe the relationship, if any, of the proposed development to formally adopted regulations and policies of federal, state, regional or county governments, which regulations or policies would govern the use of land or water resources impacted by the project;

N/A

(v) Describe the present use and zoning of the land in the development area;

The Subject Farms are located in Zoning District A-1. This will not change after the project is completed.

(vi) Describe the agricultural productivity capability of the land in the development area (NRCS classification);

The Crop irrigation requirement information for the historically irrigated acres is contained in Hendrix Wai Engineering’s report that was filed in support of the application for Rule 14 plan. That report is part of **Exhibit M**.

See the materials in **Exhibit N**. Exhibit N contains the following information:

N-1 ARF Dryland Farms Location Map
N-2 List of ARF Dryland Farms
N-3 ARF Dryland Farms activity
N-4 ARF Dryland Farms Soil Profile Maps
N-5 ARF Dryland Farms Crop Consultant Report

(vii) Describe the potential adverse impact of the proposed development on the soil of the source development area, including impact upon soil productivity, potential soil loss from air or water erosion, and degradation from susceptibility to noxious weed invasion.

As required by the FLCC Board approval of the proposed change of use of the FLCC Shares and by the dry-up covenants that ARF will convey to LAWMA for the Subject Farms, ARF will implement dry-land farming or revegetation practices to prevent soil degradation or loss, blowing dust, and development of noxious weeds. Therefore, there will be no adverse impacts on the dry-up farms' soil.

(b) Water Resources

(i) Describe and indicate on an appropriate map relevant surface water bodies (streams, lakes and reservoirs) and groundwater aquifers in the source development area and their uses;

Please see **Exhibit L.**

(ii) On the same, or other appropriate map, indicate any floodplain associated with the proposed development. Documentation of historical flooding activity should be included;

N/A

(iii) Describe potential effects of the proposed development on eutrophication, wasteload allocations and water quality of rivers, streams, aquifers and/or any existing or proposed reservoirs in this County;

The development will cause no such effects.

(iv) Describe potential effects of the proposed development on the above-described water features in the source development area, including the effects on present water quality and current uses. Include a detailed statement of impacts of the proposed project upon water quality standards including, but not limited to antidegradation standards, and all applicable basic or numeric standards for physical, biological, organic, inorganic, and metals pollutants; and

Please see the map attached as **Exhibit L**. LAWMA's diversion of water available to the FLCC Shares will have no adverse effect on the water features shown on Exhibit L. Historical diversions and return flows to the Arkansas River, including groundwater return flows, associated with the use of the FLCC Shares will not change from historical conditions.

Applicants will not cause adverse impacts on water quality or wetlands due to dry-up of formerly irrigated lands. The historical return flow component of the FLCC Share is returned to the Arkansas River following the dry-up. Thus, the stream regime is maintained without adding salt loads from irrigating the dry-up lands. A 2012 Colorado Water Institute Study investigated the relationship between irrigation and water quality. Irrigation Practices, Water Consumption, & Return Flows in Colorado's Lower Arkansas River Valley (Garcia et. al. 2012). **Exhibit O**. The study reported that in Lower Arkansas Valley areas with salty soils, surface irrigation resulting in large volumes of deep percolation return flows (water moving below the crop root zone) create salt loading which increases the salinity of the streams receiving the return flows. Removing the Subject Farms from irrigation will therefore improve and not degrade water quality. Any wetlands artificially maintained by the historical return flows will continue to be maintained because all return flows will be returned to the same location and in the same amount as the historical return flows.

(v) Describe the potential adverse effects of the proposed development upon plant and animal life dependent upon the water resources in the development area and source development area.

LAWMA's diversion of water available to the FLCC Shares will have no adverse effects upon plant or animal life because that diversion will replicate historical use of the FLCC Shares. Likewise, LAWMA will deliver water to the stream to replicate historical return flows from use of the FLCC Shares. Accordingly, LAWMA's use of the FLCC Shares will have no adverse impact on the amount or location of water available for plant and animal life. **Exhibit P.**

(c) Air Quality

Detail the impact of the proposed development on ambient air quality of the source development area and its environs. Specifically include description of impacts associated with airborne dust.

As required by the FLCC Board approval of the proposed change of use of the FLCC Shares and by the dry-up covenants that ARF will convey to LAWMA for the Subject Farms, ARF will implement dry-land farming or revegetation practices to prevent soil degradation or loss, blowing dust, and development of noxious weeds. Therefore, there will be no adverse impacts on ambient air quality.

(d) Significant Environmentally Sensitive Factors

Identify and locate on a map of an appropriate scale each of the following features present in the source development area and its environs and detail the potential impact of the proposed development upon each feature:

Please see the map attached as **Exhibit L**.

(i) Marshlands and wetlands,

The development will not affect marshlands or wetlands.

(ii) Groundwater recharge areas,

The development will not affect existing groundwater recharge areas. LAWMA will deliver water to new recharge ponds on ARF Farm No. 63 as a means of returning water to the stream system to replicate historical return flows from irrigation of the dry-up farms, and to generate augmentation and replacement credits. Before use, each of the recharge ponds' design and operation must be approved in writing by the Office of the Division Engineer.

(iii) Potential natural hazards,

The development will not affect potential natural hazards.

(iv) Forests and woodlands,

The development will not affect forests or woodlands.

(v) Critical wildlife habitat or other wildlife protection areas,

LAWMA's diversion of water available to the FLCC Shares is not expected to have adverse effects upon wildlife habitat because that diversion will replicate historical use of the FLCC Shares. **Exhibit P.** Likewise, LAWMA will deliver water to the stream to replicate historical return flows from use of the FLCC Shares. Accordingly, LAWMA's use of the FLCC Shares will have no impact on the amount of water available for wildlife. In fact, ARF will construct recharge ponds that LAWMA will operate on Farm No. 63 that may have a positive impact on wildlife habitat, particularly for migratory waterfowl. Further, dry-land crops planted on certain of the Subject Farms may provide cover for pheasants and other wildlife.

(vi) Public outdoor recreation areas,

The development will not affect public outdoor recreation areas.

(vi) Critical aquatic life habitat, and

The development will not affect critical aquatic life habitat.

(vii) Agricultural lands.

<u>As described above, and as required by the FLCC Board approval of the proposed change of use of the FLCC shares and by the dry-up covenants that ARF will convey to LAWMA for the Subject Farms, ARF will implement dry-land farming or revegetation practices to prevent soil degradation or loss, blowing dust, and development of noxious weeds on the Subject Farms. Therefore, the Subject Farms will retain their agricultural character.</u>

(e) Visual Aesthetics and Nuisance Factors:

Identify any significant deterioration of existing natural aesthetics, creation of visual blight, noise pollution or obnoxious odors which may stem from the proposed development, including airborne dust and noxious weed invasion.

<u>As described above, and as required by the FLCC Board approval of the proposed change of use of the FLCC shares and by the dry-up covenants that ARF will convey to LAWMA for the Subject Farms, ARF will implement dry-land farming or revegetation practices to prevent soil degradation or loss, blowing dust, and development of noxious weeds on the Subject Farms. As a result, there will be no significant deterioration of existing natural aesthetics, no creation of visual blight, and no airborne dust or noxious weed invasion. The development will cause no noise pollution or obnoxious odors.</u>

(f) Revegetation Plan:

All applications must include a detailed revegetation plan for all land areas from which historic [sic] irrigation practices will be removed. Describe all revegetation plans or efforts proposed as part of the development, including any such plans required as a condition of any Water Court decree pertaining to the developments. Such plan shall include, at a minimum:

(i) Description of all lands included.

(ii) Plant and seed material to be used and the method and timing of their application.

(iii) Source, amount, timing and seasonal duration of irrigation water to be applied to establish the intended revegetation, for a period no less than two (2) growing seasons.

(iv) Whether the plan is required as a part of any Water Court transfer decree, and if so whether the plan has been approved by the Water Court (include a copy of the decree and plan as so approved).

(v) Proposed security to guarantee implementation of the revegetation plan.

The Permit Authority may, but is not required to consider a Water Court approved revegetation plan as partial or full satisfaction of the requirements of this Section 4.03(6)(f)

ARF will dry-land farm or revegetate the Subject Farms. The proposed dry-land farming and revegetation certification process is set forth in **Exhibit Q.** The FLCC Board and Bent County approved this process for implementing a reasonable dry-land farming or revegetation plan. ARF proposes that Prowers County adopt the same process to prevent conflicting overlap in regulatory requirements.

(7) Financial impact analysis, including but not limited to the following:

(a) Review and summary of any assessed taxable property valuations, property tax collection experience, and all other matters of aid in determining the impact of the proposed development upon the County.

(b) Proposed security to guarantee revegetation.

Applicants propose that the County rely on an Irrevocable Standby Letter of Credit issued by RABO AGRIFINANCE LLC, a Delaware limited liability company in a maximum amount of up to ____________________________ ("Stated Amount"). This amount reflects a rate of $250/acre. The $250/acre amount is based on the Fort Lyon Canal Company decision on the subject. **Exhibit A**, pp. 20-22. This document provides:

ARF presented testimony from Brad Walker and Bill Grasmick on the viability of revegetation and dry-land farming of historically irrigated lands. The FLCC Board also received testimony from Michelle Nelson and Karen Conrad concerning such matters. The FLCC Board determined that in order to have an acceptable probability of success, ARF must conduct its dry-land farming in adherence with the principles set forth in **Exhibit A**. The FLCC Board further determined that any LAWMA Dry-Up lands that are dry-land farmed must also comply with the Colorado Weed Management Act, Article 5.5 of Title 35, C.R.S. and all other state and local laws concerning control of noxious weeds and control of soil erosion caused by wind dust and may not grow alfalfa or other highly water consumptive species.

(8) The benefits of the project, both in natural and socioeconomic terms, and the degree to which benefits, both within the County and to the applicant, outweigh the adverse impacts of the project within the County.

Please see **Exhibit K** attached.

Exhibit F
ARF PROPOSED DRY-LAND FARMING CERTIFICATION PROCESS

This exhibit responds to the requirement that Applicant show how Design and Performance Standards will be met for the farms subject of this application ("Subject Farms" or "Subject Farm").

The FLCC Board approved the following process for implementing a reasonable dry-land farming plan ("Process"). ARF proposes that the County adopt the same Process to prevent overlap in regulatory requirements.

I. DRY-LAND PROCESS

1. Upon the removal of irrigation water from each Subject Farm, such parcel shall be subject to these requirements to be converted to dry-land farming. The conversion to dry-land farming shall be done in the manner described in Sections II A and B below.

2. ARF shall have ten (10) years from the date irrigation water is removed from a Subject Farm to obtain a Certificate of Completion for that parcel.

3. Prior to removal of a Subject Farm parcel from irrigation, ARF will give notice to the County and Company that provides the identity of the parcel(s) to be removed from irrigation.

4. ARF will obtain security in an amount equal to the number of acres historically irrigated by any LAWMA Dry-Up farm removed from irrigation multiplied by $250 (number of acres in farm removed from irrigation X $250 = required security amount) to secure its obligation to successfully convert the Subject Farm to dry-land farming. The security shall be a Letter of Credit from Rabo Bank.

5. Once ARF obtains a Certificate of Completion for any particular parcel of the LAWMA Dry-Up, the security for that parcel shall be released consistent with the terms of the security.

6. Once ARF obtains a Certificate of Completion for any parcel of the LAWMA Dry-Up, FLCC shall have no further oversight of the farming or land management practices on that parcel by Prowers County.

7. If ARF has not successfully converted any Subject Farm to dry-land farming within ten years of the parcel being removed from irrigation the County may withdraw and employ from the security such funds as may be necessary to carry out revegetation work

for such parcel, up to an amount equal to the number of acres not certified as complete times $250. In the event that the Company has utilized it's security to revegetate the same parcel, the County shall not withdraw funds from security for revegetation of the same parcel. The County shall provide ARF a reasonable time to cure of no less than one irrigation season for any deficiency identified by the County prior to requesting withdrawal from the security.

8. In the event that the owner of any Subject Farm desires to continue to irrigate portions of the Subject Farm with ground water pumped by wells, the County acknowledges that nothing in this Process is intended to preclude the owner from continuing to irrigate the Subject Farm with ground water, as long as any such irrigation with ground water is treated as sole-source pumping and is fully augmented under LAWMA's augmentation plan or other augmentation plan approved by the Water Court for Water Division No. 2, or any substitute water supply plan or replacement plan approved by the Colorado State Engineer. If any dry-up covenant for the Subject Farms is more restrictive on the owner of the Subject Farms or more protective of LAWMA than this Process, then the terms and conditions of the dry-up covenant shall control.

9. In the event that the owner of any Subject Farm desires to irrigate portions of the Subject Farm with FLCC shares not part of this application and not previously used on the Subject Farm proposed to be irrigated ("New FLCC shares"), the County acknowledges that nothing in this Process is intended to preclude the owner from doing so, as long as any such irrigation with New FLCC shares has been approved by the Company if required by the FLCC By-laws. If any dry-up covenant for the Subject Farms is more restrictive on the owner of the Subject Farms or more protective of LAWMA than this Process, then the terms and conditions of the dry-up covenant shall control.

II. CERTIFICATION OF COMPLETION

A. Definitions

1. Acceptable Farms where Dry-land Farming will occur means:

   a. The farm has been planted to a dry-land crop or is in a fallow period following a dry-land crop; the crop was planted and farmed without irrigation water, such that it is dependent solely upon precipitation to meet crop water requirements; if other dry-land farming in the region is producing crops, the farm also is producing a dry-land crop with weeds adequately controlled and that controls soil erosion from wind in a manner consistent with state and local law; and minimum crop residue after harvesting a dry-land crop is as described below, and the crop residue is left on the parcel until the parcel is prepared for the next rotation of planting; provided, however, that this requirement for crop residue does not prevent a farmer from controlling weeds by mechanical tillage of the parcel or using other acceptable methods of weed control that do not disturb the residue on the surface. For grain crops, such as winter wheat or milo, this shall include a minimum crop residue of at least thirty percent (30%) determined by the step-point method. For hay or forage crops, crop stubble shall measure at least five inches (5”) with row spacing no more than thirty inches (30”).

b. Recommended best management practices for Farms designated to be Dry-land Farmed shall include the following.

   i. The management of annual precipitation to produce commodities or forage for livestock warranting a reasonable expectation of ongoing profits.

   ii. Weed control methods on crop land may include conservation tillage, mowing or chemicals to manage harvested crop residue to reduce evapotranspiration of soil moisture and maintain ground cover to minimize soil erosion by wind or water.

   iii. Conservation tillage is achieved by the use of non-inversion tillage equipment such as chisels, field cultivators, sweeps, vertical tillage, no-till planters or strip till planters to maximize harvested crop residue ground cover over thirty percent (30%) or more of the entire field.

A farm designated to be Dry-land Farmed will be deemed Acceptable even in the absence of the above-described recommended best management practices, as long as the requirements in Section II A 1.a above have been met for that Subject Farm.

2. Dry-land Farming means the establishment and maintenance of dry-land farming practices with weeds adequately controlled and that controls soil erosion from wind in a manner consistent with state and local law. Dry-land farming practices include: No-Till Dry-land Farming and Minimum-tillage Dry-land Farming.

3. Farm means the parcels of land used for agricultural purposes which will be permanently removed from irrigation as described in the Process.

4. Field means a portion of the Subject Farms.

5. Minimum tillage Dry-land Farming means management of farming operations which seeks to minimize impacts from tilling through the use of a sweep plow, strip-till, or similar technology. Additionally, a farmer may rely on herbicides to control weeds. Both contact and residual herbicides may be used. Periodic fallowing and crop rotation may be used to stabilize the crop yields and allow the soil to rest.

6. No-till Dry-land Farming means a system of planting seeds into untilled soil by opening a narrow slot, trench or band, of sufficient width and depth to obtain proper seed coverage. As no soil tillage is utilized, a farmer must rely on herbicides to control the weeds. Both contact and residual herbicides may be used. Periodic fallowing and crop rotation may be used to stabilize the crop yields and allow the soil to rest.

7. Percentage of Completion is the total dry-up acres for a farm classified as Acceptable divided by the total number of dry-up acres for a Farm as shown in the Annual Report, multiplied by 100.

B. Annual Report.

1. On or about December 1 of every year ARF shall submit a report to the Company, County and the Water Court that provides information about the Subject Farms <u>that have been removed from irrigation</u>. The Annual Report shall provide the following information:

    a. The number of the Subject Farm and the year that irrigation water first was removed.

    b. The total number of acres that were dried-up.

    c. The Percentage of Completion for the Subject Farm.

    d. The approximate annual precipitation that fell on the Subject Farm, which may be estimated based on the average of published local weather station data.

    e. The efforts undertaken in the preceding year to convert the Subject Farm to Dry-land Farming, including information about tilling practices, the planting and fallowing rotation, the crops planted, and the acres fallowed; information about herbicides or pesticides applied; information about efforts to control erosion of the soil caused by wind; information about the amount of crops harvested or the number of animal units grazing the land; and information about the amount of crops planted and harvested by other Dry-land farmers in the area during the preceding year;

    f. Information about the nature of the crop grown and whether the crop is a grain crop or a hay/forage crop. If the crop is a hay/forage crop, the expert also will determine and record the stubble height in inches and the distance, in inches, on which the hay/forage crop was planted.

g. Whether water was used to assist conversion to Dry-land Farming and if so describe the water used in amount and method of application.

h. Whether any other factors occurred that had a negative impact on efforts to convert to Dry-land Farming.

i. If an Annual Report has been filed on the Farm in past years, how the conditions on the Farm compares to past years.

j. If a Farm is recommended for a Certificate of Completion, the Annual Report shall also contain representative photographs of the Farm depicting how the Farm has been converted to Dry-land Farming.

k. Whether the Farm is eligible for issuance of a Certificate of Completion.

C. Certificate of Completion. The criteria for issuing a Certificate of Completion for lands converted to Dry-land Farming shall be:

1. Certificate of Completion may only be issued for an entire Farm.

2. Dry-land Farming: Any Farm where 90% of its Fields were used for one full crop rotation cycle (two years crop production, one year fallow with appropriate stubble and weed control) in accordance with the standards described in Section II A.1 a above and with adequate control of weeds and wind-caused soil erosion in a manner consistent with state and local law shall be granted a Certificate of Completion.

D. Review of Annual Report and Dispute Resolution.

1. ARF shall pay the reasonable expenses of an expert jointly retained by the County and Company (Retained Expert) to review any Annual Report that recommends that a Farm is eligible for a Certificate of Completion.

2. The Retained Expert shall approve or reject the Annual Report that recommends that a Farm is eligible for a Certificate of Completion, no later than January 15.

    a. If the Retained Expert approves the Annual Report, FLCC shall not oppose Water Court approval of a Certificate of Completion for any Farm for which the Annual Report recommends issuance of a Certificate of Completion.

i. Any FLCC stockholder on their own behalf and not on behalf of the FLCC, may separately oppose Water Court approval of a Certificate of Completion for any Farm in which the Annual Report recommends issuance of a Certificate of Completion.

b. If the Retained Expert does not approve an Annual Report that recommends that a Farm is eligible for a Certificate of Completion, ARF's Expert and the Retained Expert, no later than February 1, shall consult and attempt to reach a consensus, which consensus may modify, or add terms to the recommendation contained in the Annual Report.

c. If the experts do not reach consensus on whether a Farm is eligible for a Certificate of Completion, then the recommendation may be withdrawn by ARF or Water Court approval of the Certificate of Completion may be requested, which may be opposed by FLCC.

d. The Water Court shall rule upon any contested request for approval of a Certificate of Completion, whether FLCC or a FLCC stockholder is the opposer.

    i. Any appeal of the Water Court's Process on a request for approval of a Certificate of Completion shall follow the normal rules and procedures for appeal of a water matter.

Farm 62 Dry-up

Purchase History:

Farm 62-Purchased from A.C. & Bonnie Rowan

187.42 Acres

207 Shares FLCC

A tract of land lying in Prowers County, Colorado in the S1/2 of Sec.17, T.22S., R.46W., 6th P.M. and more particularly described as follows:

Beginning at the Southeast corner of said Sec.17 as monumented by aluminum cap properly marked PLS 12103; thence along the South line of said Sec.17 bearing S.89°30'03"W. (GPS bearings), 1479.22 feet; thence N.0°01'25"W., 211.25 feet to the Northeast corner of Tract No.2 of the First Subdivision to the SE1/4 of said Sec.17; thence S.89°29'32"W., 811.77 feet to the Northwest corner of Tract No.2 of the First Subdivision of the S1/2 of said Sec.17; thence along the boundary of Tract No.1 of the First Subdivision of the S1/2 of said Sec.17 as monumented by aluminum caps marked PLS 30087 through the following six courses:

N.1°01'44"W., 964.54 feet; N.27°04'12"E., 388.96 feet;
N.31°48'53"W., 73.44 feet; S.84°43'27"W., 556.68 feet;
S.2°57'11"E., 269.06 feet; S.89°10'05"W., 438.91 feet;

thence departing said subdivision tract bearing N.15°39'56"W., 1440.61 feet; thence N.89°30'03"E., 3904.14 feet (Deed=3889 feet) to the East line of said Sec.17; thence S.1°08'00"E., 2655.85 feet to the point of beginning. SUBJECT TO the South and East 30.00 feet of herein described tract for County Road purposes.

Rowans retained 30 FLCC shares and the follow land:

Tract No. 1: A tract of land lying in Prowers County, Colorado in the S1/2 of Sec 17, T 22 S, R 46 W of the 6th P.M., and being more particularly described as follows: Beginning at the Southeast corner of said Sec 17 as monumented by a ¾" rebar and 3-1/4" aluminum cap marked PLS 12103 and considering the South line of said Sec 17, (as monumented by a similar rebar and cap at its East end), bearing S 89°30'03" W, with all other bearing contained herein being relative thereto; thence S 89°30'03" W, along said South line, a distance of 2687.93 feet to the TRUE POINT OF BEGINNING; thence continuing S 89°30'03" W, 537.07 feet; N 13°49'46" W, 800.00 feet; thence N 15°39'56" W, 504.39 feet; thence N 89°11'05" E, 438.98 feet; thence N 2°56'40" W, 269.24 feet; thence N 84°44'42" E, 556.74 feet; thence S 31°45'11" E, 73.61 feet; thence S 27°05'37" W, 388.87 feet; thence S 1°01'13" E, 964.35 feet; thence S 1°41'24" E, 211.06 feet to the True Point of Beginning. Subject to the South 30.00 feet of said tract for County Road LL Right-of-Way purposes.

Tract No. 2: A tract of land lying in Prowers County, Colorado in the S1/2 of Sec 17, T 22 S, R 46 W of the 6th P.M., and being more particularly described as follows: Beginning at the Southeast corner of said Sec 17 as monumented by a ¾" rebar and 3-1/4" aluminum cap marked PLS 12103 and considering the South line of said Sec 17, (as monumented by a similar rebar and cap at its East end), bearing S 89°30'03" W, with all other bearings contained herein being relative thereto; thence S 89°30'03" W, along said South line, a distance of 1882.28 feet to the TRUE POINT OF BEGINNING; thence continuing S 89°30'03" W, 805.65 feet; thence N 1°41'24" W, 211.06 feet; thence N 89°30'27" E, 812.07 feet; thence S 0°03'11" W, 210.93 feet to the True Point of Beginning. Subject to the South 30.00 feet of said tract for County Road LL Right-of-Way purposes. All in Prowers County, Colorado.

1 Acre of land was donated to the Alta Vista School 3-16-2006
Dry-up Covenant Reception # 510883, 1 Acre that was donated to the Alta Vista School Dry-up

4 Acres of land were sold to the Alta Vista School 3-1-2010
Dry-up Covenant Reception # 523292, 4 Acres that were sold to the Alta Vista School

The 30 shares that Rowans retain from the original sale were purchase 4-14-2006
Dry-up Covenant Reception # 51146, References 30 shares from certificate 9630.
Exhibit "A" list two tracts of land that were retained by the Rowans.

Conclusion:

Dry-Up Covenant Rec# 511146 for Farm #62 relates to 30 FLCC shares (certificate No 9821, replaced by Certificate 10381 on 6/10/15) which irrigated approximately 23.45 acres of land retained by the Rowan's. Dry-Up Covenants Rec#'s 510883 & 510883 are for a total of 5 acres relating to land sold to the Alta Vista School. Both these Dry-Up Covenants reference the full certificate 9629 for 207 FLCC shares and were recorded so as to preserve the historic consumptive use for this 5 acres. The 207 FLCC shares continue to be used on the remaining 177.02 acres Pure Cycle owns attributable to Farm #62b. All the documents appear to be in order on this transaction.

DRY-UP COVENANT

A. On and after May 5, 2006, A. C. Rowan and Bonnie I. Rowan (the "Grantors"), covenant and agree that the water and water rights evidenced by Fort Lyon Canal Company Certificate Nos. 9630, representing 30 shares of the capital stock of the Fort Lyon Canal Company (the "Water Rights") and any other water shall not be used upon or in connection with the real property described in Exhibit A hereto (the "Property"), without the prior written consent of SW Lamar, LLC, a Colorado limited liability company ("Grantee"), its successors or assigns, which permission may be withheld in Grantee's sole discretion.

B. From and after May 5, 2006, Grantors covenant not to irrigate said real property with any source of water, including, but not limited to, groundwater, without the prior written consent of SW Lamar, LLC, its successors or assigns. In the event of a breach of this covenant by Grantors, SW Lamar, LLC, its successors or assigns shall be entitled to the remedies of specific performance, damages or both.

C. Grantors further covenant and agree to take those actions necessary to eliminate any consumptive use of water for irrigation purposes on those portions of the Property which were historically irrigated by the Water Rights, or such other portion thereof as determined by a court or other tribunal of competent jurisdiction in the judgment and decree entered in any case involved in the change or exchange of any of the Water Rights.

D. Grantors agree to comply, at Grantor's expense and not Grantee's expense, with any revegetation requirement or other term and condition which may be imposed on the property by a court or other tribunal of competent jurisdiction. In the event of Grantors' failure to do so, SW Lamar, LLC shall have the reimbursement of the costs associated with such revegetation from Grantors.

E. Grantors hereby grant Grantee a non-exclusive, perpetual easement for the purpose of access to and over the Property as may be necessary to take actions to effectuate and enforce this Covenant, including but not limited to the alteration and removal of ditches, and to conduct any monitoring or testing activity that may be a precondition for changing the Water Rights to a new use or place of use.

F. This Covenant may be enforced by Grantee or by any party having any right, title or interest in the Water Rights, or any part thereof, its heirs, successors, and assigns, or by the State Engineer of the State of Colorado, at any time in any action at law or in equity. This Covenant shall bind Grantors, their heirs, successors, assigns and legal representatives. This covenant shall run with and burden the Property and shall run with and benefit the Water Rights.

A C Rowan
A. C. Rowan

Bonnie I. Rowan
Bonnie I. Rowan

REC # 511146 05/18/2006 01:52:40 PM
Prowers County, CO COV Page: 2 of 3 R:16.00 D:0.00

STATE OF COLORADO)
)ss.
COUNTY OF Prowers)

The foregoing instrument was acknowledged before me this 2 day of May, 2006 by A. C. Rowan and Bonnie I. Rowan.

Witness my hand and official seal.
My commission expires: 11-10-2007

STATE OF COLORADO NOTARY PUBLIC

Notary Public

REC # 511146 05/18/2006 01:52:40 PM
Prowers County, CO COV Page: 3 of 3 R:16.00 D:0.00

Exhibit A

Tract No. 1: A tract of land lying in Prowers County, Colorado in the S1/2 of Sec 17, T 22 S, R 46 W of the 6th P.M., and being more particularly described as follows: Beginning at the Southeast corner of said Sec 17 as monumented by a ¾" rebar and 3-1/4" aluminum cap marked PLS 12103 and considering the South line of said Sec 17, (as monumented by a similar rebar and cap at its East end), bearing S 89°30'03" W, with all other bearing contained herein being relative thereto; thence S 89°30'03" W, along said South line, a distance of 2687.93 feet to the TRUE POINT OF BEGINNING; thence continuing S 89°30'03" W, 537.07 feet; N 13°49'46" W, 800.00 feet; thence N 15°39'56" W, 504.39 feet; thence N 89°11'05" E, 438.98 feet; thence N 2°56'40" W, 269.24 feet; thence N 84°44'42" E, 556.74 feet; thence S 31°45'11" E, 73.61 feet; thence S 27°05'37" W, 388.87 feet; thence S 1°01'13" E, 964.35 feet; thence S 1°41'24" E, 211.06 feet to the True Point of Beginning. Subject to the South 30.00 feet of said tract for County Road LL Right-of-Way purposes.

Tract No. 2: A tract of land lying in Prowers County, Colorado in the S1/2 of Sec 17, T 22 S, R 46 W of the 6th P.M., and being more particularly described as follows: Beginning at the Southeast corner of said Sec 17 as monumented by a ¾" rebar and 3-1/4" aluminum cap marked PLS 12103 and considering the South line of said Sec 17, (as monumented by a similar rebar and cap at its East end), bearing S 89°30'03" W, with all other bearings contained herein being relative thereto; thence S 89°30'03" W, along said South line, a distance of 1882.28 feet to the TRUE POINT OF BEGINNING; thence continuing S 89°30'03" W, 805.65 feet; thence N 1°41'24" W, 211.06 feet; thence N 89°30'27" E, 812.07 feet; thence S 0°03'11" W, 210.93 feet to the True Point of Beginning. Subject to the South 30.00 feet of said tract for County Road LL Right-of-Way purposes. All in Prowers County, Colorado.

DRY-UP COVENANT

A. On and after April 14, 2006, the record title owner (the "Owner"), covenants and agrees that the water and water rights evidenced by Fort Lyon Canal Company Certificate No. 9629, representing 207 shares of the capital stock of the Fort Lyon Canal Company (the "Water Rights") and any other water shall not be used upon or in connection with the real property described in Exhibit A hereto (the "Property"), without the prior written consent of High Plains A & M, LLC, a Colorado limited liability company as successor by merger to High Plains A & M, LLC, a Nevada limited liability company ("Grantee"), its successors or assigns, which permission may be withheld in Grantee's sole discretion.

B. From and after April 14, 2006, Owner covenants not to irrigate said real property with any source of water, including, but not limited to, groundwater, without the prior written consent of Grantee, its successors or assigns. In the event of a breach of this covenant by Owner, Grantee, its successors or assigns shall be entitled to the remedies of specific performance, damages or both.

C. Owner further covenants and agrees to take those actions necessary to eliminate any consumptive use of water for irrigation purposes on those portions of the Property which were historically irrigated by the Water Rights, or such other portion thereof as determined by a court or other tribunal of competent jurisdiction in the judgment and decree entered in any case involved in the change or exchange of any of the Water Rights.

D. Owner agrees to comply, at Owner's expense and not Grantee's expense, with any revegetation requirement or other term and condition which may be imposed on the property by a court or other tribunal of competent jurisdiction. In the event of Owner's failure to do so, Grantee shall have the reimbursement of the costs associated with such revegetation from Owner.

E. Owner hereby grants Grantee a non-exclusive, perpetual easement for the purpose of access to and over the Property as may be necessary to take actions to effectuate and enforce this Covenant, including but not limited to the alteration and removal of ditches, and to conduct any monitoring or testing activity that may be a precondition for changing the Water Rights to a new use or place of use.

F. This Covenant may be enforced by Grantee or by any party having any right, title or interest in the Water Rights, or any part thereof, its heirs, successors, and assigns, or by the State Engineer of the State of Colorado, at any time in any action at law or in equity. This Covenant shall bind Owner, its heirs, successors, assigns and legal representatives. This covenant shall run with and burden the Property and shall run with and benefit the Water Rights.

High Plains A & M, LLC, a Colorado limited liability company

By: [signature]

Its: authorized agent

510883
Page: 2 of 3
04/18/2006 12:10P
Prowers County, CO MISC R 16.00 D 0.00

STATE OF COLORADO)
)ss.
COUNTY OF Denver)

The foregoing instrument was acknowledged before me this 13th day of April, 2006 by Robert J. Bruce as Authorized Agent of High Plains A & M, LLC, a Colorado limited liability company.

Witness my hand and official seal.
My commission expires: 3-3-09

SHANNON M. MEARY NOTARY PUBLIC STATE OF COLORADO

Notary Public

510883
Page: 3 of 3
04/18/2006 12:10P
Prowers County, CO. MISC R 16.00 D 0.00

Exhibit A

A tract of land lying in the Southeast Quarter of Section 17, Township 22 South, Range 46 West of the 6th P.M., Prowers County, Colorado, described as follows:

Commencing at the Southeast Corner of Tract No. 2, First Subdivision of the SE 1/4 Section 17, Township 22 South, Range 46 West, of the 6th P.M. Prowers County, Colorado, according to the plat thereof recorded on the 3rd day of January, 2000, under reception no. 487239 of the records of said County; Thence N00°29'56"W, along the West line thereof, 30.00' to a point on the North line of County Road LL, being the point of beginning; Thence N39°53'41"W along the Northeast line, 234.51' to the Northeast corner thereof; Thence N89°27'25"E along the North line thereof extended, 291.06'; Thence S00°29'56"E, 211.45'; Thence S89°30'04"W along the South line of said Section 17, 142.22' to the point of beginning.

DRY-UP COVENANT

A. On and after February 5th 2010, the record title owner (the "Owner"), covenant and agree that the water and water rights evidenced by Fort Lyon Canal Company Certificate No. 9876 representing 207 shares of the capital stock of the Fort Lyon Canal Company (the "Water Rights") and any other water shall not be used upon or in connection with the real property described in Exhibit A hereto (the "Property"), without the prior written consent of Pure Cycle Corporation, a Colorado Corporation ("Grantee"), its successors or assigns, which permission may be withheld in Grantee's sole discretion.

B. From and after February 5th 2010, Owner covenants not to irrigate said real property with any source of water, including, but not limited to, groundwater, without the prior written consent of Grantee, its successors or assigns. In the event of a breach of this covenant by Owner, Grantee, its successors or assigns shall be entitled to the remedies of specific performance, damages or both.

C. Owner further covenants and agrees to take those actions necessary to eliminate any consumptive use of water for irrigation purposes on those portions of the Property which were historically irrigated by the Water Rights, or such other portion thereof as determined by a court or other tribunal of competent jurisdiction in the judgment and decree entered in any case involved in the change or exchange of any of the Water Rights.

D. Owner agrees to comply, at Owner's expense and not Grantee's expense, with any revegetation requirement or other term and condition which may be imposed on the property by a court or other tribunal of competent jurisdiction. In the event of Owner's failure to do so, Grantee shall have the reimbursement of cost associated with such revegetation from Owner.

E. Owner hereby grants Grantee a non-exclusive, perpetual easement for the purpose of access to and over the Property as may be necessary to take actions to effectuate and enforce this Covenant, including but not limited to the alteration and removal of ditches, and to conduct any monitoring or testing activity that may be a precondition for changing the Water Rights to a new use or place of use.

F. This Covenant may be enforced by Grantee or by any party having any right, title or interest in the Water Rights, or any part thereof, its heirs, successors, and assigns, or by the State Engineer of the State of Colorado, at any time in any action at law or in equity. This Covenant shall bind Owner, their heirs, successors, assigns and legal representatives. This covenant shall run with and burden the Property and shall run with and benefit the Water Rights.

PURE CYCLE CORPORATION, a
Colorado corporation

By: ______________________
Mark W. Harding, President

STATE OF COLORADO)
CITY AND) ss.
COUNTY OF DENVER)

The foregoing instrument was acknowledged before me this [illegible] day of [illegible], 2010, by Mark W. Harding, as President of Pure Cycle Corporation, a Colorado corporation.

Witness my hand and official seal.

My commission expires: [illegible]

____
Notary Public

KEVIN B McNEILL
NOTARY
PUBLIC
STATE OF COLORADO
My Commission Expires 11/09/2013

REC # 523292 03/02/2010 02:27:22 PM
COV Page: 2 of 3 R:16.00 D:0.00
Prowers County, CO

Exhibit A

Legal Description

A Tract of land lying in the Southeast Quarter of Section 17, Township 22 South, Range 46 West of the 6th P.M., Prowers County, Colorado, described as follows: Beginning at a point on the south line of said Southeast Quarter of Section 17 that bears S89°30'04"W along said south line, 681.74 feet from the southeast corner thereof; Thence continuing S89°30'04"W along said south line, 504.52 feet; Thence N00°29'56"W, 211.54 feet; Thence S89°27'25"W, 693.96 feet; Thence N00°3'11"E, 89.32 feet; Thence N89°30'04"E, 912.40 feet; Thence S47°44'11"E, 285.95 feet; Thence S35°51'51"E, 130.08 feet to the point of beginning, and containing 4.00 acres.

REC # 523292 03/02/2010 02:27:22 PM
COV Page: 3 of 3 R:16.00 D:0.00
Prowers County, CO

Farm 62 Dry-up

Purchase History:

Farm 62-Purchased from A.C. & Bonnie Rowan

187.42 Acres

207 Shares FLCC

A tract of land lying in Prowers County, Colorado in the S1/2 of Sec.17, T.22S., R.46W., 6th P.M. and more particularly described as follows:

Beginning at the Southeast corner of said Sec.17 as monumented by aluminum cap properly marked PLS 12103; thence along the South line of said Sec.17 bearing S.89°30'03"W. (GPS bearings), 1479.22 feet; thence N.0°01'25"W., 211.25 feet to the Northeast corner of Tract No.2 of the First Subdivision to the SE1/4 of said Sec.17; thence S.89°29'32"W., 811.77 feet to the Northwest corner of Tract No.2 of the First Subdivision of the S1/2 of said Sec.17; thence along the boundary of Tract No.1 of the First Subdivision of the S1/2 of said Sec.17 as monumented by aluminum caps marked PLS 30087 through the following six courses:

N.1°01'44"W., 964.54 feet; N.27°04'12"E., 388.96 feet;
N.31°48'53"W., 73.44 feet; S.84°43'27"W., 556.68 feet;
S.2°57'11"E., 269.06 feet; S.89°10'05"W., 438.91 feet;

thence departing said subdivision tract bearing N.15°39'56"W., 1440.61 feet; thence N.89°30'03"E., 3904.14 feet (Deed=3889 feet) to the East line of said Sec.17; thence S.1°08'00"E., 2655.85 feet to the point of beginning. SUBJECT TO the South and East 30.00 feet of herein described tract for County Road purposes.

Rowans retained 30 FLCC shares and the follow land:

Tract No. 1: A tract of land lying in Prowers County, Colorado in the S1/2 of Sec 17, T 22 S, R 46 W of the 6th P.M., and being more particularly described as follows: Beginning at the Southeast corner of said Sec 17 as monumented by a ¾" rebar and 3-1/4" aluminum cap marked PLS 12103 and considering the South line of said Sec 17, (as monumented by a similar rebar and cap at its East end), bearing S 89°30'03" W, with all other bearing contained herein being relative thereto; thence S 89°30'03" W, along said South line, a distance of 2687.93 feet to the TRUE POINT OF BEGINNING; thence continuing S 89°30'03" W, 537.07 feet; N 13°49'46" W, 800.00 feet; thence N 15°39'56" W, 504.39 feet; thence N 89°11'05" E, 438.98 feet; thence N 2°56'40" W, 269.24 feet; thence N 84°44'42" E, 556.74 feet; thence S 31°45'11" E, 73.61 feet; thence S 27°05'37" W, 388.87 feet; thence S 1°01'13" E, 964.35 feet; thence S 1°41'24" E, 211.06 feet to the True Point of Beginning. Subject to the South 30.00 feet of said tract for County Road LL Right-of-Way purposes.

Tract No. 2: A tract of land lying in Prowers County, Colorado in the S1/2 of Sec 17, T 22 S, R 46 W of the 6th P.M., and being more particularly described as follows: Beginning at the Southeast corner of said Sec 17 as monumented by a ¾" rebar and 3-1/4" aluminum cap marked PLS 12103 and considering the South line of said Sec 17, (as monumented by a similar rebar and cap at its East end), bearing S 89°30'03" W, with all other bearings contained herein being relative thereto; thence S 89°30'03" W, along said South line, a distance of 1882.28 feet to the TRUE POINT OF BEGINNING; thence continuing S 89°30'03" W, 805.65 feet; thence N 1°41'24" W, 211.06 feet; thence N 89°30'27" E, 812.07 feet; thence S 0°03'11" W, 210.93 feet to the True Point of Beginning. Subject to the South 30.00 feet of said tract for County Road LL Right-of-Way purposes. All in Prowers County, Colorado.

1 Acre of land was donated to the Alta Vista School 3-16-2006
Dry-up Covenant Reception # 510883, 1 Acre that was donated to the Alta Vista School Dry-up

4 Acres of land were sold to the Alta Vista School 3-1-2010
Dry-up Covenant Reception # 523292, 4 Acres that were sold to the Alta Vista School

The 30 shares that Rowans retain from the original sale were purchase 4-14-2006
Dry-up Covenant Reception # 51146, References 30 shares from certificate 9630.
Exhibit "A" list two tracts of land that were retained by the Rowans.

Conclusion:

Pure Cycle owns the land associated with the Historical use of the shares except for the 5 acres that have been donated to the Alta Vista School and the acres retained by Rowans in the initial purchase. All the documents appear to be in order on this transaction.

Prowers 1041 Exhibit G-62

INCORPORATED UNDER THE LAWS OF THE STATE OF COLORADO.

9821

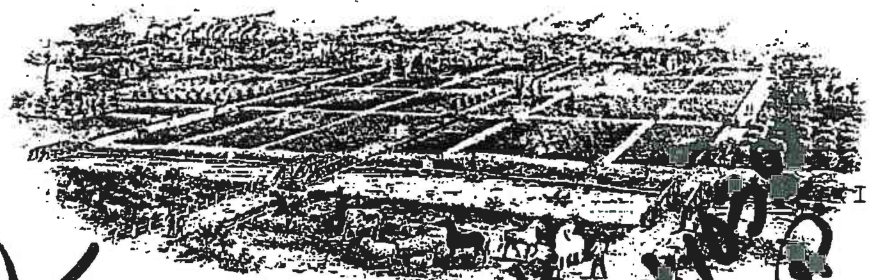
NUMBER

-30-

SHARES

THE FORT LYON CANAL COMPANY

CAPITAL STOCK
$525,000



105,000 SHARES
$5.00 EACH

This Certifies that SW Lamar, LLC a Colorado limited liability company** & A.C. Rowan & Bonnie I. Rowan, 1st mortgagee is the owner of Thirty and no/100 Shares of the Capital Stock of

THE FORT LYON CANAL COMPANY, transferable only on the books of the company in person or by Attorney on surrender of this Certificate and under such conditions as may be imposed by the By-Laws of the Company or rules established by the Board of Directors of the said Company.

The stock represented by this Certificate is subject to assessments as provided by the Articles of Incorporation and By-Laws of the Company and to all by-laws, rules and regulations adopted by the Company, and other existing liens on the water right represented by said stock, whether created by law, or the predecessor in ownership of this stock or otherwise.

And the said owner of this Certificate, by virtue thereof is entitled to 30/100 cubic feet of water per second of time from said canal to be used on the following described land:

Tracts 1 & 2 totaling 2,737 acres of the first subdivision of S½ 17-22-46 Prowers County, Colorado

the said water to be delivered pro rata and in accordance with the rules and regulations governing the distribution thereof established by the Corporation, and/or its directors, and is also subject to all decrees of court establishing the right to the use of water by the said Company or limiting the use thereof, now or hereafter entered.

Cancel 5/21/15

Replaced by certificate #1051

In Witness Whereof the President and Secretary have hereunto subscribed their names and caused its corporate seal to be affixed at Las Animas, Colorado this 9th *day of* August *A. D.* 2006

Mike [signature]
Secretary.

Dale L. [signature]
President.

SEAL

INCORPORATED UNDER THE LAWS OF THE STATE OF COLORADO.

NUMBER 10381

SHARES -30-

THE FORT LYON CANAL COMPANY

CAPITAL STOCK
$525,000

105,000 SHARES
$5.00 EACH

*Equity Owner

This Certifies that Pure Cycle Corporation, a Colorado Corporation,* is the owner of - - -Thirty and no/100- - - Shares of the Capital Stock of

THE FORT LYON CANAL COMPANY, transferable only on the books of the company in person or by Attorney on surrender of this Certificate and under such conditions as may be imposed by the By-Laws of the Company or rules established by the Board of Directors of the said Company.

The stock represented by this Certificate is subject to assessments as provided by the Articles of Incorporation and By-Laws of the Company and to all by-laws, rules and regulations adopted by the Company, and to all existing liens on the water right represented by said stock, whether created by law, or the predecessor in ownership of this stock or otherwise.

And the said owner of this Certificate, by virtue thereof, is entitled to 30/100 cubic feet of water per second of time from said canal to be used on the following described land:

Tracts 1 & 2 totaling 27.37 acres of the first subdivision of S½ 17-22-46, Prowers County, Colorado

the said water to be delivered pro rata and in accordance with the rules and regulations governing the distribution thereof established by the Corporation, and/or its directors, and is also subject to all decrees of court establishing the right to the use of water by the said Company or limiting the use thereof, now or hereafter entered.

In Witness Whereof the President and Secretary have hereunto subscribed their names and caused its corporate seal to be affixed at Las Animas, Colorado this Tenth day of June A. D. 2015

Secretary.

President.

DRY-UP COVENANT

This DRY-UP COVENANT ("Covenant") dated as of this ____ day of March 5, 2019 is granted by Arkansas River Farms, LLC, a Colorado limited liability company with an address of 1400 16th Street Suite 320 Denver, Colorado 80202 ("Grantor"), for the benefit of Lower Arkansas River Management Association., ("Grantee").

A. On and after March 5, 2015, Grantor, covenants and agrees that the water and water rights evidenced by Fort Lyon Canal Company Certificate No. 10445, representing 230 shares of the capital stock of the Fort Lyon Canal Company (the "Water Rights") and any other water shall not be used in connection with the real property described in Exhibit A hereto (the "Property"), without the prior written consent of Grantee, its successors or assigns, which permission may be withheld in Grantee's sole discretion; provided, however, that Grantor may use such amount of the Water Rights as is reasonably required to fulfill its obligations in Paragraph D below.

B. Subject to the proviso set forth in Paragraph A above, from and after the date set forth above, Grantor covenants not to irrigate the Property with any source of water, including, but not limited to, groundwater, without the prior written consent of Grantee, its successors or assigns. In the event of a breach of this covenant by Grantors, Grantee, its successors or assigns shall be entitled to the remedies of specific performance, damages or both.

C. Subject to the proviso set forth in Paragraph A above, Grantor further covenants and agrees to take those actions necessary to eliminate any consumptive use of water for irrigation purposes on those portions of the Property which were historically irrigated by the Water Rights, or such other portion thereof as determined by a court or other tribunal of competent jurisdiction in the judgment and decree entered in any case involved in the change or exchange of any of the Water Rights.

D. Grantor agrees to comply with any revegetation requirement or other term and condition which may be imposed on the Property by a court or other tribunal of competent jurisdiction. In the event of Grantor's failure to do so, Grantee is hereby granted an easement to enter onto the Property and may do so. In such event, Grantee shall have the reimbursement of the costs associated with such revegetation from Grantor.

E. This Covenant shall not prohibit Grantor, its successors or assigns from irrigating the Property (1) with water rights which may in the future be transferred to the Property and judicially approved for such use by a court or other tribunal of competent jurisdiction; (2) with water from a well or wells to be constructed in the future which are authorized to pump pursuant to a plan for augmentation approved by a court or other tribunal of competent jurisdiction; (3) with water which is not tributary to the Arkansas River or any of its tributaries; (4) or with treated water supplied by a municipal or quasi-municipal government water provider.

F. Grantor hereby grants Grantee a non-exclusive, perpetual easement for the purpose of access to and over the Property as may be necessary to take actions to effectuate and enforce this Covenant, including but not limited to the alteration and removal of ditches, and to conduct any monitoring or testing activity that may be a precondition for changing the Water Rights to a new use or place of use.

G. This Covenant may be enforced by Grantee or by any party having any right, title or interest in the Water Rights, or any part thereof, its heirs, successors, and assigns, or by the State Engineer of the State of Colorado, at any time in any action at law or in equity. This Covenant shall bind Grantor, its successors, assigns, legal representatives and heirs, if applicable. This Covenant shall run with and burden the Property and shall run with and benefit the Water Rights. For purposes of this Covenant, "Grantee" shall mean the party named above and any one or more parties holding title, from time to time, to any of the shares representing the Water Rights.

[Signature and acknowledgement on following page]

IN WITNESS WHEREOF, Grantor has caused this Covenant to be executed this day and year first above written.

GRANTOR:

Arkansas River Farms, LLC,
a Colorado limited liability company

By: ______________________________
Name: Aaron Patsch
Title: Authorized Representative

STATE OF COLORADO)
) ss.
COUNTY OF ARAPAHOE)

The foregoing instrument was acknowledged before me this ____ day of ____________, by Aaron Patsch, as an Authorized Representative

Witness my hand and official seal.

My commission expires: ________________

____
Notary Public

(SEAL)

Exhibit A

Legal Description of the Property

A tract of land lying in Prowers County, Colorado in Section 16, Township 22 South, Range 46 West of the 6th P.M., and more particularly described as follows:

Beginning at the Northwest corner of said Section 16 as monumented by as aluminum cap marked PS, INC. PLS 30087; thence N89°31’58”E (GPS bearings), 2641.51 feet to the Northeast corner of the NW ¼ of said Section 16; thence along the North line of said Section 16 bearing N89°29’49”E, 482.49 feet; thence S0°47’39”E, 2850.00 feet; thence S89°31’05”W, 2637.99 feet; thence N0°39’17”W, 568.69 feet’ thence N85°18’43”W, 489.63 feet to the West line of said Section 16; thence N0°47’39”W, 2237.69 feet to the Point of Beginning, According to a Land Survey Plat by Brundage Land Surveying, Inc., dated April 13, 2015 as Project #22ARFS15.48.

DRY-UP COVENANT

This DRY-UP COVENANT ("Covenant") dated as of this ____ day of March 5, 2019 is granted by Arkansas River Farms, LLC, a Colorado limited liability company with an address of 1400 16th Street Suite 320 Denver, Colorado 80202 ("Grantor"), for the benefit of Lower Arkansas River Management Association., ("Grantee").

A. On and after March 5, 2015, Grantor, covenants and agrees that the water and water rights evidenced by Fort Lyon Canal Company Certificate No. 10446, representing 224 shares of the capital stock of the Fort Lyon Canal Company (the "Water Rights") and any other water shall not be used in connection with the real property described in Exhibit A hereto (the "Property"), without the prior written consent of Grantee, its successors or assigns, which permission may be withheld in Grantee's sole discretion; provided, however, that Grantor may use such amount of the Water Rights as is reasonably required to fulfill its obligations in Paragraph D below.

B. Subject to the proviso set forth in Paragraph A above, from and after the date set forth above, Grantor covenants not to irrigate the Property with any source of water, including, but not limited to, groundwater, without the prior written consent of Grantee, its successors or assigns. In the event of a breach of this covenant by Grantors, Grantee, its successors or assigns shall be entitled to the remedies of specific performance, damages or both.

C. Subject to the proviso set forth in Paragraph A above, Grantor further covenants and agrees to take those actions necessary to eliminate any consumptive use of water for irrigation purposes on those portions of the Property which were historically irrigated by the Water Rights, or such other portion thereof as determined by a court or other tribunal of competent jurisdiction in the judgment and decree entered in any case involved in the change or exchange of any of the Water Rights.

D. Grantor agrees to comply with any revegetation requirement or other term and condition which may be imposed on the Property by a court or other tribunal of competent jurisdiction. In the event of Grantor's failure to do so, Grantee is hereby granted an easement to enter onto the Property and may do so. In such event, Grantee shall have the reimbursement of the costs associated with such revegetation from Grantor.

E. This Covenant shall not prohibit Grantor, its successors or assigns from irrigating the Property (1) with water rights which may in the future be transferred to the Property and judicially approved for such use by a court or other tribunal of competent jurisdiction; (2) with water from a well or wells to be constructed in the future which are authorized to pump pursuant to a plan for augmentation approved by a court or other tribunal of competent jurisdiction; (3) with water which is not tributary to the Arkansas River or any of its tributaries; (4) or with treated water supplied by a municipal or quasi-municipal government water provider.

F. Grantor hereby grants Grantee a non-exclusive, perpetual easement for the purpose of access to and over the Property as may be necessary to take actions to effectuate and enforce this Covenant, including but not limited to the alteration and removal of ditches, and to conduct any monitoring or testing activity that may be a precondition for changing the Water Rights to a new use or place of use.

G. This Covenant may be enforced by Grantee or by any party having any right, title or interest in the Water Rights, or any part thereof, its heirs, successors, and assigns, or by the State Engineer of the State of Colorado, at any time in any action at law or in equity. This Covenant shall bind Grantor, its successors, assigns, legal representatives and heirs, if applicable. This Covenant shall run with and burden the Property and shall run with and benefit the Water Rights. For purposes of this Covenant, “Grantee” shall mean the party named above and any one or more parties holding title, from time to time, to any of the shares representing the Water Rights.

[Signature and acknowledgement on following page]

IN WITNESS WHEREOF, Grantor has caused this Covenant to be executed this day and year first above written.

GRANTOR:

Arkansas River Farms, LLC,
a Colorado limited liability company

By: ______________________________
Name: Aaron Patsch
Title: Authorized Representative

STATE OF COLORADO)
) ss.
COUNTY OF ARAPAHOE)

The foregoing instrument was acknowledged before me this ____ day of ____________, by Aaron Patsch, as an Authorized Representative

Witness my hand and official seal.

My commission expires: ________________

____
Notary Public

(SEAL)

Exhibit A

Legal Description of the Property

Township 22 South, Range 46 West of the Sixth Principal Meridian, County of Prowers, State of Colorado.

Section 17: NE ¼ and that part of NW ¼ lying North and East of the Amity Canal and the Atchison, Topeka and Santa Fe Railway right of way.

AGREEMENT FOR DRY-UP COVENANT AND FOR REVEGETATION OR DRY-LAND FARMING COVENANT, AND GRANT OF NON-EXCLUSIVE RIGHT OF ENTRY AND EASEMENTS

[Farm No. 3 Dry-Up]

THIS AGREEMENT FOR DRY-UP COVENANT AND FOR REVEGETATION OR DRY-LAND FARMING COVENANT, AND GRANT OF NON-EXCLUSIVE RIGHT OF ENTRY AND EASEMENTS ("Agreement") is entered into this _____ day of _______________, 2016, by and between Arkansas River Farms, LLC, a Colorado limited liability company ("Arkansas River Farms"), as Grantor, and Lower Arkansas Water Management Association, a Colorado non-profit corporation ("LAWMA"), as Grantee (together, the "Parties").

Recitals

A. Arkansas River Farms and LAWMA enter into this Agreement as additional consideration for LAWMA's issuance of 8,043 shares of common LAWMA stock (the "LAWMA Shares") to Arkansas River Farms in trade for 8,043 of the 93,989.4166 shares of capital stock outstanding in the Fort Lyon Canal Company ("Fort Lyon Shares") pursuant to the Amended and Restated Water Rights Exchange Agreement and Reimbursement Agreement between the Parties ("Exchange Agreement") and as more particularly described therein.

B. Arkansas River Farms and its predecessors-in-interest historically have used 83 of the Fort Lyon Shares to irrigate Farm No. 3, located in the SE ¼, the SE ¼ of the NE ¼, and the SW ¼ of the NE ¼ of Section 30, Township 23 South, Range 54 West in Otero County, Colorado ("Farm No. 3 Shares"). 1985 irrigated acreage on Farm No. 3 was 76.8 acres ("Farm No. 3 1985 Acreage"), and 2013 irrigated acreage on Farm No. 3 was 77 acres ("Farm No. 3 2013 Acreage"), all as shown on the map attached as **Exhibit A.** The Farm No. 3 2013 Acreage also is described as the "Farm No. 3 Dry-Up" in this Agreement. The Farm No. 3 Shares are represented by Stock Certificate No. 10488. Arkansas River Farms will exchange and convey to LAWMA 82 of the Farm No. 3 Shares ("Trade Shares") under the Exchange Agreement.

C. Arkansas River Farms acknowledges that LAWMA intends to use the Trade Shares for augmentation and replacement purposes, and that to effect such uses, the Trade Shares will need to be changed permanently in a change of water rights proceeding before the Water Court for Division 2 (the "Water Court Change Case"), and temporarily pursuant to a substitute water supply plan ("SWSP") or interruptible water supply agreement ("IWSA") approved by the Office of the State Engineer. Arkansas River Farms further acknowledges that the Water Court and/or the State Engineer may require, as terms and conditions of such a change, that the Farm No. 3 Dry-Up be dried up and either revegetated or established and maintained in dry-land farming practices.

D. Arkansas River Farms and LAWMA desire to enter into this Agreement to affirm the permanent cessation of use of the Farm No. 3 Shares on the Farm No. 3 Dry-Up, to confirm Arkansas River Farms' obligation either to revegetate or to establish and maintain dry-land farming practices on the Farm No. 3 Dry-Up, and to provide for a right of entry and easements for LAWMA and its agents, and for LAWMA's successors and assigns and their agents, upon the Farm No. 3 Dry-Up for the purposes of enforcing this Agreement and the decree and any orders entered by the Water Court in the Water Court Change Case.

NOW, THEREFORE, in consideration of LAWMA's issuance of the LAWMA Shares in trade for the Fort Lyon Shares and other consideration, Arkansas River Farms hereby covenants, agrees, and grants as follows:

Section 1 – Real Covenant for Dry-Up

1.1 Arkansas River Farms covenants and agrees to cease irrigation of the Farm No. 3 Dry-Up with the Farm No. 3 Shares.

1.2 Arkansas River Farms covenants and agrees that the Farm No. 3 Dry-Up will not be irrigated, including for purposes of revegetation, with any source of water unless LAWMA first gives its express written consent or the water used for such irrigation is ground water that is treated as sole-source pumping and is fully augmented under LAWMA's augmentation plan or other augmentation plan approved by the Water Court for Water Division 2, or any SWSP or Arkansas River replacement plan approved by the State Engineer; provided, however, that Arkansas River Farms is prohibited from performing such irrigation with ground water in a way that reduces the consumptive use credit available to LAWMA from the Fort Lyon Shares under the terms and conditions of any decree entered in the Water Court Change Case.

1.3 Arkansas River Farms shall ensure that the Farm No. 3 Dry-Up complies with all terms and conditions included in the *Kansas v. Colorado* Operating Procedures for Administration of Parcels Claimed for Augmentation Credit ("*Kansas v. Colorado* Dry-Up Agreement"), a copy of which is attached as **Exhibit B.** Those terms and conditions include, without limitation, requirements that a physical separation must exist between any irrigated portion of a parcel and the dry-up portion unless the Division Engineer gives prior approval, that parcels formerly containing alfalfa or alfalfa-grass stands must be deep tilled or chemically killed, and that dry-up parcels must be monumented in accordance with specific standards.

1.4 Arkansas River Farms covenants and agrees that in addition to the dry-up requirements for the Farm No. 3 Dry-Up imposed by this Real Covenant for Dry-Up, Arkansas River Farms also shall meet any dry-up obligations imposed by the following: (i) the decree and/or any orders entered by the Water Court in the Water Court Change Case; (ii) the terms and conditions of state water officials' approval of LAWMA's use of the Farm No. 3 Water in any SWSP, IWSA, Arkansas River Replacement Plan pursuant to Rule 14 of the Amended Rules and Regulations Governing the Diversion and Use of Tributary Ground Water in the Arkansas River Basin ("Rule 14 Plan"), and/or Compact Compliance Plan pursuant to Rule 10 of the Compact Rules Governing Improvements to Surface Water Irrigation Systems in the Arkansas River Basin in Colorado ("Rule 10 Plan"); and (iii) the Fort Lyon Canal Company Board of Directors' approval of the change of use of the Fort Lyon Shares.

1.5 Successful completion of dry-up of the Farm No. 3 Dry-Up will be determined by LAWMA and its successors and assigns in the exercise of reasonable discretion. In the event the Water Court retains jurisdiction in the Water Court Change Case to certify successful completion of dry-up of the Farm No. 3 Dry-Up as a condition to transferring the consumptive use credit available to LAWMA for the Fort Lyon Shares, then the determination of whether dry-up of the Farm No. 3 Dry-Up has been successfully completed will be made by the Water Court.

1.6 This Real Covenant for Dry-Up, with the burdens it imposes, is binding upon and will run with the Farm No. 3 Dry-Up forever, and is forever enforceable against Arkansas River Farms and its successors and assigns in the Farm No. 3 Dry-Up for the benefit of the Trade Shares, LAWMA, and LAWMA's successors and assigns.

<u>Section 2 – Real Covenant for Revegetation or Dry-Land Farming</u>

2.1 As used in this Agreement, the term "revegetation" means ground cover of plant life demonstrated to be, without irrigation, reasonably capable of sustaining itself under the climatic conditions, soils, precipitation and terrain prevailing on the Farm No. 3 Dry-Up, with weeds adequately controlled; and the term "dry-land farming" means dry-land farming practices with weeds adequately controlled.

2.2 So long as Arkansas River Farms is irrigating the Farm No. 3 Dry-Up for agricultural production purposes in accordance with the terms and conditions in Section 1.2 above, the revegetation and dry-land farming obligations described in this Section 2 will not apply. Upon cessation of irrigation of the Farm No. 3 Dry-Up for agricultural production purposes pursuant to Section 1.2 above, Arkansas River Farms immediately shall revegetate or establish and maintain dry-land farming practices on the Farm No. 3 Dry-Up in accordance with the terms and conditions of this Section 2. Within sixty days of ceasing irrigation of the Farm No. 3 Dry-Up for agricultural production purposes, Arkansas River Farms shall provide LAWMA with written notice of that cessation, by email to lawma@cminet.net, with a copy to rmehren@mwhw.com.

2.3 No later than the end of the third growing season after irrigation for agricultural purposes has ceased on the Farm No. 3 Dry-Up pursuant to Section 1.2 above (the "Revegetation/Dry-Land Farming Deadline"), Arkansas River Farms shall have established and maintained either revegetation or dry-land farming on the Farm No. 3 Dry-Up. For either revegetation or dry-land farming to be "maintained" on the Farm No. 3 Dry-

Up, such revegetation or dry-land farming must have been established for more than one growing season. Arkansas River Farms shall pay all costs of the revegetation, dry-land farming, and weed control of the Farm No. 3 Dry-Up, including without limitation the cost of any water required for establishing and maintaining revegetation and all power costs for associated well pumping.

2.4 The species of grass or other plants used for revegetation may not include grasses or other plants defined as "noxious" under the provisions of the Colorado Weed Management Act, Article 5.5 of Title 35, C.R.S., and may not include alfalfa or other highly water-consumptive species.

2.5 Arkansas River Farms covenants and agrees that in addition to the revegetation and dry-land farming requirements imposed by this Real Covenant for Revegetation or Dry-Land Farming, Arkansas River Farms also shall meet any lawful revegetation or dry-land farming obligations imposed by the following: (i) the decree and/or any orders entered by the Water Court in the Water Court Change Case; (ii) the terms and conditions of state water officials' approval of LAWMA's use of the Farm No. 3 Water in any SWSP, IWSA, Rule 14 Plan, and/or Rule 10 Plan; and (iii) the Fort Lyon Canal Company Board of Directors' approval of the change of use of the Fort Lyon Shares. Arkansas River Farms also shall take any and all actions as may be necessary to comply with any requirements imposed upon Arkansas River Farms and/or LAWMA by federal, state, and/or local government authorities due to the removal of the Farm No. 3 Water from the Farm No. 3 Dry-Up, including without limitation any requirements imposed by a 1041 permit, if any, issued by Otero County. If a decree is entered in the Water Court Change Case after the Revegetation/Dry-Land Farming Deadline, Arkansas River Farms shall satisfy any additional terms and conditions for revegetation and/or dry-land farming in that decree.

2.6 Successful completion of revegetation of the Farm No. 3 Dry-Up will be determined by LAWMA and its successors and assigns, using applicable Conservation Reserve Program criteria, lawful criteria imposed by the Board of Directors of the Fort Lyon Canal Company, or the criteria imposed by the Water Court, whichever standards are strictest. Successful establishment and maintenance of dry-land farming of the Farm No. 3 Dry-Up will be determined by LAWMA and its successors and assigns in the exercise of reasonable discretion, or by the Water Court. At Arkansas River Farms' request, the Revegetation/Dry-Land Farming Deadline will be extended by one year for each year that, from the year of closing and up to and including the year of the Revegetation/Dry-Land Farming Deadline, the amount of precipitation measured at the Lamar precipitation station falls below 80% of the March through August average of 10.4 inches (1950-2004 average). Until the decree is entered in the Water Court Change Case, at Arkansas River Farms' request, LAWMA will extend the Revegetation/Dry-Land Farming Deadline upon a showing by Arkansas River Farms that its efforts to establish and maintain dry-land farming practices or revegetation have been materially hindered due to circumstances beyond Arkansas River Farms' control, including fire, hail storms, wind storms, tornadoes, flooding, and freezes after May 15 and before September 15 of any year from the year of closing up to and including the year of the Revegetation/Dry-Land Farming Deadline; after the decree is entered in the Water Court Change Case, at Arkansas River Farms' request, LAWMA may extend the Revegetation/Dry-Land Farming Deadline upon a showing by Arkansas River Farms that its efforts to establish and maintain dry-land farming have been materially hindered due to the same circumstances.

2.7 In the alternative to meeting the obligations imposed by Sections 2.2, 2.3, and 2.5 above, Arkansas River Farms may demonstrate to LAWMA's satisfaction that the Farm No. 3 Dry-Up has been developed with structures and improvements such that the Farm No. 3 Dry-Up is not susceptible to erosion, weeds, or agricultural uses.

2.8 To the extent that successful establishment and maintenance of revegetation may require water for an interim period, Arkansas River Farms shall provide such water at its cost. Potential sources of such water may include but are not limited to the following: (i) ground water that is treated as sole-source pumping and is fully augmented under LAWMA's augmentation plan or other augmentation plan approved by the Water Court for Water Division 2, or any SWSP or Arkansas River replacement plan approved by the State Engineer; (ii) water available to other Fort Lyon Canal Company shares owned by Arkansas River Farms; and/or (iii) water available to certain of the Fort Lyon Shares, repaid to LAWMA in the form of an equivalent reduction in allocation to the LAWMA Shares (e.g., if the water available to the 82 Trade Shares historically used on the Farm No. 3 Dry-Up is required to establish and maintain revegetation, LAWMA would not allocate water to 82 of the LAWMA Shares during that irrigation season); provided, however, that use of any such source must not result in a reduction of the consumptive use credit attributable to the Fort Lyon Shares under the terms and conditions of any administrative proceedings and/or any decree entered in the Water Court Change Case. LAWMA will make the determination as to whether water is required for an interim period to establish and maintain revegetation based on the opinion of its consulting expert in agronomy.

2.9 This Real Covenant for Revegetation or Dry-Land Farming, with the burdens it imposes, is binding upon and will run with the Farm No. 3 Dry-Up forever, and is forever enforceable against Arkansas River Farms and its successors and assigns in the Farm No. 3 Dry-Up for the benefit of the Trade Shares, LAWMA, and LAWMA's successors and assigns.

<u>Section 3 – Right of Entry and Easements</u>

3.1 Arkansas River Farms hereby grants to LAWMA a non-exclusive right of entry to, upon, under, and across the Farm No. 3 Dry-Up for the purposes of providing a reasonable means for LAWMA and its agents, as well as the Colorado Division of Water Resources and the Water Court, to take all actions reasonably necessary to ensure that Arkansas River Farms has met its obligations under this Agreement and the decree or any orders entered in the Water Court Change Case, including without limitation site inspections, installation of observation wells, piezometers, or lysimeters, performance of soil evaporation and plant transpiration tests, and performance of vegetative studies and surveys.

3.2 Arkansas River Farms hereby further grants to LAWMA and/or its agents easements (i) to construct, operate, and maintain on the Farm No. 3 Dry-Up such facilities as are required by the decree or any orders entered in the Water Court Change Case for replication of historical return flows from irrigation use of the Fort Lyon Shares, including without limitation storage reservoirs and/or recharge facilities; (ii) to use such portions of the surface and subsurface of the Farm No. 3 Dry-Up as are necessary to replicate historical return flows from irrigation use of the Fort Lyon Shares; and (iii) to perform all acts necessary, including without limitation engineering and historical consumptive use studies, to prosecute the Water Court Change Case and/or an application for a Rule 14 Plan, a Rule 10 Plan, an SWSP or an IWSA using the Fort Lyon Shares as a source of supply. Arkansas River Farms and LAWMA acknowledge and agree that the exact nature, extent, and location of these easements are difficult to define in advance of completion of the Water Court Change Case or any administrative proceeding for approval of a Rule 14 Plan, a Rule 10 Plan, an SWSP or an IWSA. Arkansas River Farms and LAWMA agree that the absence of specified locations for the easements on the Farm No. 3 Dry-Up does not void or render the easements unenforceable. To the extent reasonably practical, any easement that may require the construction of a physical structure on the Farm No. 3 Dry-Up will be located in a manner so as not to interfere unreasonably with Arkansas River Farms' continued and proposed future use of the Farm No. 3 Dry-Up. Upon identification of an acceptable location for any facilities required under Paragraphs 3.2(i) and (ii), the Parties shall create and record a specific legal description of easements therefor. Upon such recording, the balance of the Farm No. 3 Dry-Up will be automatically released from Paragraphs 3.2(i) and (ii).

3.3 In the event that Arkansas River Farms defaults in its obligations for dry-up and revegetation or dry-land farming hereunder, this right of entry and these easements also will entitle LAWMA, at Arkansas River Farms' expense, to take all actions necessary to accomplish the dry-up and revegetation or dry-land farming of the Farm No. 3 Dry-Up, including without limitation constructing drainage and conveyance ditches, monumenting dried-up acreage, revegetating with drought-resistant plants, removing alfalfa and other deep-rooted plants, trees, phreatophytes, and tamarisk, and removing and filling in all or portions of irrigation ditches and/or farm laterals; provided, however, that Arkansas River Farms will not be required to incur out-of-pocket expenses in excess of $200 per acre, for a maximum of $15,400, to complete the actions necessary to dry-up and revegetate or dry-land farm the Farm No. 3 Dry-Up as required by Sections 1 and 2 above; and provided further that this out-of-pocket expense limitation does not include or apply to any costs Arkansas River Farms may incur in relation to its provision of water for revegetation purposes pursuant to Section 2.8 above.

3.4 This non-exclusive right of entry and these non-exclusive easements, with the burdens they impose, are binding upon and will run with the Farm No. 3 Dry-Up forever, and are forever enforceable against Arkansas River Farms and its successors and assigns in the Farm No. 3 Dry-Up for the benefit of the Trade Shares, LAWMA, and LAWMA's agents, successors, and assigns.

Section 4 – General Provisions

4.1 The terms and conditions of this Agreement and the real covenants given and non-exclusive right of entry and non-exclusive easements granted herein are perpetual and will not expire unless specifically released in writing by LAWMA or its successor or assign.

4.2 This Agreement may be enforced by LAWMA or its successor or assign, by any party having any right, title, or interest in the Trade Shares, or by the State Engineer of the State of Colorado, through an action at law or in equity.

4.3 Arkansas River Farms is and will be entitled to use the Farm No. 3 Dry-Up for any purpose not inconsistent with this Agreement, including but not limited to the mining and removal of sand, gravel, and other materials; dry-land grazing; and recreational, residential, commercial, and industrial purposes.

4.4 Arkansas River Farms shall reasonably cooperate with LAWMA to demonstrate the dry-up and revegetation of the Farm No. 3 Dry-Up, including but not limited to providing affidavits or testimony at no cost to LAWMA.

4.5 Upon LAWMA's transfer of the Trade Shares to any party, that party will succeed to LAWMA's interest in this Agreement and will have the right to enforce the terms of the Agreement against Arkansas River Farms or the then-current owner of the Farm No. 3 Dry-Up.

4.6 All attached exhibits to this Agreement are incorporated herein by this reference.

4.7 LAWMA shall record this Agreement in the real property records of the Otero County Clerk and Recorder.

Remainder of this page intentionally left blank.

Executed and effective as of the day first written above.

ARKANSAS RIVER FARMS, LLC

____
Aaron M. Patsch, authorized representative
Resource Land Fund, IV, LLC
Managing Member

Date: _______________________

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

____
Robert Wilger, Vice-President

Date: _______________________

ATTEST:

____
Donald F. Higbee, Secretary

February 28, 2019

Bill W. Tyner
Colorado Division of Water Resources
310 E. Abriendo, Suite B
Pueblo, Colorado 81004

Subject: 2019 Rule 14 Plan for the Lower Arkansas Water Management Association

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Dear Bill:

This letter requests approval of a Rule 14 Plan for the Lower Arkansas Water Management Association (LAWMA) to cover the period April 1, 2019 through March 31, 2020. In preparing this plan, we followed the instructions in your December 1, 2018 letter outlining requirements for 2019 Rule 14 Plans (Requirement Letter). As outlined in Paragraph 1.b of the Requirement Letter, LAWMA is submitting the plan application and all supporting documents via e-mail as a pdf file, Excel spreadsheets, and geographic information system files and will not submit hard copies unless requested.

Members

Table A presents a summary of the LAWMA member wells covered by this plan, projected 2019 pumping by LAWMA member wells, types of uses, and active status. **Table B** lists the 18 wells that are alternate points of diversion for pre-Compact water rights and the projected amount of in-priority pumping by those wells. **Table C** lists the 27 pre-Compact wells and those wells' pre-Compact pumping and depletion allowances. **Table D** lists the 4 wells added to the Rule 14 plan this year, as well as the 13 wells removed from the plan this year. Ten wells that were removed as requested by the LAWMA member. The member no longer has shares in LAWMA and will not be augmented by LAWMA per this plan. It will become that member's responsibility to make the well(s) inactive or provide augmentation for any pumping from the well(s). The three GP Irrigated Farms, LLC wells re-irrigate dry-up of Lamar Canal land in Case No. 15CW3067. The pumping from these three wells will be augmented under LAWMA's augmentation plan per the decree in Case No. 14CW3004. Per Paragraph 15 of the Requirement Letter, **Table E** lists the wells that may be part of a hemp growing operation in 2019. **Table 1** is a listing, by meters, of the 493 wells covered by this plan. **Table 1** shows the well owner and user information as listed in the Division of Water Resources records and verified by LAWMA.

Estimated Pumping Volumes

The pumping allocated to each well is based on the number of LAWMA shares associated with each well. Additional pumping was allocated to each of the 27 pre-Compact wells listed in **Table C** based on those wells' physical locations. If a pre-Compact well is located below the Buffalo

Canal headgate, the well's entire pre-Compact pumping entitlement was allocated to the well, but if a pre-Compact well is located above the Buffalo Canal headgate, only 5/12ths of the well's pre-Compact pumping entitlement was allocated to the well on the assumption that these wells only would be in priority during the months of November through March.

An additional amount of pumping was allocated to wells decreed as alternate points of diversion for pre-Compact surface water rights as described in **Table B**. LAWMA and Mr. Hughes, the owner of the majority of the Graham Ditch water rights (56.20 cfs of 61.0 cfs), have signed an Agreement (Hughes-Graham Agreement) to facilitate the use of the Graham Wells owned by Mr. Hughes as points of diversion for 56.20 cfs of the Graham Ditch water right pursuant to the decree entered in Case No. W-4262. LAWMA continues to pursue a similar agreement with Mr. Swafford, the owner of 1.83 cfs of the 61.0 cfs Graham Ditch water right and 3 wells that are decreed as alternate points of diversion for his 1.83 cfs interest in the Graham Ditch. The values shown in **Table B** are based on the Hughes-Graham Agreement for the 13 Graham Wells owned by Mr. Hughes. Although LAWMA has no formal agreement with Mr. Swafford for the 2019 plan year, LAWMA will allocate pumping to the 3 Swafford Graham Wells using the methodology described in the Hughes-Graham Agreement as shown in **Table B**. The Sapp Ditch Wells are alternate points of diversion for the Sapp Ditch, which takes water from Wild Horse Creek. Since the confluence of Wild Horse Creek and the Arkansas River is downstream from all Colorado water rights, it is assumed that the Sapp Ditch water rights will be in priority for the entire year, and thus will be able to pump the full amount of water they are authorized to pump under their decree in priority. For accounting purposes, the amount of pumping shown in **Table 2** for the alternate point of diversion wells includes the pumping allocated under each well's LAWMA shares and the pumping allowed under the alternate points of diversion. Any pumping in excess of this amount is not covered by LAWMA's plan.

Table 2a shows, for each well/meter listed in **Table 1**, the well's farm group, farm unit, identification suffix (ID_Suf), depletion location (main stem or tributary), and projected monthly pumping for April 2019 through March 2020. An allocation of 100% was made to a LAWMA common share for purposes of developing the monthly pumping projection. LAWMA has identified the wells as either irrigation or non-irrigation wells since 1997, the first full year of Rule 14 plan operation, and has developed a monthly distribution of the annual projected pumping based on the 1997 to 2017 pumping by month of the irrigation and non-irrigation wells. The following chart shows that distribution:

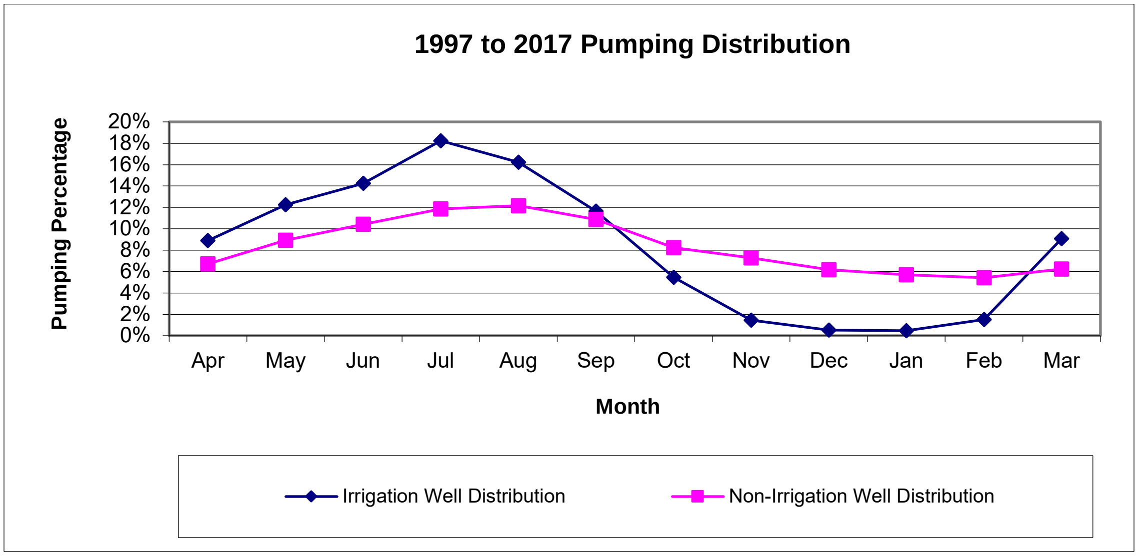

Table 2b shows, for each well/meter listed in **Table 1**, the well's farm group, farm unit, identification suffix (ID_Suf), well use code, and irrigation information.

Estimated Depletions

Stream depletions were projected from the post-Compact pumping that occurred from June 1996 through December 2018 as well as the projected pumping for January 2019 through March 2020. For the wells that are decreed as alternate points of diversion for pre-Compact surface water rights, the projected amount of in-priority pumping shown in **Table B** is subtracted from the total well pumping shown in **Table 2a** to determine the post-Compact pumping at these wells.

The well head depletions are estimated using the presumptive stream depletion factors from Rule 4.2. For the 2019 plan, the presumptive stream depletion factor for all supplemental flood irrigation wells was set at 0.36 as directed by your office. The timing, location, and amount of stream depletions were estimated using D. Schroeder's **G**round **W**ater **A**ccounting **M**odel with the actual well head depletions for June 1996 through December 2018 and the estimated well head depletions for January 2019 through March 2020.

Table 3a shows the stream depletions projected for the Rule 3 wells (post-Compact irrigation pumping in the main stem area) distributed by H-I Model river reach and calculated from actual pumping prior to January 2019 and estimated pumping for January 2019 through March 2019. Allowances for depletions from pumping by pre-Compact wells and for in-priority pumping at alternate points of diversion are included in this estimate.

Table 3b shows the stream depletions projected for the Rule 3 wells (post-Compact irrigation pumping in the main stem area) distributed by H-I Model river reach and calculated from estimated pumping for April 2019 through March 2020. Allowances for depletions from pumping by pre-

Compact wells and for in-priority pumping at alternate points of diversion are included in this estimate.

Table 4a shows the stream depletions projected for the Rule 4 wells (all main stem pumping) from actual pumping prior to January 2019 and estimated pumping for January 2019 through March 2019. Allowances for depletions for in-priority pumping at alternate points of diversion are included in this estimate.

Table 4b shows the stream depletions projected for the Rule 4 wells (all main stem pumping) distributed by H-I Model river reach and calculated from estimated pumping for April 2019 through March 2020. Allowances for depletions for in-priority pumping at alternate points of diversion are included in this estimate.

Table 5 was not included in this letter because LAWMA does not have any member wells located in the Fountain Creek basin.

Table 6 shows the stream depletions projected for the Rule 5 wells (all tributary wells, excluding Fountain Creek) by tributary. These stream depletions include those resulting from the reported pumping for June 1996 through December 2018 and from the estimated pumping for January 2019 through March 2020. The depletions to the Arkansas River from the tributary area were estimated at 4% of the wellhead depletions. This percentage was derived using an analytical technique developed by R.E. Glover for estimating depletions to flood flows in streams where the water table has dropped below the bottom of the streambed.[1] We believe that this condition is representative of the areas where these wells are located. In essence, the technique yields estimates of the additional leakage that is induced from occasional floods by the lowering of the water table in the area of the pumped well. Based on examination of the recorded flow in Big Sandy and Two Buttes Creeks, we estimated that such floods would occur twice each year and that each flood would have a duration of two days. The calculations were made for an "average well," from which an average of 32 acre-feet were consumed between floods that would lower the water table in a square area of 6,000 feet through which the stream flows. The following hydrogeologic parameters were used in this analysis and were based on information presented in a report by the U.S. Geological Survey on the Big Sandy Creek Basin.[2]

Specific Yield	………………………	0.15
Initial depth below streambed to water	………………………	4 ft
Horizontal permeability	………………………	254 ft/day
Vertical permeability	………………………	4.50 ft/day
Initial saturated thickness	………………………	24 ft

[1] *Studies of Ground Water Movement*, Technical Memorandum 657, United States Department of the Interior, Bureau of Reclamation, March 1960.
[2] *Geology and Ground-Water Resources of the Big Sandy Creek Valley Lincoln, Cheyenne, and Kiowa Counties*, Colorado, Donald L. Coffin, 1967.

Width of stream bed ……………………… 40 ft

The well head depletions will affect the stream flow in the Arkansas River during the few days each year the tributaries flow due to large rainfall events. Since it is impossible to predict when these events will occur, we assumed that the stream depletions occur in the same month as the corresponding pumping.

Table 7a summarizes the stream depletions within **Table 3a** and **Table 4a** by month and major reaches on the river. Values in **Table 7a** also take into account adjustments for usable Stateline flow, allowances for pre-Compact pumping, and allowances for pumping by alternate points of diversion for pre-Compact surface water rights. Since stream depletions from tributary wells shown in Table 6 are included during the month the depletions occur, these stream depletions were not included in **Table 7a**.

Table 7b summarizes the stream depletions within **Table 3b**, **Table 4b** and **Table 6** by month and major reaches on the river. Values in **Table 7b** also take into account adjustments for usable Stateline flow, allowances for pre-Compact pumping, and allowances for pumping by alternate points of diversion for pre-Compact surface water rights.

Replacement Supplies

LAWMA's projected stream replacement requirements and replacement sources for April 2019 through March 2020 are shown in **Tables 8a** and **8b**. **Tables 8a** and **8b** include the replacement requirements for the following:

1. Rule 14 replacement requirements shown in **Tables 7a** and **7b**.
2. Replacement requirements for the structures identified in Decree Exhibit S in Case No. 02CW181, Decree Exhibit B in Case No. 08CW018, Decree Exhibit B in Case No. 10CW091, Decree Exhibit B in Case No. 12CW37, Decree Exhibit B in Case No. 13CW3004, Decree Exhibit C in Case No. 13CW3065, Decree Exhibit B in Case No. 14CW3004, Decree Exhibit C in Case No. 15CW3014, Decree Exhibit D in Case No. 17CW3000, Decree Exhibit D in Case No. 17CW3001, Case No. 16CW3018, and Decree Exhibit C in Case No. 17CW3035. These replacement requirements are shown in **Tables 8a** and **8b** since the replacement sources associated with these structures are also shown in **Tables 8a** and **8b**.
3. The 500 acre-feet storage charge owed to the Offset Account in John Martin Reservoir. It is anticipated that LAWMA will be reimbursed for a portion of this storage charge if the other well associations deliver water to the Offset Account. However, for the purposes of demonstrating the adequacy of the LAWMA replacement sources in **Tables 8a** and **8b**, the entire 500 acre-feet storage charge is shown as a LAWMA replacement obligation.
4. Replacement requirements for substitute water supply plans that use LAWMA shares as the source of augmentation and replacement supply.

The Arkansas Basin snow pack has a snow water equivalent of 122% of the 1981-to-2010 median as of February 27, 2019, as described by the NRCS "SNOTEL Colorado Snowpack Update Map." The National Weather Service (NWS) River Forecast Center is also predicting an above average water supply at the Arkansas River at Las Animas river gage and an above average water supply at the Purgatoire River near Las Animas river gage. The NWS forecast incorporates three components: 1) baseflow or the amount of water coming from groundwater, 2) runoff or the amount of water coming from surface runoff, and 3) routed flow or the amount of water coming from an upstream point. Baseflow is never a constant value as it can increase after rainfall events and decrease until the next rainfall event. Runoff generally comes from rainfall events and snowmelt. Upstream flow routing is based on flow coming from an upstream river gage.

Based on the methodology used by the NWS, the current NWS forecast, and the current snow pack, it is reasonable to project that the amount of replacement credits available under the majority of LAWMA's Arkansas and Purgatoire River water rights will be 100% of the long-term average. A 100% of average projection is further justified by the relatively large amount of water currently in storage in the Lamar Canal's and Fort Bent Ditch's Article II accounts, which will boost the amount of water available to LAWMA's Lamar Canal and Fort Bent Ditch shares. The following describes in more detail the replacement sources shown in Tables 8a and 8b:

1. An allocation of 1,354 acre-feet of Fryingpan-Arkansas Project return flow water is projected to be made by Southeastern Colorado Water Conservancy District (SECWCD) and the Fort Lyon Pilot Project. This is an estimate of the allocation based on the preliminary projection provided by the Division 2 Engineer's office. In the event any excess Fryingpan-Arkansas Project return flow water becomes available to LAWMA, LAWMA will purchase this water. This includes LAWMA's portion of the Fort Lyon project return flows carried over from 2018. The Fort Lyon Canal Company's engineer has informed LAWMA that the carried over project water will be delivered through the canal in 2019.

2. Consumptive use credits from the use of the Highland Canal water rights changed in Case No. 02CW181 (02CW181 Highland Canal Water Rights). In accordance with the requirements of Paragraph 31.C.i.(2). of the decree entered in Case No. 02CW181 (02CW181 Decree), during the second year after the end of the Compliance Period (as defined in Paragraph 31.A. of the 02CW181 Decree and as extended pursuant to that same Paragraph), LAWMA shall limit the amount of the 02CW181 Highland Canal Water Rights for which LAWMA may take consumptive use stream credits by multiplying the diversion rate for each 02CW181 Highland Canal Water Right by the greater of (a) the percentage of the 02CW181 Highland Canal dry-up lands that are in compliance with Paragraph 31.A. of the 02CW181 Decree; or (b) 60%. LAWMA's annual status report required by Paragraph 30.C. of the 02CW181 Decree prepared by LAWMA's expert consultant in 2018 (Annual Report) determined that 41.3% of the 02CW181 Highland Canal dry-up lands are in compliance with Paragraph 31.A. of the 02CW181 Decree. Accordingly, for this plan year, LAWMA must limit

the amount of the 02CW181 Highland Canal Water Rights for which LAWMA may take consumptive use stream credits to 60% of the amount of each of the 02CW181 Highland Canal Water Rights. The 02CW181 Highland Canal Water Rights are expected to yield 3,986 acre-feet of consumable water to the river during the 2019 Plan Year. 60% of 3,986 acre-feet is 2,392 acre-feet. Pursuant to paragraph 31.D of the 02CW181 Decree, the expected 1,594 acre-feet of fully consumable water derived from the 02CW181 Highland Canal Water Rights for which LAWMA must forgo taking credit under paragraph 31.C may be leased to LAWMA's members, with the funds collected from such leases to be used by LAWMA to establish and maintain ground cover on the 02CW181 dry-up land. The consumable water derived from the 02CW181 Highland Canal Water Rights may be stored in the Offset Account in John Martin Reservoir or left in the river to meet in-state replacement obligations.

3. Consumptive use credits from use of the Highland Canal water rights changed in Case No. 10CW85. These water rights are expected to yield 228 acre-feet of consumable water to the river. The consumptive use water may be stored in the Offset Account in John Martin Reservoir or left in the river to meet in-state replacement obligations.

4. Credit for the unconsumed portion of the transit loss from deliveries to the Offset Account of replacement water from all of LAWMA's Highland Canal water rights changed in Case No. 02CW181 and in Case No. 10CW85. These credits are expected to yield 70 acre-feet of consumable water to the river.

5. Consumptive use credits from 6,080 Fort Lyon Canal shares for which LAWMA will file a future water court application for a change of use. As part of its application for its 2017 Rule 14 plan, LAWMA provided a historical consumptive use analysis of the 6,080 Fort Lyon Canal shares LAWMA acquired in 2017 and 1,429 additional Fort Lyon Canal shares LAWMA will acquire in 2019 from Arkansas River Farms. LAWMA will continue to rely on this previously submitted analysis for the 2019 plan year. During the 2019 plan year, LAWMA will utilize 4,520 of the 6,080 Fort Lyon Canal shares LAWMA acquired in 2017 through 8 augmentation stations along the Fort Lyon Canal. LAWMA expects those shares will yield 4,773 acre-feet of consumable water to the river. During the 2018 plan year LAWMA began utilizing 1,150 of the 6,080 Fort Lyon Canal shares LAWMA acquired in 2017 via 3 recharge facilities along the Fort Lyon Canal, and LAWMA will continue to utilize those shares through those recharge facilities during the 2019 plan year. LAWMA expects those shares will yield 1,253 acre-feet of consumable water lagged back to the river over time. Approximately 58% (727 acre-feet) of this consumable water will accrue to the river during the 2019 plan year and the balance will accrue during post plan years. Lagged accretions from operations of the recharge facilities in the past are expected to yield an additional 146 acre-feet during the 2019 plan year. LAWMA is also anticipating the use of 410 of the 6,080 Fort Lyon shares at a new recharge facility that will yield 439 acre-feet of consumable water lagged back to the river.

Approximately 58% (255 acre-feet) of this consumable water will accrue to the river during the 2019 plan year.

Finally, LAWMA anticipates it will close on the additional 1,429 Fort Lyon Canal shares during the 2019 plan year. These 1,429 shares will be delivered to the Wiley or May Valley drains through an additional, already constructed, augmentation station and recharge facilities below John Martin Dam. LAWMA expects the yield of these 1,429 shares to be 1,382 acre-feet, but LAWMA will not project the yield of these shares as available for replacement purposes until LAWMA submits an amendment to its 2019 Rule 14 plan after closing on the shares. When the Amity Canal's water rights on the Wiley and May Valley drains are not in priority, water available to these shares will be shepherded past the Amity Canal to the Arkansas River pursuant to an agreement between LAWMA, Arkansas River Farms, and Amity, a copy of which is included with this application. When the Amity Canal's water rights on the May Valley and Wiley drains are in priority, water available to the shares will be delivered to the Amity Canal via the May Valley and Wiley drains and the Division Engineer for Water Division No. 2 will consider such delivery as delivery to the Arkansas River.

During the 2019 plan year, the three sets of Fort Lyon Canal shares described above (7,509 shares in total) are expected to yield 7,200 acre-feet of fully consumable water. In the historical consumptive use analysis submitted with the 2017 Rule 14 plan application, LAWMA proposed monthly consumptive use factors associated with each Fort Lyon Canal augmentation station and recharge site based on the individual historical consumptive use analyses for the farms associated with each augmentation station or recharge site, and also proposed a 10-year farm headgate delivery volumetric limit, an annual maximum volumetric limit, and monthly maximum volumetric limits for all 7,509 shares. LAWMA will continue to rely on those consumptive use factors and volumetric limits during the 2019 plan year.

6. Consumptive use credits from the use of one-half of the Keesee Ditch direct flow water rights changed in Case No. 02CW181 (02CW181 Keesee Direct Flow Water Rights). In accordance with the requirements of Paragraph 31.C.ii.(2). of the 02CW181 Decree, during the second year after the end of the Compliance Period (as defined in Paragraph 31.A. of the 02CW181 Decree and as extended pursuant to that same Paragraph), LAWMA shall limit the amount of the 02CW181 Keesee Direct Flow Water Rights for which LAWMA may take consumptive use stream credits by multiplying the diversion rate for each 02CW181 Keesee Direct Flow Water Right by the greater of (a) the percentage of the 02CW181 Keesee Ditch dry-up lands that are in compliance with Paragraph 31.A. of the 02CW181 Decree; or (b) 60%. LAWMA's Annual Report determined that 72.5% of the 02CW181 Keesee Ditch dry-up lands are in compliance with Paragraph 31.A. of the 02CW181 Decree. Accordingly, for this plan year, LAWMA must limit the amount of the 02CW181 Keesee Direct Flow Water Rights for which LAWMA may take consumptive use stream credits to 72.5% of the amount of each of the 02CW181 Keesee Direct Flow Water Rights. The 02CW181 Keesee Direct

Flow Water Rights are expected to yield 1,411 acre-feet of consumable water to the river. 72.5% of 1,411 acre-feet is 1,023 acre-feet. Pursuant to paragraph 31.D of the 02CW181 Decree, the expected 388 acre-feet of fully consumable water derived from the 02CW181 Keesee Direct Flow Water Rights for which LAWMA must forgo taking credit under paragraph 31.C may be leased to LAWMA's members, with the funds collected from such leases to be used by LAWMA to establish and maintain ground cover on the 02CW181 dry-up land.

7. Consumptive use credits from the use of the remaining one-half of the Keesee Ditch direct flow water rights changed in Case No. 05CW052. These sources are expected to yield 1,411 acre-feet of consumable water. The consumable water may be stored in the Offset Account in John Martin Reservoir or left in the river to replace in-state replacement obligations.

8. Consumptive use credits from Fort Bent Ditch shares changed in Case No. 02CW181 (02CW181 Fort Bent Shares). All water available to LAWMA under the 02CW181 Fort Bent Shares will be delivered to the river at the LAWMA Fort Bent Augmentation Station. In accordance with the requirements of Paragraph 31.C.iv.(2). of the 02CW181 Decree, during the second year after the end of the Compliance Period (as defined in Paragraph 31.A. of the 02CW181 Decree and as extended pursuant to that same Paragraph), LAWMA shall limit the amount water available to the 02CW181 Fort Bent Shares for which LAWMA may take consumptive use stream credits by multiplying the amount of water available to the 02CW181 Fort Bent Shares by the greater of (a) the percentage of the 02CW181 Fort Bent Ditch dry-up lands that are in compliance with Paragraph 31.A. of the 02CW181 Decree; or (b) 60%. LAMWA's Annual Report determined that 84.0% of the 02CW181 Fort Bent Ditch dry-up lands are in compliance with Paragraph 31.A. of the 02CW181 Decree. Accordingly, for this plan year, LAWMA must limit the amount of water available to the 02CW181 Fort Bent Shares for which LAWMA may take consumptive use stream credits to 84.0% of the amount of water available to the 02CW181 Fort Bent Shares.

   LAWMA owns 462 02CW181 Fort Bent Shares that are expected to yield 500 acre-feet of consumable water to the river. The City of Lamar (City) owns 923 02CW181 Fort Bent Shares and allows LAWMA to use the City's 02CW181 Fort Bent Shares that the City does not use, which are expected to yield 293 acre-feet of consumable water. Accordingly, the total expected yield of the 02CW181 Fort Bent Shares that LAWMA is entitled to use is 793 acre-feet. 84.0% of 793 acre-feet is 666 acre-feet. Pursuant to paragraph 31.D of the 02CW181 Decree, the expected 127 acre-feet of fully consumable water derived from the portion of the 02CW181 Fort Bent Shares for which LAWMA must forgo taking credit under paragraph 31.C may be leased to LAWMA's members, with the funds collected from such leases to be used by LAWMA to establish and maintain ground cover on the 02CW181 dry-up land.

9. Consumptive use credits from 144 Fort Bent Ditch shares changed in Case No. 10CW85. These 144 shares are expected to yield 99 acre-feet of consumable water to the river. These shares will also be turned out at the LAWMA Fort Bent Augmentation Station.

10. Consumptive use credits from 162.5 Fort Bent Ditch shares for shares for which a water court application (Case No. 17CW3068) was filed by LAWMA on December 19, 2017 for a change of use. LAWMA proposes to use the same terms and conditions on a per-share basis for calculations of consumptive use credits and historical return flow obligations for these shares as those used for the Fort Bent Ditch Shares that were changed in Case Nos. 02CW181 and 10CW85. Assuming the same terms and conditions are imposed on these shares as are imposed on LAWMA's Fort Bent Ditch shares changed in Case Nos. 02CW181 and 10CW85, these shares are expected to yield 176 acre-feet of consumable water to the river. This water will be delivered through the LAWMA augmentation station on the Fort Bent Ditch. LAWMA will use these Fort Bent Ditch shares only in its Rule 14 Plan until a decree is entered in Case No. 17CW3068.

11. Consumptive use credits from 8,247 Lamar Canal shares changed in Case No. 02CW181 (02CW181 Lamar Canal Shares). Water derived from the 02CW181 Lamar Canal Shares will be delivered to the river through the DOW Center Farm Augmentation Station, the West Farm Augmentation Station, the Granada East Augmentation Station, or the Granada West Augmentation Station. In accordance with the requirements of Paragraph 31.C.v.(2). of the 02CW181 Decree, during the second year after the end of the Compliance Period (as defined in Paragraph 31.A. of the 02CW181 Decree and as extended pursuant to that same Paragraph), LAWMA shall limit the amount water available to the 02CW181 Lamar Canal Shares for which LAWMA may take consumptive use stream credits by multiplying the amount of water available to the 02CW181 Lamar Canal Shares by the greater of (a) the percentage of the 02CW181 Lamar Canal dry-up lands that are in compliance with Paragraph 31.A. of the 02CW181 Decree; or (b) 60%. LAWMA's Annual Report determined that 95.8% of the 02CW181 Lamar Canal dry-up lands are in compliance with Paragraph 31.A. of the 02CW181 Decree. Accordingly, for this plan year, LAWMA must limit the amount of water available to the 02CW181 Lamar Canal for which LAWMA may take consumptive use stream credits to 95.8% of the amount of water available to the 02CW181 Lamar Canal Shares. The 02CW181 Lamar Canal shares are expected to yield 8,220 acre-feet of consumable water to the river. 95.8% of 8,220 acre-feet is 7,875 acre-feet. Pursuant to paragraph 31.D of the 02CW181 Decree, the expected 345 acre-feet of fully-consumable water derived from the 02CW181 Lamar Canal Shares for which LAWMA must forgo taking credit under paragraph 31.C may be leased to LAWMA's members, with the funds collected from such leases to be used by LAWMA to establish and maintain ground cover on the 02CW181 dry-up land.

12. Consumptive use credits from 897 Lamar Canal shares changed in Case No. 15CW3067 (15CW3067 Lamar Canal Shares). The LAWMA's 15CW3067 Lamar Canal Shares are

expected to yield 882 acre-feet of consumable water to the river. This water will be delivered through one or all of the following augmentation stations: West Farm Augmentation Station, DOW Center Farm Augmentation Station, or any excess credits to the West Farm Gravel Pit for later release.

13. Consumptive use credits from 783.5 Granada Irrigation Company (GIC) shares changed in Case No. 15CW3067 (15CW3067 GIC Shares). The GIC shares are delivered through the Lamar Canal system and each GIC share equates to 3.498 Lamar Canal shares (1 GIC x 10,600 Lamar Canal shares / 3,030 GIC shares). The 15CW3067 GIC Shares are expected to yield 2,065 acre-feet of consumable water to the river. This water will be delivered through one or both of the following augmentation stations: Granada East Augmentation Station or the Granada West Augmentation Station.

14. LAWMA has fully consumable water stored in the West Farm Gravel Pit. Currently there is 1,150 acre-feet of stored water that LAWMA purchased from Colorado Springs Utilities (CS-U) in 2018. LAWMA can release that water below the Lamar Canal river headgate for delivery to downstream in-State water rights or the Stateline. Under the decree in Case No. 15CW3067, LAWMA may store the consumptive use portion of the Lamar Canal shares changed in that case in the West Farm Gravel Pit. LAWMA may also acquire fully consumable water from entities such as CS-U and store that water in the gravel pit as well. It is anticipated that LAWMA will add consumable water to the gravel pit from the 897 Lamar Canal shares changed in Case No. 15CW3067 that are in excess of river replacement obligations.

15. Consumptive use credits associated with the Manvel Article II water that is estimated to yield 500 acre-feet of consumable water to the river. All of this water will be delivered through the West Farm Augmentation Station, the DOW Center Farm Augmentation Station, the Granada East Augmentation Station, or the Granada West Augmentation Station depending on which reach of the river replacement water is needed in.

16. Consumptive use credits from the 54 cfs Manvel Canal direct flow water right changed in Case No. 02CW181. This water right is expected to yield 750 acre-feet of consumable water to the river.

17. Consumptive use credits derived from the portion of the X-Y Canal direct flow water right changed in Case No. 02CW181 (67 cfs of the total water right of 69 cfs) (02CW181 X-Y Direct Flow Water Right). In accordance with the requirements of Paragraph 31.C.iii.(2). of the 02CW181 Decree, during the second year after the end of the Compliance Period (as defined in Paragraph 31.A. of the 02CW181 Decree and as extended pursuant to that same Paragraph), LAWMA shall limit the amount of the 02CW181 X-Y Direct Flow Water Right for which LAWMA may take consumptive use stream credits by multiplying 67 cfs by the greater

of (a) the percentage of the 02CW181 X-Y Canal dry-up lands that are in compliance with Paragraph 31.A. of the 02CW181 Decree; or (b) 60%. LAWMA's Annual Report determined that 98.1% of the 02CW181 X-Y Canal dry-up lands are in compliance with Paragraph 31.A. of the 02CW181 Decree. Accordingly, for this plan year, LAWMA must limit the amount of the 02CW181 X-Y Direct Flow Water Right for which LAWMA may take consumptive use stream credits to 98.1% of 67 cfs. The 02CW181 X-Y Water Right is expected to yield 3,404 acre-feet of consumable water to the river. 98.1% of 3,404 acre-feet is 3,339 acre-feet. Pursuant to paragraph 31.D of the Decree, the expected 65 acre-feet of fully-consumable water derived from the 02CW181 X-Y Direct Flow Water Right for which LAWMA must forgo taking credit under paragraph 31.C may be leased to LAWMA's members, with the funds collected from such leases to be used by LAWMA to establish and maintain ground cover on the 02CW181 dry-up land.

18. Consumptive use credits derived from 2.0 cfs of the X-Y Canal direct flow water right changed in Case No. 15CW3067 (15CW3067 X-Y Water Right). The 15CW3067 X-Y Water Right is expected to yield 99 acre-feet of consumable water to the river.

19. Consumptive use credits from the 7.2 cfs Stubbs Ditch direct flow water right changed in Case No. 02CW181. This water right is expected to yield 252 acre-feet of consumable water to the river consistent with the Sisson-Stubbs Settlement Agreement between Colorado and Kansas signed on September 23, 2005.

20. Consumptive use credits from the 18 cfs Sisson Ditch direct flow water right changed in Case No. 10CW85. This water right is expected to yield 252 acre-feet of consumable water to the river consistent with the Sisson-Stubbs Settlement Agreement between Colorado and Kansas signed on September 23, 2005.

21. Credit for the unconsumed portion of the transit loss associated with releases of LAWMA's consumable water from the Offset Account. These credits are estimated to yield 300 acre-feet of consumable water to the river based on past years' total amounts of unconsumed transit losses.

22. Credit for the unconsumed portion of the transit loss from consumptive use water that may be purchased by LAWMA during this plan year and delivered to the Offset Account. The yield will be determined based on the amount of water purchased by LAWMA and a copy of the contract(s) will be provided. In late January and early February, LAWMA acquired fully consumable water from CS-U that has been delivered to the Offset Account. LAWMA delivered the initial 500 acre-feet to the Kansas Charge account to establish the Offset Account for 2019 and the remainder is being delivered to the Downstream Consumable Account for delivery to Kansas for use in 2019. LAWMA has an agreement with CS-U for delivery of up to 4,500 acre-feet before March 31, 2019. The amount delivered to the

Downstream Consumable account as of February 27, 2019 is 1,171 acre-feet. To make the initial delivery to establish the Offset Account for 2020, LAWMA has projected a delivery of 250 acre-feet a month to the Offset Account for August and September 2019.

23. Excess consumptive use credits from the City of Lamar's operations. These credits are estimated to yield approximately 100 acre-feet. LAWMA is currently working on an agreement with the City of Lamar to acquire the excess consumptive use credits. Once an agreement for the 2019 plan year has been reached it will be submitted to the Division Engineer's office. This consumable water is derived from the City of Lamar's operation of its plan for augmentation decreed in Case No. 05CW107-A, and includes water derived from 02CW181 Fort Bent Shares delivered by the City to its Clay Creek Recharge facility that is distinct from any water derived from the 02CW181 Fort Bent Shares delivered through the LAWMA Fort Bent Ditch Augmentation Station.

24. Article II water currently in storage in John Martin Reservoir in LAWMA's Keesee, X-Y Graham, Manvel, and the Sisson - Stubbs accounts. This water will be released to the river or transferred to other Article II accounts for in-state replacement obligations or transferred to the Offset Account for replacement of Stateline depletions as needed. As of February 27, 2019, LAWMA currently has 19,699 acre-feet of consumable water stored in John Martin Reservoir. These sources are thus expected to yield 19,699 acre-feet of consumable water during the 2019 plan year.

25. LAWMA's ownership in Colorado's portion of the conservation storage in John Martin Reservoir, which is 11.0% of Colorado's portion and consists of 5.10% from the ownership of the X-Y and Graham, 2.40% from ownership of the Manvel, 2.30% from ownership of the Keesee, 0.34% from ownership of the Stubbs, and 0.86% from ownership of the Sisson. This should yield LAWMA at least 1,200 acre-feet of consumable water. As of February 19, 2019, LAWMA's share of the consumable portion of the water in conservation storage that will begin to be delivered into Article II accounts on April 1 was 904 acre-feet. It is estimated that this share will grow by an additional 300 acre-feet due to inflows to conservation storage during the month of March.

As of February 27, 2019, LAWMA's consumable water in storage in John Martin Reservoir or available as a credit at the Stateline is as follows:

Account Name	Consumable Storage/Stateline Credit (ac-ft)
Offset (doesn't include storage charge water)	7,454
XY-Graham Article II	9,267
Manvel Article II	4,428
Keesee Article II	3,572
Stubbs Article II	287
Sisson Article II	2,145
Credit at Stateline (as of Feb. 1, 2019)	9,303
LAWMA's Portion of Conservation Storage	1,027
Total	37,483

The 9,303 acre-feet of credit at the Stateline is estimated from the Division Engineer's monthly accounting and does not reflect actual H-I Model results of Stateline credit through December 2018. Those results were unavailable for the preparation of this plan but will include the removal from the 10-year Compact accounting of 12,527 acre-feet of Stateline credit in 2008 and the addition or subtraction of any deliveries or depletions by LAWMA's direct flow sources to the Stateline in 2018.

Any excess consumptive use credits derived from LAWMA's replacement water sources at the Stateline will be accumulated in the accounting and used to replace future Stateline depletions attributable to LAWMA's members' operations. Stateline credits derived from LAWMA's direct delivery to the Stateline, but not from Offset Account deliveries, will be carried forward more than one month consistent with the 10-year Compact accounting principles. Stateline credits derived from LAWMA's Offset Account deliveries to the Stateline will be carried forward indefinitely and used until all of the credits are exhausted, consistent with the Offset Account Crediting Agreement. In-state depletions or credits will only be carried forward one month. The concept for this accounting of carrying forward Stateline and in-state credits is shown in **Table 8b**. It should be noted that while in-state credits are carried forward one month in **Table 8b**, carried-forward credits are not needed for replacement of in-state depletions in the next month and therefore flow downstream to the Stateline.

Post-Plan Depletions

The projected stream depletions that will occur after March 31, 2020 as a result of LAWMA's Rule 14 plan pumping are as follows:

Plan Year	Post-Plan Stream Depletions (ac-ft)
2020	10,095
2021	3,093
2022	1,448
2023	784
2024	453
2025-2040	684
Total	16,557

Table 9 shows the first five post-plan years' depletions on a monthly basis. These depletions are compared to the average yield of LAWMA's replacement sources. The replacement source estimates do not include any water available to LAWMA's Sisson, Stubbs, XY/Graham, or Keesee Article II accounts in John Martin Reservoir. These are additional water sources available to LAWMA and, thus, this analysis is conservative in that it likely underestimates the actual volume of replacement supplies that will be available to LAWMA during these future years. The Manvel Article II storage has been included in the tables as that water would have to be released to the river and delivered through an augmentation station on the Lamar Canal per the decree in Case No. 02CW181. These comparisons in **Table 9** show that LAWMA has sufficient renewable sources of replacement water to cover these post-plan depletions on an annual and monthly basis.

Table 10 provides a replacement supply analysis. As with **Tables 8a** and **8b** this table evaluates LAWMA's replacement supplies and obligations on an annual basis. This table is required per the Memorandum of Agreement Related to the Highland Canal Water Right as part of LAWMA's efforts to deliver Highland Canal water to the John Martin Reservoir Permanent Pool on Colorado Parks and Wildlife's behalf in the 2019 plan year if LAWMA's replacement supplies exceed LAWMA's obligations.

Consumptive Use Factors & Volumetric Limits

The consumptive use factors and volumetric limits for LAWMA's water rights included as replacement sources in this plan, except for LAWMA's Fort Lyon Canal shares, are described in LAWMA's 02CW181, 05CW52, 10CW85, and 15CW3067 decrees. The consumptive use factors and volumetric limits for LAWMA's Fort Lyon Canal shares are described in the separate historical consumptive use analysis that was part of LAWMA's 2017 Rule 14 plan submittal.

Previously Irrigated Acreage

Table 11 lists the parcels that were previously irrigated with the surface water rights proposed to be used by LAWMA in this Rule 14 Plan. **Figures 1** through **13** are maps showing the location of each parcel of land that has been dried-up as part of LAWMA's replacement plan operations. A total of 21,572.2 acres previously irrigated with pre-Compact surface rights no longer receive any surface water supplies as shown in **Table 11**. The Fort Lyon Canal acres have been divided up into three phases: (1) acres associated with 5,670 Fort Lyon Canal shares, (2) acres associated with 410 Fort Lyon Canal shares, and (3) acres associated with 1,429 Fort Lyon Canal shares. Acreage associated with the 2nd and 3rd phases (i.e. the 410 Fort Lyon Canal shares and the 1,429 Fort Lyon Canal shares, respectively) were included to meet the deadline for associations to notify the Division Engineer's Office of the dry-up parcel designations.

Well Compliance and Data Collection

The well users have attempted to comply with both the Measurement Rules and the 1996 Amended Rules to the best of their ability. As necessary, power coefficients have been determined and flow meters have been verified. LAWMA proposes to submit current Rule 13 information to the Division Engineer if any changes within a farm unit occur. In the event a farm unit is about to exceed the amount of pumping allocated in the plan, LAWMA will take one of the following actions:

1. LAWMA will notify the Division Engineer of a reallocation of replacement water included in this plan. The notification will indicate which farm units' pumping allocation will increase and which farm units' pumping allocation will decrease.

2. LAWMA will notify the Division Engineer of the purchase of additional replacement water to cover the additional depletions caused by the farm unit(s) in question.

3. LAWMA will notify the Division Engineer that a farm unit's pumping is out of compliance with terms of the approved plan and will ask the Division Engineer to stop the farm unit from pumping in excess of its limit.

If you have any questions, please give me a call.

Hendrix Wai Engineering, Inc.

Randy Hendrix

Randy L. Hendrix

Enclosure

cc: Donald F. Higbee w/enc.
Richard J. Mehren, Esq. w/enc.

TABLE A
SUMMARY OF LAWMA WELLS COVERED UNDER RULE 14 OF THE AMENDED RULES AND REGULATIONS GOVERNING THE DIVERSION AND USE OF TRIBUTARY GROUNDWATER IN THE ARKANSAS RIVER BASIN, COLORADO

Type of Well	Total Number of Wells	Number of Active Wells	Amount of Pumping Requested in Current Rule 14 Plan (ac-ft)
1	**2**	**3**	**4**
Mainstem (Gray Area)			
Irrigation			
• Supplemental	171	127	16,251
• Sole Source Flood	47	25	3,190
• Sprinkler	107	100	18,766
• Other	66	58	14,007
Sub Total	391	310	52,213
Municipal	16	16	8,500
Commercial	2	2	127
Sub Total	18	18	8,627
Sub Total of Mainstem wells	409	328	60,840
Tributary (White Area)			
Irrigation			
• Sole Source Flood	13	8	1,450
• Sole Source Sprinkler	37	31	4,443
• Other	7	6	522
Sub Total	57	45	6,415
Municipal	15	15	558
Commercial	9	9	450
Sub Total	24	24	1,008
Sub Total of Tributary wells	81	69	7,423
Total of all Rule 14 wells	490	397	68,263

TABLE B
ALTERNATE POINTS OF DIVERSION WELLS
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Structure ID	Ditch Name	Projected Pumping in Priority (ac-ft)	Stream Source	Case No.
1	2	3	4	5
6705500	Graham - Alt Point	45.3	Arkansas River	W-4262
6705501	Graham - Alt Point	0.0	Arkansas River	W-4262
6705502	Graham - Alt Point	0.0	Arkansas River	W-4262
6705503	Graham - Alt Point	94.7	Arkansas River	W-4262
6705504	Graham - Alt Point	66.5	Arkansas River	W-4262
6705505	Graham - Alt Point	102.8	Arkansas River	W-4262
6705506	Graham - Alt Point	0.0	Arkansas River	W-4262
6705507	Graham - Alt Point	82.6	Arkansas River	W-4262
6705508	Graham - Alt Point	63.5	Arkansas River	W-4262
6705509	Graham - Alt Point	46.4	Arkansas River	W-4262
6705510	Graham - Alt Point	64.5	Arkansas River	W-4262
6705511	Graham - Alt Point	0.0	Arkansas River	W-4262
6705512	Graham - Alt Point	48.4	Arkansas River	W-4262
6705535	Graham - Alt Point	30.7	Arkansas River	W-4122
6705536	Graham - Alt Point	18.5	Arkansas River	W-4122
6705537	Graham - Alt Point	0.0	Arkansas River	W-4122
6705875	Sapp Ditch	175.0	Wild Horse Creek	89CW82
6705876	Sapp Ditch	175.0	Wild Horse Creek	89CW82

Notes:

1) Sapp Ditch alternate point of diversion wells are estimated to be in priority 100% of the time because the wells are located on Wild Horse Creek which enters the Arkansas River approximately 14 miles downstream of the Buffalo Canal Headgate. The Division Engineer has determined that these wells irrigate 207 acres which is greater than the 140 acres allowed by the decree in Case No. 89CW82. Therefore, 67.6 percent of the pumping will be considered in priority with a limit of 350 ac-ft/yr as described in the decree in Case No. 89CW82.

2) Amount of pumping allowed under the Graham pre-compact water right will be determined through an agreement between LAWMA and the owners of the Graham water right. When this agreement is finalized it will be provided. For the current plan submittal the amount of in priority pumping is 558.5 ac-ft.

TABLE C
PRE-COMPACT PUMPING and WELL HEAD DEPLETION
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION
(all values in ac-ft)

SEO ID NO.	OWNER	H-I MODEL USER GROUP	ABOVE / BELOW BUFFALO CANAL	PRESUMPTIVE STREAM DEPLETION FACTOR	PRE-COMPACT PUMPING ALLOWANCE	PRE-COMPACT DEPLETION ALLOWANCE
1	2	3	4	5	6	7
1705079	ARKANSAS RIVER FARMS LLC	10	Above	0.360	4.3	1.6
1705649	ARKANSAS RIVER FARMS LLC	10	Above	0.360	21.6	7.8
1705656	ARKANSAS RIVER FARMS LLC	10	Above	0.360	11.0	4.0
6705000	VERHOEFF FARMS INC	20	Above	0.360	62.7	22.6
6705017	VERHOEFF FARMS INC	20	Above	0.360	23.3	8.4
6705062	HINER CONSTRUCTION	15	Above	0.360	55.4	19.9
6705071	ARKANSAS RIVER FARMS LLC	10	Above	0.360	73.8	26.6
6705082	ARKANSAS RIVER FARMS LLC	10	Above	0.360	51.5	18.6
6705123	J-S FARMS INC	15	Above	0.360	139.9	50.4
6705125	TAYLOR, CHARLEY	15	Above	0.500	26.0	13.0
6705127	J-S FARMS INC	15	Above	0.750	73.7	55.3
6705129	MANLY, RONALD OR MARY	15	Above	0.500	51.5	25.8
6705147	SHINN, CARL	17	Above	0.360	27.8	10.0
6705185	REED & BLSH (REED, HAROLD)	20	Above	0.360	16.6	6.0
6705186	REED & BLSH (REED, HAROLD)	20	Above	0.360	16.6	6.0
6705187	REED & BLSH (REED, HAROLD)	20	Above	0.360	33.3	12.0
6705201	LUBBERS, CLAY OR NICOLE	20	Above	0.360	24.9	9.0
6705217	REED & BLSH (REED, HAROLD)	20	Above	0.360	16.6	6.0
6705240	J-S FARMS INC	17	Above	0.360	20.5	7.4
6705511	ESTATE OF LARRY HUGHES	21	Above	0.710	36.7	26.0
6705535	SWAFFORD, WILLIAM L	21	Below	0.500	73.8	36.9
6705536	SWAFFORD, WILLIAM L	21	Below	0.500	73.8	36.9
6705598	WILLHITE, J MARVIN	22	Below	0.360	129.4	46.6
6705671	SMITH, EVELYN L	17	Above	0.360	18.5	6.7
6705737	GP IRRIGATED FARMS LLC	24	Below	0.750	123.0	92.3
6705915	BRASE, LEROY	20	Above	0.360	16.7	6.0
6705971	SOUDERS, JAMES	20	Above	0.360	7.5	2.7
				Grand Total	1,230.6	564.5
				Above Buffalo Canal	830.6	351.8
				Below Buffalo Canal	400.1	212.7
			User Groups	10	162.3	58.6
				15	346.6	164.4
				17	66.8	24.1
				18	0.0	0.0
				20	218.2	78.7
				21	184.3	99.8
				22	129.4	46.6
				24	123.0	92.3

TABLE D
WELLS ADDED IN ARKANSAS RIVER REPLACEMENT PLAN DURING PAST YEAR
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Structure ID	Farm Unit	Owner's Name	Comment
(1)	(2)	(3)	(4)
1705651	368.5	ARKANSAS RIVER FARMS LLC	Well previously in CWPDA Rule 14 Plan
1705662	368.6	ARKANSAS RIVER FARMS LLC	Well previously in CWPDA Rule 14 Plan
6705011	384	NATURES ALTERNATIVE FARMS LLC	
6705013	384	NATURES ALTERNATIVE FARMS LLC	

WELLS REMOVED FROM ARKANSAS RIVER REPLACEMENT PLAN DURING PAST YEAR
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Structure ID	Farm Unit	Owner's Name	Comment
(1)	(2)	(3)	(4)
6705399	114.1	STATES, TONI	Member dropped well from LAWMA
6705402	114.2	STATES, TONI	Member dropped well from LAWMA
6705620	67	MUSICK, RANDY	Member dropped well from LAWMA
6705621	67	MUSICK, RANDY	Member dropped well from LAWMA
6705627	67	MUSICK, RANDY	Member dropped well from LAWMA
6705628	67	MUSICK, RANDY	Member dropped well from LAWMA
6705629	67	MUSICK, RANDY	Member dropped well from LAWMA
6705785	65	MIDWESTERN FARMS	Member dropped well from LAWMA
6705786	65	MIDWESTERN FARMS	Member dropped well from LAWMA
6706369	65	MIDWESTERN FARMS	Member dropped well from LAWMA
6705543	312.2	GP IRRIGATED FARMS LLC	Augmented under LAWMA's Augmentation Plan
6705545	312.2	GP IRRIGATED FARMS LLC	Augmented under LAWMA's Augmentation Plan
6705546	312.2	GP IRRIGATED FARMS LLC	Augmented under LAWMA's Augmentation Plan

TABLE E
WELLS THAT MAY BE USED IN HEMP GROWING OPERATIONS
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Structure ID	Farm Unit	Owner's Name	Comment
(1)	(2)	(3)	(4)
6705011	384	NATURES ALTERNATIVE FARMS LLC	
6705012	384	NATURES ALTERNATIVE FARMS LLC	
6705013	384	NATURES ALTERNATIVE FARMS LLC	
6705015	384	NATURES ALTERNATIVE FARMS LLC	

Table 1 - Wells Included in Arkansas River Replacement Plan

(sorted by Structure ID)

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Plan Association	Farm Group	Farm Unit	Structure ID	ID Suf	Owner Information Organization (Last Name, First Name)	User Information Organization (Last Name, First Name)	Comments	GAP/GHP Plan?	MJ Water Supply?
LAWMA	368.3	368.3	1705032	A	ARKANSAS RIVER FARMS LLC	PATSCH, AARON	FORMERLY PURE CYCLE CORPORATION		
LAWMA	368.4	368.4	1705078	A	ARKANSAS RIVER FARMS LLC	PATSCH, AARON	FORMERLY PURE CYCLE CORPORATION		
LAWMA	368.4	368.4	1705079	A	ARKANSAS RIVER FARMS LLC	PATSCH, AARON	FORMERLY PURE CYCLE CORPORATION		
LAWMA	368.3	368.3	1705356	A	ARKANSAS RIVER FARMS LLC	PATSCH, AARON	FORMERLY PURE CYCLE CORPORATION		
LAWMA	369	369	1705438	A	BENT COUNTY CEMETERY DIST	LOSEY, MARY JANE			
LAWMA	369	369	1705439	A	BENT COUNTY CEMETERY DIST	LOSEY, MARY JANE			
LAWMA	574	368.2	1705644	A	ARKANSAS RIVER FARMS LLC	PATSCH, AARON	FORMERLY PURE CYCLE CORPORATION		
LAWMA	368.5	368.5	1705649	A	ARKANSAS RIVER FARMS LLC	PATSCH, AARON	FORMERLY PURE CYCLE CORPORATION		
LAWMA	368.5	368.5	1705650	A	ARKANSAS RIVER FARMS LLC	PATSCH, AARON	FORMERLY PURE CYCLE CORPORATION		
LAWMA	368.5	368.5	1705651	A	ARKANSAS RIVER FARMS LLC	PATSCH, AARON	FORMERLY PURE CYCLE CORPORATION		
LAWMA	368.6	368.6	1705656	A	ARKANSAS RIVER FARMS LLC	PATSCH, AARON	FORMERLY PURE CYCLE CORPORATION		
LAWMA	368.6	368.6	1705657	A	ARKANSAS RIVER FARMS LLC	PATSCH, AARON	FORMERLY PURE CYCLE CORPORATION		
LAWMA	368.6	368.6	1705661	A	ARKANSAS RIVER FARMS LLC	PATSCH, AARON	FORMERLY PURE CYCLE CORPORATION		
LAWMA	368.6	368.6	1705662	A	ARKANSAS RIVER FARMS LLC	PATSCH, AARON	FORMERLY PURE CYCLE CORPORATION		
LAWMA	368.7	368.7	1705688	A	ARKANSAS RIVER FARMS LLC	PATSCH, AARON	FORMERLY PURE CYCLE CORPORATION		
LAWMA	368.7	368.7	1705689	A	ARKANSAS RIVER FARMS LLC	PATSCH, AARON	FORMERLY PURE CYCLE CORPORATION		
LAWMA	368.7	368.7	1705690	A	ARKANSAS RIVER FARMS LLC	PATSCH, AARON	FORMERLY PURE CYCLE CORPORATION		
LAWMA	368.2	368.2	1705765	A	ARKANSAS RIVER FARMS LLC	PATSCH, AARON	FORMERLY PURE CYCLE CORPORATION		
LAWMA	368.7	368.7	1705861	A	ARKANSAS RIVER FARMS LLC	PATSCH, AARON	FORMERLY PURE CYCLE CORPORATION		
LAWMA	368.8	368.8	1705900	A	ARKANSAS RIVER FARMS LLC	PATSCH, AARON	FORMERLY PURE CYCLE CORPORATION		
LAWMA	158	158	6705000	A	VERHOEFF FARMS INC	VERHOEFF, LANCE			
LAWMA	179	179	6705002	A	SMART, DEAN OR DOUG				
LAWMA	179	179	6705003	A	SMART, DEAN OR DOUG				
LAWMA	179	179	6705004	A	SMART, DEAN OR DOUG				
LAWMA	158	158	6705010	A	VERHOEFF FARMS INC	VERHOEFF, LANCE			
LAWMA	384	384	6705011	A	NATURES ALTERNATIVE FARMS LLC				
LAWMA	384	384	6705012	A	NATURES ALTERNATIVE FARMS LLC	PATSCH, AARON	FORMERLY PURE CYCLE CORPORATION		
LAWMA	384	384	6705013	A	NATURES ALTERNATIVE FARMS LLC				
LAWMA	384	384	6705015	A	NATURES ALTERNATIVE FARMS LLC	PATSCH, AARON	FORMERLY PURE CYCLE CORPORATION		
LAWMA	158	158	6705016	A	VERHOEFF FARMS INC	VERHOEFF, LANCE			
LAWMA	158	158	6705017	A	VERHOEFF FARMS INC	VERHOEFF, LANCE			
LAWMA	158	158	6705018	A	VERHOEFF FARMS INC	VERHOEFF, LANCE			
LAWMA	158	158	6705019	A	VERHOEFF FARMS INC	VERHOEFF, LANCE			
LAWMA	188	188	6705020	A	HECKMAN, BURT OR FRED				
LAWMA	147	147	6705060	A	TORRES, RUDY				
LAWMA	42	42	6705062	A	HINER CONSTRUCTION	HINER, REX M OR SHARON A			
LAWMA	121	121	6705063	A	TUCKER, GEORGE				
LAWMA	368.1	368.1	6705066	A	ARKANSAS RIVER FARMS LLC	PATSCH, AARON	FORMERLY PURE CYCLE CORPORATION		
LAWMA	368.1	368.1	6705069	A	ARKANSAS RIVER FARMS LLC	PATSCH, AARON	FORMERLY PURE CYCLE CORPORATION		
LAWMA	574	368.1	6705071	A	ARKANSAS RIVER FARMS LLC	PATSCH, AARON	FORMERLY PURE CYCLE CORPORATION		
LAWMA	574	243	6705072	A	BELL, JACK				
LAWMA	42	42	6705074	A	HINER CONSTRUCTION	HINER, REX M OR SHARON A			
LAWMA	368.1	368.1	6705082	A	ARKANSAS RIVER FARMS LLC	PATSCH, AARON	FORMERLY PURE CYCLE CORPORATION		
LAWMA	368.1	368.1	6705086	A	ARKANSAS RIVER FARMS LLC	PATSCH, AARON	FORMERLY PURE CYCLE CORPORATION		
LAWMA	340	340	6705101	A	HENDERSON, CHRIS				
LAWMA	17	17	6705107	B	COLORADO BEEF	OWNER OR REPRESENTATIVE			
LAWMA	278	278	6705111	A	RONALD PETERSON LLC	PETERSON, RONALD			
LAWMA	278	278	6705112	A	RONALD PETERSON LLC	PETERSON, RONALD			
LAWMA	84	84	6705114	A	HOFMEISTER, MARIE				
LAWMA	73	73	6705117	A	NICKELSON, ROBERT				
LAWMA	269	269	6705118	A	PETERSON, LORI				
LAWMA	368.1	368.1	6705119	A	ARKANSAS RIVER FARMS LLC	PATSCH, AARON	FORMERLY PURE CYCLE CORPORATION		
LAWMA	368.1	368.1	6705120	A	ARKANSAS RIVER FARMS LLC	PATSCH, AARON	FORMERLY PURE CYCLE CORPORATION		
LAWMA	49.2	49.2	6705123	A	J-S FARMS INC	SUTPHIN, JOHN			
LAWMA	161	161	6705125	A	TAYLOR, CHARLEY				
LAWMA	49.2	49.2	6705127	A	J-S FARMS INC	SUTPHIN, JOHN			
LAWMA	49.2	49.2	6705128	A	J-S FARMS INC	SUTPHIN, JOHN			
LAWMA	362	362	6705129	A	MANLY, RONALD OR MARY				
LAWMA	253	253	6705130	A	EATON, DWAIN OR DONNA				
LAWMA	155	155	6705131	A	TAGUE, FRANK				
LAWMA	303	303	6705132	A	HERRERA, JASON				
LAWMA	283	283	6705140	A	WOLFE, JACK R				
LAWMA	283	283	6705140	B	WOLFE, JACK R				
LAWMA	175	175	6705143	A	VAN CAMPEN, BRENDA				
LAWMA	1	1	6705145	A	FBO WURST INC	WURST, BRIAN			
LAWMA	103	103	6705146	A	SHINN, CARL				
LAWMA	103	103	6705147	A	SHINN, CARL				
LAWMA	1	1	6705148	A	FBO WURST INC	WURST, BRIAN			
LAWMA	1	1	6705149	A	FBO WURST INC	WURST, BRIAN			
LAWMA	1	1	6705150	A	FBO WURST INC	WURST, BRIAN			
LAWMA	1	1	6705151	A	FBO WURST INC	WURST, BRIAN			

Table 1 - Wells Included in Arkansas River Replacement Plan

(sorted by Structure ID)

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Plan Association	Farm Group	Farm Unit	Structure ID	ID Suf	Owner Information Organization (Last Name, First Name)	User Information Organization (Last Name, First Name)	Comments	GAP/GHP Plan?	MJ Water Supply?
LAWMA	247	247	6705152	A	RONALD PETERSON LLC	PETERSON, RONALD			
LAWMA	233	233	6705153	A	PRICE, JACK				
LAWMA	75	75	6705155	A	OLIVER, LARRY				
LAWMA	233	233	6705170	A	PRICE, JACK				
LAWMA	233	233	6705171	A	PRICE, JACK				
LAWMA	247	247	6705172	A	RONALD PETERSON LLC	PETERSON, RONALD			
LAWMA	296	296	6705185	A	REED, HAROLD				
LAWMA	296	296	6705186	A	REED, HAROLD				
LAWMA	296	296	6705187	A	REED, HAROLD				
LAWMA	49.4	49.4	6705189	A	J-S FARMS INC	SUTPHIN, JOHN			
LAWMA	49.4	49.4	6705190	A	J-S FARMS INC	SUTPHIN, JOHN			
LAWMA	49.4	49.4	6705191	A	J-S FARMS INC	SUTPHIN, JOHN			
LAWMA	49.4	49.4	6705192	A	J-S FARMS INC	SUTPHIN, JOHN			
LAWMA	122	122	6705193	A	LUBBERS, CLAY OR NICOLE				
LAWMA	122	122	6705194	A	ULLOM, DONALD OR KENNITH				
LAWMA	122	122	6705195	A	ULLOM, DONALD OR KENNITH				
LAWMA	122	122	6705196	A	ULLOM, DONALD OR KENNITH				
LAWMA	296	296	6705197	A	REED & BLSH	REED, HAROLD			
LAWMA	122	122	6705198	A	ULLOM, DONALD OR KENNITH				
LAWMA	49.4	49.4	6705199	A	J-S FARMS INC	SUTPHIN, JOHN			
LAWMA	49.4	49.4	6705200	A	J-S FARMS INC	SUTPHIN, JOHN			
LAWMA	122	122	6705201	A	LUBBERS, CLAY OR NICOLE				
LAWMA	368	368	6705202	A	ARKANSAS RIVER FARMS LLC	PATSCH, AARON			
LAWMA	368	368	6705203	A	ARKANSAS RIVER FARMS LLC	PATSCH, AARON			
LAWMA	122	122	6705204	A	ULLOM, DONALD OR KENNITH				
LAWMA	122	122	6705205	A	ULLOM, DONALD OR KENNITH				
LAWMA	122	122	6705206	A	ULLOM, DONALD OR KENNITH				
LAWMA	296	296	6705207	A	REED & ULLOM PARTNERSHIP	OWNER OR REPRESENTATIVE			
LAWMA	296	296	6705208	A	REED & BLSH	REED, HAROLD			
LAWMA	296	296	6705209	A	REED & ULLOM PARTNERSHIP	OWNER OR REPRESENTATIVE			
LAWMA	296	296	6705210	A	REED & BLSH	REED, HAROLD			
LAWMA	296	296	6705211	A	REED & ULLOM PARTNERSHIP	OWNER OR REPRESENTATIVE			
LAWMA	296	296	6705217	A	REED, HAROLD				
LAWMA	210	210	6705227	A	MCCLAVE SCHOOL DISTRICT	WEBER, TERRY			
LAWMA	136	135	6705234	A	REYHER ENTERPRISES	MCKENZIE, ROBERT			
LAWMA	212	212	6705235	A	PORTS TO PLAINS TRAVEL PLAZA	OWNER OR REPRESENTATIVE			
LAWMA	49.1	49.1	6705239	A	J-S FARMS INC	SUTPHIN, JOHN			
LAWMA	49.1	49.1	6705240	A	J-S FARMS INC	SUTPHIN, JOHN			
LAWMA	15	15	6705272	A	LAMAR LIGHT & POWER	O'NEILL, RORY			
LAWMA	15	15	6705272	B	LAMAR LIGHT & POWER	O'NEILL, RORY			
LAWMA	15	15	6705272	C	LAMAR LIGHT & POWER	O'NEILL, RORY			
LAWMA	15	15	6705273	A	LAMAR LIGHT & POWER	O'NEILL, RORY			
LAWMA	15	15	6705275	A	LAMAR LIGHT & POWER	O'NEILL, RORY			
LAWMA	15	15	6705276	A	LAMAR LIGHT & POWER	O'NEILL, RORY			
LAWMA	15	15	6705278	A	LAMAR LIGHT & POWER	O'NEILL, RORY			
LAWMA	15	15	6705279	A	LAMAR LIGHT & POWER	O'NEILL, RORY			
LAWMA	15	15	6705280	A	LAMAR LIGHT & POWER	O'NEILL, RORY			
LAWMA	15	15	6705281	A	LAMAR LIGHT & POWER	O'NEILL, RORY			
LAWMA	15	15	6705282	A	LAMAR LIGHT & POWER	O'NEILL, RORY			
LAWMA	15	15	6705283	A	LAMAR LIGHT & POWER	O'NEILL, RORY			
LAWMA	15	15	6705284	A	LAMAR LIGHT & POWER	O'NEILL, RORY			
LAWMA	15	15	6705285	A	LAMAR LIGHT & POWER	O'NEILL, RORY			
LAWMA	15	15	6705286	A	LAMAR LIGHT & POWER	O'NEILL, RORY			
LAWMA	15	15	6705287	A	LAMAR LIGHT & POWER	O'NEILL, RORY			
LAWMA	15	15	6705288	A	LAMAR LIGHT & POWER	O'NEILL, RORY			
LAWMA	15	15	6705289	A	LAMAR LIGHT & POWER	O'NEILL, RORY			
LAWMA	48	48	6705290	A	INMAN, VIRGINIA				
LAWMA	122	122	6705312	A	ULLOM, DONALD OR KENNITH				
LAWMA	122	122	6705314	A	ULLOM, DONALD OR KENNITH				
LAWMA	122	122	6705315	A	ULLOM, DONALD OR KENNITH				
LAWMA	92	92	6705331	A	ROBERTSON, ROY				
LAWMA	33	33	6705343	A	GILBERT, RAY				
LAWMA	15	15	6705349	A	LAMAR, CITY OF	RIGEL, RICK			
LAWMA	312	312	6705350	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	312	312	6705355	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	312	312	6705355	B	#N/A	#N/A			
LAWMA	219	219	6705364	A	J-S FARMS INC	SUTPHIN, JOHN			
LAWMA	312	312	6705373	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	312	312	6705374	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	42	42.1	6705375	A	HINER CONSTRUCTION	HINER, REX M OR SHARON A			
LAWMA	229	229	6705376	A	PROWERS COUNTY	OWNER OR REPRESENTATIVE			

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LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Plan Association	Farm Group	Farm Unit	Structure ID	ID Suf	Owner Information Organization (Last Name, First Name)	User Information Organization (Last Name, First Name)	Comments	GAP/GHP Plan?	MJ Water Supply?
LAWMA	172	172	6705391	A	LAMAR COMMUNITY COLLEGE	REAMY, ROGER			
LAWMA	172	172	6705392	A	LAMAR COMMUNITY COLLEGE	REAMY, ROGER			
LAWMA	172	172	6705393	A	LAMAR COMMUNITY COLLEGE	REAMY, ROGER			
LAWMA	36	36	6705400	A	GRUENLOH, MARVIN				
LAWMA	292	292	6705401	A	WITT, RANDY A OR MINDA L				
LAWMA	70.2	70.2	6705404	A	S&S LAND & CATTLE, INC.	SUTPHIN, III, JOHN			
LAWMA	30	30	6705410	A	SPITZ CATTLE COMPANY	SPITZ, JOE			
LAWMA	18	18	6705411	A	CO DIV OF PARKS & WILDLIFE	OWNER OR REPRESENTATIVE			
LAWMA	18	18	6705413	A	CO DIV OF PARKS & WILDLIFE	OWNER OR REPRESENTATIVE			
LAWMA	18	18	6705414	A	CO DIV OF PARKS & WILDLIFE	OWNER OR REPRESENTATIVE			
LAWMA	18	18	6705415	A	CO DIV OF PARKS & WILDLIFE	OWNER OR REPRESENTATIVE			
LAWMA	86	86.1	6705416	A	REYHER ENTERPRISES	MCKENZIE, ROBERT			
LAWMA	86	86.1	6705417	A	REYHER ENTERPRISES	MCKENZIE, ROBERT			
LAWMA	70.2	70.2	6705421	A	NEVIUS RANCH	NIEVIUS, BRAD			
LAWMA	289	289	6705426	A	J-S RANCH LLC	SUTPHIN, JOHN JR			
LAWMA	128	128	6705430	A	WIDENER FARMS INC	KNOBBE, LINDA			
LAWMA	128	128	6705431	A	WIDENER FARMS INC	KNOBBE, LINDA			
LAWMA	219	219	6705433	A	J-S FARMS INC	SUTPHIN, JOHN			
LAWMA	219	219	6705435	A	J-S FARMS INC	SUTPHIN, JOHN			
LAWMA	86	86.1	6705438	A	REYHER ENTERPRISES	MCKENZIE, ROBERT			
LAWMA	138	138	6705451	A	WOOTTEN, WILLIAM				
LAWMA	138	138	6705452	A	WOOTTEN, WILLIAM				
LAWMA	86.2	86.2	6705454	A	REYHER ENTERPRISES	MCKENZIE, ROBERT			
LAWMA	112	112	6705455	A	SPRINGER, PAUL				
LAWMA	193	193	6705457	A	MAY FARMS	MAY, DALLAS			
LAWMA	193	193	6705458	A	MAY FARMS	MAY, DALLAS			
LAWMA	59	59	6705459	A	MAY, RILEY L				
LAWMA	59	59	6705460	A	MAY, RILEY L				
LAWMA	193	193	6705461	A	MAY FARMS	MAY, DALLAS			
LAWMA	193	193	6705462	A	MAY FARMS	MAY, DALLAS			
LAWMA	193	193	6705463	A	MAY FARMS	MAY, DALLAS			
LAWMA	104	104	6705464	A	SMARTT, KENNETH				
LAWMA	146	146.1	6705466	A	ELLENBERGER PARTNERSHIP LLP	ELLENBERGER, D J			
LAWMA	146	146.1	6705467	A	ELLENBERGER PARTNERSHIP LLP	ELLENBERGER, D J			
LAWMA	5	5	6705474	A	BARRETT CHILDREN GENERAL PTSHP	OWNER OR REPRESENTATIVE			
LAWMA	312.4	312.4	6705477	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	312	312.3	6705478	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	312	312.3	6705479	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	312	312.2	6705480	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	312	312.3	6705481	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	312.4	312.4	6705482	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	312	312.3	6705483	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	312	365	6705484	A	S-D INVESTMENTS LLC	HOUSTMA, JAY			
LAWMA	312	312.3	6705485	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	312	312.3	6705486	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	312	312.3	6705488	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	312	312.3	6705489	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	53.1	53.1	6705490	A	NOVA-SOMINA LLC	JENSEN, ERIC OR RYAN			
LAWMA	312	312.3	6705491	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	312	312.3	6705492	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	31	31	6705493	A	GEORGE TEMPEL LIVESTOCK	TEMPEL, GEORGE			
LAWMA	312	312.3	6705494	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	31	31	6705496	A	GEORGE TEMPEL LIVESTOCK	TEMPEL, GEORGE			
LAWMA	31	31	6705497	A	GEORGE TEMPEL LIVESTOCK	TEMPEL, GEORGE			
LAWMA	31	31	6705498	A	GEORGE TEMPEL LIVESTOCK	TEMPEL, GEORGE			
LAWMA	271	271	6705500	A	ESTATE OF LARRY HUGHES	HUGHES, LARRY H			
LAWMA	271	271	6705501	A	ESTATE OF LARRY HUGHES	HUGHES, LARRY H			
LAWMA	271	271	6705502	A	ESTATE OF LARRY HUGHES	HUGHES, LARRY H			
LAWMA	271	271	6705503	A	ESTATE OF LARRY HUGHES	HUGHES, LARRY H			
LAWMA	271	271	6705504	A	ESTATE OF LARRY HUGHES	HUGHES, LARRY H			
LAWMA	271	271	6705505	A	ESTATE OF LARRY HUGHES	HUGHES, LARRY H			
LAWMA	271	271	6705506	A	ESTATE OF LARRY HUGHES	HUGHES, LARRY H			
LAWMA	271	271	6705507	A	ESTATE OF LARRY HUGHES	HUGHES, LARRY H			
LAWMA	271	271	6705508	A	ESTATE OF LARRY HUGHES	HUGHES, LARRY H			
LAWMA	271	271	6705509	A	ESTATE OF LARRY HUGHES	HUGHES, LARRY H			
LAWMA	271	271	6705510	A	ESTATE OF LARRY HUGHES	HUGHES, LARRY H			
LAWMA	271	271	6705511	A	ESTATE OF LARRY HUGHES	HUGHES, LARRY H			
LAWMA	271	271	6705512	A	ESTATE OF LARRY HUGHES	HUGHES, LARRY H			
LAWMA	999	999	6705527	A	LAWMA	HIGBEE, DONALD			
LAWMA	160	160	6705535	A	SWAFFORD, WILLIAM L				
LAWMA	160	160	6705536	A	SWAFFORD, WILLIAM L				

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Plan Association	Farm Group	Farm Unit	Structure ID	ID Suf	Owner Information Organization (Last Name, First Name)	User Information Organization (Last Name, First Name)	Comments	GAP/GHP Plan?	MJ Water Supply?
LAWMA	160	160	6705537	A	SWAFFORD, WILLIAM L				
LAWMA	312	312.3	6705538	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	312	312.3	6705539	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	242	242	6705540	A	REESE, CHARLES				
LAWMA	41	41	6705541	A	HIGBEE, DONALD				
LAWMA	312	312.2	6705542	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	312	312.3	6705544	A	KOEHN, DONALD R				
LAWMA	312	312.2	6705547	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	312	312.2	6705548	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	242	242	6705549	A	REESE, CHARLES				
LAWMA	242	242	6705550	A	REESE, CHARLES				
LAWMA	52	52	6705551	A	JENSEN, HENRY				
LAWMA	52	52	6705552	A	JENSEN, HENRY				
LAWMA	34	34	6705555	A	GRANADA SCHOOL DISTRICT	OWNER OR REPRESENTATIVE			
LAWMA	202	202	6705557	A	GRANADA LUMBER CO	EVERHART, DON			
LAWMA	208.1	208.1	6705558	A	JONES, CARL				
LAWMA	208.1	208.1	6705559	A	JONES, CARL				
LAWMA	338	338	6705565	A	PARKER, ROBERT				
LAWMA	182	182	6705567	A	BRISTOL GRANADA CEMETERY DIST	MUSICK, NATALIE			
LAWMA	272	272	6705592	A	FLETCHER, NEIL OR BECKY				
LAWMA	211	211	6705594	A	WINTERS, SHARON				
LAWMA	274	274	6705595	A	TRI-STATE GENERATION & TRANSMISSION	FUEL OR WATER RESOURCES			
LAWMA	131	53.2	6705597	A	NOVA-SOMINA LLC	JENSEN, ERIC OR RYAN			
LAWMA	131	131	6705598	A	WILLHITE, J MARVIN				
LAWMA	65	65	6705599	A	MIDWESTERN FARMS	DEPRA, MEL			
LAWMA	242	242	6705601	A	REESE, CHARLES				
LAWMA	252	252.1	6705606	A	CO DIV OF PARKS & WILDLIFE	OWNER OR REPRESENTATIVE			
LAWMA	53.2	53.2	6705607	A	NOVA-SOMINA LLC	JENSEN, ERIC OR RYAN			
LAWMA	53.2	53.2	6705611	A	NOVA-SOMINA LLC	JENSEN, ERIC OR RYAN			
LAWMA	53.2	53.2	6705613	A	NOVA-SOMINA LLC	JENSEN, ERIC OR RYAN			
LAWMA	247	247	6705614	A	RONALD PETERSON LLC	PETERSON, RONALD			
LAWMA	177	177	6705615	A	TRI-STATE GENERATION & TRANSMISSION	FUEL OR WATER RESOURCES			
LAWMA	162	162	6705617	A	RINK, MILTON OR CAROL				
LAWMA	162	162	6705618	A	RINK, MILTON OR CAROL				
LAWMA	8	8	6705619	A	TRI-STATE GENERATION & TRANSMISSION	FUEL OR WATER RESOURCES			
LAWMA	113	113	6705631	A	STALFORD CATTLE CO	STALFORD, ELMER R			
LAWMA	113	113	6705632	A	STALFORD CATTLE CO	STALFORD, ELMER R			
LAWMA	191	191	6705635	A	THOMPSON, ROBERT				
LAWMA	191	191	6705636	A	THOMPSON, ROBERT				
LAWMA	191	191	6705637	A	THOMPSON, ROBERT				
LAWMA	191	191	6705638	A	THOMPSON, ROBERT				
LAWMA	28.1	28.1	6705642	A	4 SISTERS LLC	WILLEY, CHARLEE			
LAWMA	28.1	28.1	6705645	A	4 SISTERS LLC	WILLEY, CHARLEE			
LAWMA	28.1	28.1	6705646	A	4 SISTERS LLC	WILLEY, CHARLEE			
LAWMA	2	2	6705652	A	ARNOLD, WILLIAM G				
LAWMA	57	57	6705658	A	KOEHN, DONALD R				
LAWMA	41	41	6705660	A	HIGBEE, DONALD				
LAWMA	41	41	6705661	A	HIGBEE, DONALD				
LAWMA	187	187	6705662	A	DUVALL, FRANK				
LAWMA	70.2	70.2	6705663	A	S&S LAND & CATTLE INC	SUTPHIN, JOHN III			
LAWMA	70.2	70.2	6705664	A	S&S LAND & CATTLE INC	SUTPHIN, JOHN III			
LAWMA	70.2	70.2	6705665	A	S&S LAND & CATTLE INC	SUTPHIN, JOHN III			
LAWMA	70.2	70.2	6705668	A	S&S LAND & CATTLE INC	SUTPHIN, JOHN III			
LAWMA	70.2	70.2	6705669	A	S&S LAND & CATTLE INC	SUTPHIN, JOHN III			
LAWMA	364	364	6705670	A	SMOTHERMAN, KEVIN				
LAWMA	302	302	6705671	A	SMITH, EVELYN L				
LAWMA	29	29	6705677	A	FLINT, LAWRENCE OR CAROL				
LAWMA	70.1	70.1	6705678	A	NEVIUS RANCH	NIEVIUS, BRAD			
LAWMA	29	29	6705679	A	FLINT, LAWRENCE OR CAROL				
LAWMA	49.1	49	6705683	A	J-S FARMS INC	SUTPHIN, JOHN			
LAWMA	49.1	49	6705684	A	J-S FARMS INC	SUTPHIN, JOHN			
LAWMA	49.1	49	6705685	A	J-S FARMS INC	SUTPHIN, JOHN			
LAWMA	49.1	49	6705686	A	J-S FARMS INC	SUTPHIN, JOHN			
LAWMA	49.1	49	6705687	A	J-S FARMS INC	SUTPHIN, JOHN			
LAWMA	49.1	49	6705688	A	J-S FARMS INC	SUTPHIN, JOHN			
LAWMA	49.1	49	6705689	A	J-S FARMS INC	SUTPHIN, JOHN			
LAWMA	49.1	49	6705690	A	J-S FARMS INC	SUTPHIN, JOHN			
LAWMA	28.1	28.1	6705691	A	4 SISTERS LLC	WILLEY, CHARLEE			
LAWMA	28.1	28.1	6705691	B	4 SISTERS LLC	WILLEY, CHARLEE			
LAWMA	49.1	49	6705692	A	J-S FARMS INC	SUTPHIN, JOHN			
LAWMA	49.1	49	6705693	A	J-S FARMS INC	SUTPHIN, JOHN			

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LAWMA	49.1	49	6705694	A	J-S FARMS INC	SUTPHIN, JOHN			
LAWMA	49.1	49	6705695	A	J-S FARMS INC	SUTPHIN, JOHN			
LAWMA	342	342	6705696	A	A&B FARM LLC	WILGER, JAMES			
LAWMA	342	342	6705696	B	A&B FARM LLC	WILGER, JAMES			
LAWMA	342	342	6705697	A	A&B FARM LLC	WILGER, JAMES			
LAWMA	130	130	6705698	A	WILGER, ROBERT OR LINDA				
LAWMA	130	130	6705699	A	WILGER, ROBERT OR LINDA				
LAWMA	43	43	6705700	A	HOLDEN, SHERYL A				
LAWMA	130	130	6705701	A	WILGER, ROBERT OR LINDA				
LAWMA	130	130	6705702	A	WILGER, ROBERT OR LINDA				
LAWMA	43	43	6705703	A	HOLDEN, SHERYL A				
LAWMA	43	43	6705704	A	HOLDEN, SHERYL A				
LAWMA	62	62	6705705	A	MALONE FARMS LLP	MALONE, AL			
LAWMA	62	62	6705707	A	MALONE FARMS LLP	MALONE, AL			
LAWMA	130	130	6705708	A	TRI-STATE GENERATION & TRANSMISSION	FUEL OR WATER RESOURCES			
LAWMA	312.1	312.1	6705715	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	312.1	312.1	6705716	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	312.1	312.1	6705717	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	6	6	6705718	A	BARTH FARMS INC	BARTH, BOB			
LAWMA	6	6	6705719	A	BARTH FARMS INC	BARTH, BOB			
LAWMA	312.1	312.1	6705720	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	96	96	6705721	A	SCHENCK, LARRY				
LAWMA	312.1	312.1	6705722	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	312.1	312.1	6705723	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	312.1	312.1	6705724	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	312.1	312.1	6705725	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	312.1	312.1	6705726	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	312.1	312.1	6705727	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	312.1	312.1	6705728	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	312.1	312.1	6705729	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	312.1	312.1	6705731	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	312.1	312.1	6705733	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	6	6	6705735	A	BARTH FARMS INC	BARTH, BOB			
LAWMA	312.1	312.1	6705736	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	312.1	312.1	6705737	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	105	105	6705738	A	SMITH, DAVE				
LAWMA	345	345	6705739	A	NORTHERN AGRICULTURE c/o FARMLAND MNGT SRVC	SILVEIRA, JOSEPH			
LAWMA	345	345	6705740	A	NORTHERN AGRICULTURE c/o FARMLAND MNGT SRVC	SILVEIRA, JOSEPH			
LAWMA	345	345	6705741	A	NORTHERN AGRICULTURE c/o FARMLAND MNGT SRVC	SILVEIRA, JOSEPH			
LAWMA	345	345	6705742	A	NORTHERN AGRICULTURE c/o FARMLAND MNGT SRVC	SILVEIRA, JOSEPH			
LAWMA	370	370	6705744	A	MILLER & MILLER FARMS LTD	MILLER, JEROD W			
LAWMA	370	370	6705745	A	MILLER & MILLER FARMS LTD	MILLER, JEROD W			
LAWMA	370	370	6705746	A	MILLER & MILLER FARMS LTD	MILLER, JEROD W			
LAWMA	370	370	6705748	A	MILLER & MILLER FARMS LTD	MILLER, JEROD W			
LAWMA	370	370	6705749	A	MILLER & MILLER FARMS LTD	MILLER, JEROD W			
LAWMA	345	345	6705752	A	NORTHERN AGRICULTURE c/o FARMLAND MNGT SRVC	SILVEIRA, JOSEPH			
LAWMA	213	213	6705773	A	REED, HARRY				
LAWMA	312.1	312.1	6705774	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	312.1	312.1	6705775	A	GP IRRIGATED FARMS LLC	NYQUIST, KARL			
LAWMA	28.2	28.2	6705777	A	DaVAULT, GLENN				
LAWMA	28.3	28.3	6705778	A	DaVAULT, GLENN				
LAWMA	28.3	28.3	6705779	A	DaVAULT, GLENN				
LAWMA	28.3	28.3	6705780	A	DaVAULT, GLENN				
LAWMA	28.3	28.3	6705781	A	DaVAULT, GLENN				
LAWMA	28.3	28.3	6705782	A	DaVAULT, GLENN				
LAWMA	46	46	6705783	A	ICE, ROBERT				
LAWMA	131	131	6705784	A	WILLHITE, J MARVIN				
LAWMA	65	65	6705787	A	MIDWESTERN FARMS	DEPRA, MEL			
LAWMA	65	65	6705788	A	MIDWESTERN FARMS	DEPRA, MEL			
LAWMA	295	295	6705801	A	NEUGEBAUER, MARTY W OR TARA R				
LAWMA	295	295	6705802	A	NEUGEBAUER, MARTY W OR TARA R				
LAWMA	334.1	334.1	6705803	A	COLORADO WATER & LAND LLLP	BROYLES, WILLIAM			
LAWMA	334.1	334.1	6705804	A	COLORADO WATER & LAND LLLP	BROYLES, WILLIAM			
LAWMA	334.1	334.1	6705806	A	COLORADO WATER & LAND LLLP	BROYLES, WILLIAM			
LAWMA	334.1	334.1	6705810	A	COLORADO WATER & LAND LLLP	BROYLES, WILLIAM			
LAWMA	334.1	334.1	6705811	A	COLORADO WATER & LAND LLLP	BROYLES, WILLIAM			
LAWMA	250	250	6705814	A	LEIKER, WILLIAM				
LAWMA	87	87	6705818	A	REYMAN, KENT				
LAWMA	100	100	6705820	A	SEUFER, DONALD				
LAWMA	213	213	6705822	A	REED, HARRY				
LAWMA	201	201	6705824	A	REYNOLDS, CLARENCE				

Table 1 - Wells Included in Arkansas River Replacement Plan

(sorted by Structure ID)

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Plan Association	Farm Group	Farm Unit	Structure ID	ID Suf	Owner Information Organization (Last Name, First Name)	User Information Organization (Last Name, First Name)	Comments	GAP/GHP Plan?	MJ Water Supply?
LAWMA	9	9	6705825	A	TRI-STATE GENERATION & TRANSMISSION	FUEL OR WATER RESOURCES			
LAWMA	192	192	6705827	A	TRI-STATE GENERATION & TRANSMISSION	FUEL OR WATER RESOURCES			
LAWMA	12.2	12.2	6705828	A	TRI-STATE GENERATION & TRANSMISSION	FUEL OR WATER RESOURCES			
LAWMA	251	101	6705829	A	SEUFER, DOROTHY or DALE				
LAWMA	12.2	12.2	6705831	A	TRI-STATE GENERATION & TRANSMISSION	FUEL OR WATER RESOURCES			
LAWMA	251	101	6705832	A	SUEFER, DOROTHY C/O DONALD				
LAWMA	341	341	6705833	A	SANDERS, MARK OR DIANE				
LAWMA	190	190	6705838	A	TRI-STATE GENERATION & TRANSMISSION	FUEL OR WATER RESOURCES			
LAWMA	100	100	6705839	A	SEUFER, DONALD				
LAWMA	190	190	6705840	A	TRI-STATE GENERATION & TRANSMISSION	FUEL OR WATER RESOURCES			
LAWMA	190	190	6705841	A	TRI-STATE GENERATION & TRANSMISSION	FUEL OR WATER RESOURCES			
LAWMA	61	61	6705854	A	LIGHTNER, FRANK				
LAWMA	35.1	35.1	6705855	A	TRI-STATE GENERATION & TRANSMISSION	FUEL OR WATER RESOURCES			
LAWMA	35.1	35.1	6705856	A	TRI-STATE GENERATION & TRANSMISSION	FUEL OR WATER RESOURCES			
LAWMA	203	203	6705857	A	TRI-STATE GENERATION & TRANSMISSION	FUEL OR WATER RESOURCES			
LAWMA	191	337	6705858	A	TRI-STATE GENERATION & TRANSMISSION	FUEL OR WATER RESOURCES			
LAWMA	191	337	6705859	A	TRI-STATE GENERATION & TRANSMISSION	FUEL OR WATER RESOURCES			
LAWMA	191	337	6705860	A	TRI-STATE GENERATION & TRANSMISSION	FUEL OR WATER RESOURCES			
LAWMA	191	337	6705861	A	TRI-STATE GENERATION & TRANSMISSION	FUEL OR WATER RESOURCES			
LAWMA	49.1	49.3	6705867	A	J-S FARMS INC	SUTPHIN, JOHN			
LAWMA	49.1	49.3	6705868	A	J-S FARMS INC	SUTPHIN, JOHN			
LAWMA	197	197	6705869	A	TRI-STATE GENERATION & TRANSMISSION	FUEL OR WATER RESOURCES			
LAWMA	197	197	6705870	A	TRI-STATE GENERATION & TRANSMISSION	FUEL OR WATER RESOURCES			
LAWMA	199	199	6705871	A	ANDERSON, EVA				
LAWMA	199	199	6705872	A	ANDERSON, EVA				
LAWMA	199	199	6705873	A	ANDERSON, EVA				
LAWMA	251	251	6705874	A	SEUFER, DALE AND DENICE				
LAWMA	35	35	6705875	A	TRI-STATE GENERATION & TRANSMISSION	FUEL OR WATER RESOURCES			
LAWMA	35	35	6705876	A	TRI-STATE GENERATION & TRANSMISSION	FUEL OR WATER RESOURCES			
LAWMA	35.1	35.1	6705877	A	TRI-STATE GENERATION & TRANSMISSION	FUEL OR WATER RESOURCES			
LAWMA	35.1	35.1	6705878	A	TRI-STATE GENERATION & TRANSMISSION	FUEL OR WATER RESOURCES			
LAWMA	49.1	49.3	6705879	A	J-S FARMS INC	SUTPHIN, JOHN			
LAWMA	344	344	6705881	A	MAUNE, BECKY OR MATT				
LAWMA	200	200	6705889	A	SEYBERT, GERALD				
LAWMA	248	248	6705915	A	BRASE, LEROY				
LAWMA	180	180	6705918	A	HAGGARD, RONNIE				
LAWMA	49.6	49.6	6705920	A	J-S RANCH LLC	SUTPHIN, JOHN JR			
LAWMA	49.6	49.6	6705921	A	J-S RANCH LLC	SUTPHIN, JOHN JR			
LAWMA	49.6	49.6	6705922	A	J-S RANCH LLC	SUTPHIN, JOHN JR			
LAWMA	49.6	49.6	6705923	A	J-S RANCH LLC	SUTPHIN, JOHN JR			
LAWMA	49.6	49.6	6705924	A	J-S RANCH LLC	SUTPHIN, JOHN JR			
LAWMA	195	195	6705936	A	WEIMER, JOSH OR JANA				
LAWMA	195	195	6705937	A	WEIMER, JOSH OR JANA				
LAWMA	99	99	6705938	A	SEMMENS, GIDEON OR MARY LOU				
LAWMA	195	195	6705943	A	WEIMER, JOSH OR JANA				
LAWMA	196	196	6705944	A	TEMPEL, ETHEL				
LAWMA	220	220	6705945	A	GILBERT FAMILY PARTNERSHIP	GILBERT, GALEN			
LAWMA	220	220	6705946	A	GILBERT FAMILY PARTNERSHIP	GILBERT, GALEN			
LAWMA	146	146	6705949	A	ELLENBERGER PARTNERSHIP LLP	ELLENBERGER, D J			
LAWMA	146	146	6705950	A	ELLENBERGER PARTNERSHIP LLP	ELLENBERGER, D J			
LAWMA	146	146	6705951	A	ELLENBERGER PARTNERSHIP LLP	ELLENBERGER, D J			
LAWMA	146	146	6705952	A	ELLENBERGER PARTNERSHIP LLP	ELLENBERGER, D J			
LAWMA	137	137	6705956	A	WOLLERT, RUBEN				
LAWMA	164	164	6705958	A	WOLLERT, RICHARD				
LAWMA	136	136	6705959	A	WOLLERT, RONALD				
LAWMA	136	136	6705960	A	WOLLERT, RONALD				
LAWMA	136	136	6705962	A	WOLLERT, RONALD				
LAWMA	134	134	6705963	A	WOLLERT, RONALD				
LAWMA	134	134	6705964	A	WOLLERT, RONALD				
LAWMA	154	154	6705965	A	WOLLERT, RONALD				
LAWMA	367	367	6705967	A	ARKANSAS RIVER FARMS LLC	PATSCH, AARON			
LAWMA	108	108	6705969	A	SOUDERS, JAMES				
LAWMA	108	108	6705970	A	SOUDERS, JAMES				
LAWMA	108	108	6705971	A	SOUDERS, JAMES				
LAWMA	108	108	6705972	A	SOUDERS, JAMES				
LAWMA	152	152	6705973	A	HUDSON & PERSYN LTD	OWNER OR REPRESENTATIVE			
LAWMA	196	196	6705975	A	TEMPEL, ETHEL				
LAWMA	196	196	6705976	A	TEMPEL, ETHEL				
LAWMA	196	196	6705977	A	TEMPEL, ETHEL				
LAWMA	304	304	6705981	A	SOUTH PLACE FARMS	VAN HOOK, DAWN K			
LAWMA	305	305	6705983	A	TEMPEL, GALE				

Table 1 - Wells Included in Arkansas River Replacement Plan

(sorted by Structure ID)

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

					Owner Information	User Information			
Plan Association	Farm Group	Farm Unit	Structure ID	ID Suf	Organization (Last Name, First Name)	Organization (Last Name, First Name)	Comments	GAP/GHP Plan?	MJ Water Supply?
LAWMA	217	217	6705984	A	BEEF CITY	MCKENZIE, JOHN ROBERT			
LAWMA	137	137	6705987	A	WOLLERT, RUBEN				
LAWMA	137	137	6705988	A	WOLLERT, RUBEN				
LAWMA	49.1	49.3	6706023	A	J-S FARMS INC	SUTPHIN, JOHN			
LAWMA	34	34	6706030	A	GRANADA SCHOOL DISTRICT	OWNER OR REPRESENTATIVE			
LAWMA	241	241	6706038	A	COLORADO INTERSTATE GAS CO - LAMAR	OWNER OR REPRESENTATIVE			
LAWMA	241	241	6706039	A	COLORADO INTERSTATE GAS CO - LAMAR	OWNER OR REPRESENTATIVE			
LAWMA	235	235	6706058	A	BROWN AND SONS INC	BROWN, GILBERT			
LAWMA	255	255	6706059	A	KERN FARMS LIMITED	OWNER OR REPRESENTATIVE			
LAWMA	255	255	6706061	A	KERN FARMS LIMITED	OWNER OR REPRESENTATIVE			
LAWMA	255	255	6706062	A	KERN FARMS LIMITED	OWNER OR REPRESENTATIVE			
LAWMA	255	255	6706063	A	KERN FARMS LIMITED	OWNER OR REPRESENTATIVE			
LAWMA	235	235	6706064	A	BROWN AND SONS INC	BROWN, GILBERT			
LAWMA	235	235	6706065	A	BROWN AND SONS INC	BROWN, GILBERT			
LAWMA	255	255	6706066	A	KERN FARMS LIMITED	OWNER OR REPRESENTATIVE			
LAWMA	255	255	6706067	A	KERN FARMS LIMITED	OWNER OR REPRESENTATIVE			
LAWMA	128	128	6706076	A	WIDENER FARMS INC	KNOBBE, LINDA			
LAWMA	343	343	6706080	A	GOODEN, LANE OR DEBORAH				
LAWMA	235	235	6706087	A	BROWN AND SONS INC	BROWN, GILBERT			
LAWMA	117	117	6706089	A	EADS, TOWN OF	BROWN, VAN			
LAWMA	117	117	6706094	A	EADS, TOWN OF	BROWN, VAN			
LAWMA	117	117	6706094	B	EADS, TOWN OF	BROWN, VAN			
LAWMA	117	117	6706095	A	EADS, TOWN OF	BROWN, VAN			
LAWMA	117	117	6706097	A	EADS, TOWN OF	BROWN, VAN			
LAWMA	117	117	6706098	A	EADS, TOWN OF	BROWN, VAN			
LAWMA	117	117	6706099	A	EADS, TOWN OF	BROWN, VAN			
LAWMA	117	117	6706100	A	EADS, TOWN OF	BROWN, VAN			
LAWMA	307	307	6706103	A	TRI OAK FOODS dba HIGH PLAINS PORK	PFLUM, RANDALL			
LAWMA	307	307	6706144	A	TRI OAK FOODS dba HIGH PLAINS PORK	PFLUM, RANDALL			
LAWMA	307	307	6706145	A	TRI OAK FOODS dba HIGH PLAINS PORK	PFLUM, RANDALL			
LAWMA	307	307	6706146	A	TRI OAK FOODS dba HIGH PLAINS PORK	PFLUM, RANDALL			
LAWMA	307	307	6706148	A	TRI OAK FOODS dba HIGH PLAINS PORK	PFLUM, RANDALL			
LAWMA	307	307	6706149	A	TRI OAK FOODS dba HIGH PLAINS PORK	PFLUM, RANDALL			
LAWMA	307	307	6706150	A	TRI OAK FOODS dba HIGH PLAINS PORK	PFLUM, RANDALL			
LAWMA	32	32	6706170	A	GARLAND N GIBBS TRUST B	GIBBS, RUBY J			
LAWMA	88	88	6706171	A	RHOADES, BYRON				
LAWMA	88	88	6706172	A	RHOADES, BYRON				
LAWMA	119	119	6706182	A	KIT CARSON, TOWN OF	HOLLAND, RANDY			
LAWMA	119	119	6706183	A	KIT CARSON, TOWN OF	HOLLAND, RANDY			
LAWMA	221	221	6706184	A	DORIS PRICE TRUST	PRICE, LLOYD E			
LAWMA	19	19	6706188	A	COLORADO INTERSTATE GAS CO - EADS	OWNER OR REPRESENTATIVE			
LAWMA	19	19	6706189	A	COLORADO INTERSTATE GAS CO - EADS	OWNER OR REPRESENTATIVE			
LAWMA	288	288	6706190	A	SCHMITT & MOUSEL	SCHMITT, JOE			
LAWMA	32	32	6706191	A	GARLAND N GIBBS TRUST B	GIBBS, RUBY J			
LAWMA	32	32	6706192	A	GARLAND N GIBBS TRUST B	GIBBS, RUBY J			
LAWMA	363	363	6706199	A	BGH INC	HOLLOWELL, BERNARD			
LAWMA	363	363	6706200	A	BGH INC	HOLLOWELL, BERNARD			
LAWMA	363	363	6706201	A	BGH INC	HOLLOWELL, BERNARD			
LAWMA	139	139	6706203	A	YOUNGREN, VINCENT				
LAWMA	139	139	6706204	A	YOUNGREN, VINCENT				
LAWMA	115	115	6706205	A	THOMPSON, DAVID OR RAYLEENE				
LAWMA	115	115	6706206	A	THOMPSON, DAVID OR RAYLEENE				
LAWMA	115	115	6706207	A	THOMPSON, DAVID OR RAYLEENE				
LAWMA	140	140	6706208	A	HUGO, TOWN OF	OWNER OR REPRESENTATIVE			
LAWMA	140	140	6706209	A	HUGO, TOWN OF	OWNER OR REPRESENTATIVE			
LAWMA	140	140	6706210	A	HUGO, TOWN OF	OWNER OR REPRESENTATIVE			
LAWMA	140	140	6706211	A	HUGO, TOWN OF	OWNER OR REPRESENTATIVE			
LAWMA	140	140	6706212	A	HUGO, TOWN OF	OWNER OR REPRESENTATIVE			
LAWMA	140	140	6706213	A	HUGO, TOWN OF	OWNER OR REPRESENTATIVE			
LAWMA	237	237	6706225	A	DECHANT, MARY LOUISE				
LAWMA	275	275	6706226	A	VICK, ANTHONY OR STACY				
LAWMA	115	115	6706289	A	THOMPSON, DAVID OR RAYLEENE				
LAWMA	239	239	6706316	A	MEMORY LANE RANCH	SNOVER, JOHN OR CONNIE			
LAWMA	239	239	6706317	A	MEMORY LANE RANCH	SNOVER, JOHN OR CONNIE			
LAWMA	239	239	6706318	A	MEMORY LANE RANCH	SNOVER, JOHN OR CONNIE			
LAWMA	323	323	6706324	A	RAINES, ROBERT W JR				
LAWMA	323	323	6706325	A	RAINES, ROBERT W JR				
LAWMA	256	256	6706346	A	ROGERS, JAMES				
LAWMA	307	307	6706390	A	TRI OAK FOODS dba HIGH PLAINS PORK	PFLUM, RANDALL			
LAWMA	307	307	6706392	A	TRI OAK FOODS dba HIGH PLAINS PORK	PFLUM, RANDALL			
LAWMA	307	307	6706393	A	TRI OAK FOODS dba HIGH PLAINS PORK	PFLUM, RANDALL			

Table 2a - Projected Pumping for Wells in Table 1

(sorted by Structure ID)

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Plan Association	Farm Group	Farm Unit	Structure ID	ID Suf	Mainstem / Tributary	2019 Plan Year Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Summer Season (Apr 19 - Oct 19)	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Winter Season (Nov 19 - Mar 20)	TOTAL (Apr 19 - Mar 20)	Comments
LAWMA	368.3	368.3	1705032	A	Mainstem	8.55	11.77	13.71	17.54	15.59	11.19	5.25	83.60	1.40	0.51	0.45	1.47	8.72	12.55	96.15	
LAWMA	368.4	368.4	1705078	A	Mainstem	8.23	11.34	13.20	16.89	15.01	10.78	5.06	80.51	1.34	0.50	0.43	1.41	8.40	12.08	92.59	
LAWMA	368.4	368.4	1705079	A	Mainstem	8.71	11.99	13.96	17.87	15.88	11.40	5.35	85.16	1.42	0.52	0.46	1.49	8.89	12.78	97.94	
LAWMA	368.3	368.3	1705356	A	Mainstem	8.23	11.34	13.20	16.89	15.01	10.78	5.06	80.51	1.34	0.50	0.43	1.41	8.40	12.08	92.59	
LAWMA	369	369	1705438	A	Mainstem	2.13	2.93	3.41	4.36	3.88	2.79	1.31	20.81	0.35	0.13	0.11	0.36	2.17	3.12	23.93	
LAWMA	369	369	1705439	A	Mainstem	2.08	2.87	3.34	4.27	3.80	2.73	1.28	20.37	0.34	0.13	0.11	0.36	2.12	3.06	23.43	
LAWMA	574	368.2	1705644	A	Mainstem	33.74	46.47	54.10	69.21	61.54	44.17	20.74	329.97	5.51	2.03	1.77	5.78	34.43	49.52	379.49	
LAWMA	368.5	368.5	1705649	A	Mainstem	9.03	12.44	14.48	18.53	16.47	11.83	5.55	88.33	1.48	0.54	0.47	1.55	9.22	13.26	101.59	
LAWMA	368.5	368.5	1705650	A	Mainstem	8.55	11.77	13.71	17.54	15.59	11.19	5.25	83.60	1.40	0.51	0.45	1.47	8.72	12.55	96.15	
LAWMA	368.5	368.5	1705651	A	Mainstem	8.23	11.34	13.20	16.89	15.01	10.78	5.06	80.51	1.34	0.50	0.43	1.41	8.40	12.08	92.59	
LAWMA	368.6	368.6	1705656	A	Mainstem	8.96	12.33	14.36	18.37	16.33	11.72	5.50	87.57	1.46	0.54	0.47	1.54	9.14	13.15	100.72	
LAWMA	368.6	368.6	1705657	A	Mainstem	8.23	11.34	13.20	16.89	15.01	10.78	5.06	80.51	1.34	0.50	0.43	1.41	8.40	12.08	92.59	
LAWMA	368.6	368.6	1705661	A	Mainstem	8.23	11.34	13.20	16.89	15.01	10.78	5.06	80.51	1.34	0.50	0.43	1.41	8.40	12.08	92.59	
LAWMA	368.6	368.6	1705662	A	Mainstem	8.23	11.34	13.20	16.89	15.01	10.78	5.06	80.51	1.34	0.50	0.43	1.41	8.40	12.08	92.59	
LAWMA	368.7	368.7	1705688	A	Mainstem	8.23	11.34	13.20	16.89	15.01	10.78	5.06	80.51	1.34	0.50	0.43	1.41	8.40	12.08	92.59	
LAWMA	368.7	368.7	1705689	A	Mainstem	8.23	11.34	13.20	16.89	15.01	10.78	5.06	80.51	1.34	0.50	0.43	1.41	8.40	12.08	92.59	
LAWMA	368.7	368.7	1705690	A	Mainstem	8.23	11.34	13.20	16.89	15.01	10.78	5.06	80.51	1.34	0.50	0.43	1.41	8.40	12.08	92.59	
LAWMA	368.2	368.2	1705765	A	Mainstem	8.23	11.34	13.20	16.89	15.01	10.78	5.06	80.51	1.34	0.50	0.43	1.41	8.40	12.08	92.59	
LAWMA	368.7	368.7	1705861	A	Mainstem	8.23	11.34	13.20	16.89	15.01	10.78	5.06	80.51	1.34	0.50	0.43	1.41	8.40	12.08	92.59	
LAWMA	368.8	368.8	1705900	A	Mainstem	8.23	11.34	13.20	16.89	15.01	10.78	5.06	80.51	1.34	0.50	0.43	1.41	8.40	12.08	92.59	
LAWMA	158	158	6705000	A	Mainstem	13.09	18.02	20.98	26.85	23.87	17.13	8.04	127.98	2.14	0.79	0.69	2.24	13.36	19.22	147.20	
LAWMA	179	179	6705002	A	Mainstem	1.58	2.18	2.54	3.25	2.89	2.07	0.97	15.48	0.26	0.10	0.08	0.27	1.62	2.33	17.81	
LAWMA	179	179	6705003	A	Mainstem	1.27	1.74	2.03	2.60	2.31	1.66	0.78	12.39	0.21	0.08	0.07	0.22	1.29	1.87	14.26	
LAWMA	179	179	6705004	A	Mainstem	1.90	2.62	3.05	3.90	3.46	2.49	1.17	18.59	0.31	0.11	0.10	0.33	1.94	2.79	21.38	
LAWMA	158	158	6705010	A	Mainstem	14.25	19.62	22.85	29.23	25.99	18.65	8.76	139.35	2.33	0.86	0.75	2.44	14.54	20.92	160.27	
LAWMA	384	384	6705011	A	Mainstem	5.99	8.26	9.61	12.30	10.93	7.85	3.68	58.62	0.98	0.36	0.31	1.03	6.12	8.80	67.42	
LAWMA	384	384	6705012	A	Mainstem	5.33	7.34	8.55	10.93	9.72	6.98	3.28	52.13	0.87	0.32	0.28	0.91	5.44	7.82	59.95	
LAWMA	384	384	6705013	A	Mainstem	2.82	3.89	4.53	5.79	5.15	3.70	1.73	27.61	0.46	0.17	0.15	0.48	2.88	4.14	31.75	
LAWMA	384	384	6705015	A	Mainstem	13.68	18.84	21.93	28.06	24.95	17.91	8.41	133.78	2.23	0.82	0.72	2.34	13.96	20.07	153.85	
LAWMA	158	158	6705016	A	Mainstem	13.61	18.75	21.83	27.93	24.83	17.82	8.37	133.14	2.22	0.82	0.71	2.33	13.89	19.97	153.11	
LAWMA	158	158	6705017	A	Mainstem	5.93	8.16	9.51	12.16	10.81	7.76	3.64	57.97	0.97	0.36	0.31	1.02	6.05	8.71	66.68	
LAWMA	158	158	6705018	A	Mainstem	5.07	6.98	8.12	10.39	9.24	6.63	3.11	49.54	0.83	0.31	0.27	0.87	5.17	7.45	56.99	
LAWMA	158	158	6705019	A	Mainstem	5.07	6.98	8.12	10.39	9.24	6.63	3.11	49.54	0.83	0.31	0.27	0.87	5.17	7.45	56.99	
LAWMA	188	188	6705020	A	Mainstem	2.22	3.06	3.56	4.56	4.05	2.91	1.37	21.73	0.36	0.13	0.12	0.38	2.27	3.26	24.99	
LAWMA	147	147	6705060	A	Mainstem	2.43	3.35	3.90	4.99	4.43	3.18	1.49	23.77	0.40	0.15	0.13	0.42	2.48	3.58	27.35	
LAWMA	42	42	6705062	A	Mainstem	7.12	9.80	11.41	14.60	12.98	9.32	4.37	69.60	1.16	0.43	0.37	1.22	7.26	10.44	80.04	
LAWMA	121	121	6705063	A	Mainstem	12.35	17.01	19.80	25.33	22.52	16.17	7.59	120.77	2.02	0.74	0.65	2.12	12.60	18.13	138.90	
LAWMA	368.1	368.1	6705066	A	Mainstem	8.23	11.34	13.20	16.89	15.01	10.78	5.06	80.51	1.34	0.50	0.43	1.41	8.40	12.08	92.59	
LAWMA	368.1	368.1	6705069	A	Mainstem	8.23	11.34	13.20	16.89	15.01	10.78	5.06	80.51	1.34	0.50	0.43	1.41	8.40	12.08	92.59	
LAWMA	574	368.1	6705071	A	Mainstem	72.71	100.14	116.58	149.15	132.61	95.19	44.69	711.07	11.87	4.38	3.81	12.46	74.20	106.72	817.79	
LAWMA	574	243	6705072	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	42	42	6705074	A	Mainstem	4.75	6.54	7.62	9.74	8.66	6.22	2.92	46.45	0.78	0.29	0.25	0.81	4.85	6.98	53.43	
LAWMA	368.1	368.1	6705082	A	Mainstem	10.14	13.97	16.26	20.80	18.50	13.28	6.23	99.18	1.66	0.61	0.53	1.74	10.35	14.89	114.07	
LAWMA	368.1	368.1	6705086	A	Mainstem	8.23	11.34	13.20	16.89	15.01	10.78	5.06	80.51	1.34	0.50	0.43	1.41	8.40	12.08	92.59	
LAWMA	340	340	6705101	A	Mainstem	8.23	11.34	13.20	16.89	15.01	10.78	5.06	80.51	1.34	0.50	0.43	1.41	8.40	12.08	92.59	
LAWMA	17	17	6705107	B	Mainstem	58.45	80.50	93.72	119.90	106.60	76.52	35.92	571.61	9.55	3.52	3.06	10.02	59.65	85.80	657.41	
LAWMA	278	278	6705111	A	Mainstem	12.99	17.89	20.83	26.64	23.69	17.00	7.98	127.02	2.12	0.78	0.68	2.23	13.26	19.07	146.09	
LAWMA	278	278	6705112	A	Mainstem	12.82	17.66	20.56	26.30	23.38	16.78	7.88	125.38	2.09	0.77	0.67	2.20	13.08	18.81	144.19	
LAWMA	84	84	6705114	A	Mainstem	7.60	10.47	12.18	15.59	13.86	9.95	4.67	74.32	1.24	0.46	0.40	1.30	7.76	11.16	85.48	
LAWMA	73	73	6705117	A	Mainstem	5.70	7.85	9.14	11.69	10.39	7.46	3.50	55.73	0.93	0.34	0.30	0.98	5.82	8.37	64.10	
LAWMA	269	269	6705118	A	Mainstem	1.90	2.62	3.05	3.90	3.46	2.49	1.17	18.59	0.31	0.11	0.10	0.33	1.94	2.79	21.38	
LAWMA	368.1	368.1	6705119	A	Mainstem	8.23	11.34	13.20	16.89	15.01	10.78	5.06	80.51	1.34	0.50	0.43	1.41	8.40	12.08	92.59	
LAWMA	368.1	368.1	6705120	A	Mainstem	8.23	11.34	13.20	16.89	15.01	10.78	5.06	80.51	1.34	0.50	0.43	1.41	8.40	12.08	92.59	
LAWMA	49.2	49.2	6705123	A	Mainstem	22.60	31.12	36.24	46.36	41.22	29.59	13.89	221.02	3.69	1.36	1.18	3.87	23.06	33.16	254.18	
LAWMA	161	161	6705125	A	Mainstem	3.93	5.41	6.30	8.06	7.17	5.14	2.41	38.42	0.64	0.24	0.21	0.67	4.01	5.77	44.19	
LAWMA	49.2	49.2	6705127	A	Mainstem	11.09	15.27	17.78	22.75	20.23	14.52	6.82	108.46	1.81	0.67	0.58	1.90	11.32	16.28	124.74	
LAWMA	49.2	49.2	6705128	A	Mainstem	13.93	19.19	22.34	28.58	25.41	18.24	8.56	136.25	2.28	0.84	0.73	2.39	14.22	20.46	156.71	
LAWMA	362	362	6705129	A	Mainstem	1.91	2.63	3.06	3.92	3.48	2.50	1.17	18.67	0.31	0.12	0.10	0.33	1.95	2.81	21.48	
LAWMA	253	253	6705130	A	Mainstem	9.18	12.65	14.72	18.84	16.75	12.02	5.64	89.80	1.50	0.55	0.48	1.57	9.37	13.47	103.27	
LAWMA	155	155	6705131	A	Mainstem	1.37	1.88	2.19	2.81	2.49	1.79	0.84	13.37	0.22	0.08	0.07	0.23	1.40	2.00	15.37	
LAWMA	303	303	6705132	A	Mainstem	1.90	2.62	3.05	3.90	3.46	2.49	1.17	18.59	0.31	0.11	0.10	0.33	1.94	2.79	21.38	
LAWMA	283	283	6705140	A	Mainstem	0.30	0.42	0.49	0.62	0.55	0.40	0.19	2.97	0.05	0.02	0.02	0.05	0.31	0.45	3.42	
LAWMA	283	283	6705140	B	Mainstem	0.30	0.42	0.49	0.62	0.55	0.40	0.19	2.97	0.05	0.02	0.02	0.05	0.31	0.45	3.42	
LAWMA	175	175	6705143	A	Mainstem	2.51	3.45	4.02	5.14	4.57	3.28	1.54	24.51	0.41	0.15	0.13	0.43	2.56	3.68	28.19	
LAWMA	1	1	6705145	A	Mainstem	6.65	9.16	10.66	13.64	12.13	8.71	4.09	65.04	1.09	0.40	0.35	1.14	6.79	9.77	74.81	

Table 2a - Projected Pumping for Wells in Table 1

(sorted by Structure ID)

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Plan Association	Farm Group	Farm Unit	Structure ID	ID Suf	Mainstem / Tributary	2019 Plan Year Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Summer Season (Apr 19 - Oct 19)	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Winter Season (Nov 19 - Mar 20)	TOTAL (Apr 19 - Mar 20)	Comments
LAWMA	103	103	6705146	A	Mainstem	13.93	19.19	22.34	28.58	25.41	18.24	8.56	136.25	2.28	0.84	0.73	2.39	14.22	20.46	156.71	
LAWMA	103	103	6705147	A	Mainstem	14.96	20.60	23.99	30.69	27.28	19.59	9.19	146.30	2.44	0.90	0.78	2.56	15.27	21.95	168.25	
LAWMA	1	1	6705148	A	Mainstem	9.13	12.57	14.63	18.72	16.65	11.95	5.61	89.26	1.49	0.55	0.48	1.56	9.31	13.39	102.65	
LAWMA	1	1	6705149	A	Mainstem	6.75	9.29	10.82	13.84	12.30	8.83	4.15	65.98	1.10	0.41	0.35	1.16	6.88	9.90	75.88	
LAWMA	1	1	6705150	A	Mainstem	3.16	4.35	5.06	6.48	5.76	4.13	1.94	30.88	0.52	0.19	0.17	0.54	3.22	4.64	35.52	
LAWMA	1	1	6705151	A	Mainstem	2.74	3.77	4.39	5.61	4.99	3.58	1.68	26.76	0.45	0.16	0.14	0.47	2.79	4.01	30.77	
LAWMA	247	247	6705152	A	Mainstem	11.55	15.91	18.52	23.69	21.07	15.12	7.10	112.96	1.89	0.70	0.60	1.98	11.79	16.96	129.92	
LAWMA	233	233	6705153	A	Mainstem	7.28	10.03	11.68	14.94	13.28	9.53	4.48	71.22	1.19	0.44	0.38	1.25	7.43	10.69	81.91	
LAWMA	75	75	6705155	A	Mainstem	10.45	14.39	16.75	21.43	19.06	13.68	6.42	102.18	1.71	0.63	0.55	1.79	10.66	15.34	117.52	
LAWMA	233	233	6705170	A	Mainstem	2.53	3.49	4.06	5.20	4.62	3.32	1.56	24.78	0.41	0.15	0.13	0.43	2.59	3.71	28.49	
LAWMA	233	233	6705171	A	Mainstem	2.85	3.92	4.57	5.85	5.20	3.73	1.75	27.87	0.47	0.17	0.15	0.49	2.91	4.19	32.06	
LAWMA	247	247	6705172	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	296	296	6705185	A	Mainstem	3.15	4.34	5.05	6.46	5.74	4.12	1.94	30.80	0.51	0.19	0.16	0.54	3.21	4.61	35.41	
LAWMA	296	296	6705186	A	Mainstem	3.15	4.34	5.05	6.46	5.74	4.12	1.94	30.80	0.51	0.19	0.16	0.54	3.21	4.61	35.41	
LAWMA	296	296	6705187	A	Mainstem	3.76	5.19	6.04	7.72	6.87	4.93	2.31	36.82	0.61	0.23	0.20	0.65	3.84	5.53	42.35	
LAWMA	49.4	49.4	6705189	A	Mainstem	6.69	9.21	10.72	13.72	12.20	8.75	4.11	65.40	1.09	0.40	0.35	1.15	6.82	9.81	75.21	
LAWMA	49.4	49.4	6705190	A	Mainstem	5.02	6.91	8.04	10.29	9.15	6.57	3.08	49.06	0.82	0.30	0.26	0.86	5.12	7.36	56.42	
LAWMA	49.4	49.4	6705191	A	Mainstem	7.14	9.84	11.45	14.65	13.03	9.35	4.39	69.85	1.17	0.43	0.37	1.22	7.29	10.48	80.33	
LAWMA	49.4	49.4	6705192	A	Mainstem	1.98	2.72	3.17	4.05	3.60	2.59	1.21	19.32	0.32	0.12	0.10	0.34	2.02	2.90	22.22	
LAWMA	122	122	6705193	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	122	122	6705194	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	122	122	6705195	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	122	122	6705196	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	296	296	6705197	A	Mainstem	6.97	9.59	11.17	14.29	12.70	9.12	4.28	68.12	1.14	0.42	0.36	1.19	7.11	10.22	78.34	
LAWMA	122	122	6705198	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	49.4	49.4	6705199	A	Mainstem	4.08	5.62	6.54	8.37	7.44	5.34	2.51	39.90	0.67	0.25	0.21	0.70	4.16	5.99	45.89	
LAWMA	49.4	49.4	6705200	A	Mainstem	4.08	5.62	6.54	8.37	7.44	5.34	2.51	39.90	0.67	0.25	0.21	0.70	4.16	5.99	45.89	
LAWMA	122	122	6705201	A	Mainstem	2.82	3.89	4.53	5.79	5.15	3.70	1.74	27.62	0.46	0.17	0.15	0.48	2.88	4.14	31.76	
LAWMA	368	368	6705202	A	Mainstem	8.23	11.34	13.20	16.89	15.01	10.78	5.06	80.51	1.34	0.50	0.43	1.41	8.40	12.08	92.59	
LAWMA	368	368	6705203	A	Mainstem	8.23	11.34	13.20	16.89	15.01	10.78	5.06	80.51	1.34	0.50	0.43	1.41	8.40	12.08	92.59	
LAWMA	122	122	6705204	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	122	122	6705205	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	122	122	6705206	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	296	296	6705207	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	296	296	6705208	A	Mainstem	8.55	11.77	13.71	17.54	15.59	11.19	5.25	83.60	1.40	0.51	0.45	1.47	8.72	12.55	96.15	
LAWMA	296	296	6705209	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	296	296	6705210	A	Mainstem	5.70	7.85	9.14	11.69	10.39	7.46	3.50	55.73	0.93	0.34	0.30	0.98	5.82	8.37	64.10	
LAWMA	296	296	6705211	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	296	296	6705217	A	Mainstem	1.25	1.72	2.00	2.56	2.28	1.64	0.77	12.22	0.20	0.08	0.07	0.21	1.27	1.83	14.05	
LAWMA	210	210	6705227	A	Mainstem	0.46	0.63	0.73	0.94	0.83	0.60	0.28	4.47	0.07	0.03	0.02	0.08	0.47	0.67	5.14	
LAWMA	136	135	6705234	A	Mainstem	3.79	5.04	5.87	6.68	6.86	6.13	4.64	39.01	4.11	3.48	3.22	3.06	3.53	17.40	56.41	
LAWMA	212	212	6705235	A	Mainstem	0.30	0.42	0.49	0.62	0.55	0.40	0.19	2.97	0.05	0.02	0.02	0.05	0.31	0.45	3.42	
LAWMA	49.1	49.1	6705239	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	49.1	49.1	6705240	A	Mainstem	14.06	19.36	22.54	28.84	25.64	18.40	8.64	137.48	2.30	0.85	0.74	2.41	14.35	20.65	158.13	
LAWMA	15	15	6705272	A	Mainstem	285.72	379.92	442.45	503.54	517.21	461.75	349.61	2940.20	309.55	262.12	242.31	230.18	265.63	1309.79	4249.99	
LAWMA	15	15	6705272	B	Mainstem	285.05	379.02	441.41	502.36	516.00	460.67	348.79	2933.30	308.82	261.50	241.74	229.64	265.01	1306.71	4240.01	
LAWMA	15	15	6705272	C	Mainstem	0.67	0.89	1.04	1.18	1.22	1.09	0.82	6.91	0.73	0.62	0.57	0.54	0.63	3.09	10.00	
LAWMA	15	15	6705273	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	15	15	6705275	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	15	15	6705276	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	15	15	6705278	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	15	15	6705279	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	15	15	6705280	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	15	15	6705281	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	15	15	6705282	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	15	15	6705283	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	15	15	6705284	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	15	15	6705285	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	15	15	6705286	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	15	15	6705287	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	15	15	6705288	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	15	15	6705289	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	48	48	6705290	A	Mainstem	0.32	0.44	0.51	0.65	0.58	0.41	0.19	3.10	0.05	0.02	0.02	0.05	0.32	0.46	3.56	
LAWMA	122	122	6705312	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	122	122	6705314	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

Table 2a - Projected Pumping for Wells in Table 1

(sorted by Structure ID)

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

						2019 Plan Year															
Plan Association	Farm Group	Farm Unit	Structure ID	ID Suf	Mainstem / Tributary	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Summer Season (Apr 19 - Oct 19)	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Winter Season (Nov 19 - Mar 20)	TOTAL (Apr 19 - Mar 20)	Comments
LAWMA	122	122	6705315	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	92	92	6705331	A	Big Sandy	13.34	18.37	21.38	27.36	24.32	17.46	8.20	130.43	2.18	0.80	0.70	2.29	13.61	19.58	150.01	
LAWMA	33	33	6705343	A	Mainstem	4.12	5.67	6.60	8.44	7.51	5.39	2.53	40.26	0.67	0.25	0.22	0.71	4.20	6.05	46.31	
LAWMA	15	15	6705349	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	312	312	6705350	A	Mainstem	26.76	36.86	42.91	54.90	48.81	35.04	16.45	261.73	4.37	1.61	1.40	4.59	27.31	39.28	301.01	
LAWMA	312	312	6705355	A	Mainstem	15.35	21.14	24.61	31.49	28.00	20.10	9.43	150.12	2.51	0.92	0.80	2.63	15.67	22.53	172.65	
LAWMA	312	312	6705355	B	Mainstem	0.80	1.10	1.28	1.64	1.46	1.04	0.49	7.81	0.13	0.05	0.04	0.14	0.81	1.17	8.98	
LAWMA	219	219	6705364	A	Big Sandy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	312	312	6705373	A	Mainstem	12.33	16.98	19.76	25.28	22.48	16.14	7.58	120.55	2.01	0.74	0.65	2.11	12.58	18.09	138.64	
LAWMA	312	312	6705374	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	42	42.1	6705375	A	Mainstem	2.28	3.14	3.66	4.68	4.16	2.98	1.40	22.30	0.37	0.14	0.12	0.39	2.33	3.35	25.65	
LAWMA	229	229	6705376	A	Mainstem	12.31	16.95	19.74	25.25	22.45	16.12	7.57	120.39	2.01	0.74	0.64	2.11	12.56	18.06	138.45	
LAWMA	172	172	6705391	A	Mainstem	2.74	3.77	4.39	5.61	4.99	3.58	1.68	26.76	0.45	0.16	0.14	0.47	2.79	4.01	30.77	
LAWMA	172	172	6705392	A	Mainstem	3.04	4.19	4.87	6.24	5.54	3.98	1.87	29.73	0.50	0.18	0.16	0.52	3.10	4.46	34.19	
LAWMA	172	172	6705393	A	Mainstem	2.28	3.14	3.66	4.68	4.16	2.98	1.40	22.30	0.37	0.14	0.12	0.39	2.33	3.35	25.65	
LAWMA	36	36	6705400	A	Mainstem	3.65	5.02	5.85	7.48	6.65	4.78	2.24	35.67	0.60	0.22	0.19	0.63	3.72	5.36	41.03	
LAWMA	292	292	6705401	A	Mainstem	6.65	9.16	10.66	13.64	12.13	8.71	4.09	65.04	1.09	0.40	0.35	1.14	6.79	9.77	74.81	
LAWMA	70.2	70.2	6705404	A	Mainstem	5.32	7.33	8.53	10.91	9.70	6.96	3.27	52.02	0.87	0.32	0.28	0.91	5.43	7.81	59.83	
LAWMA	30	30	6705410	A	Mainstem	15.50	21.35	24.86	31.80	28.27	20.30	9.53	151.61	2.53	0.93	0.81	2.66	15.82	22.75	174.36	
LAWMA	18	18	6705411	A	Mainstem	6.38	8.79	10.23	13.09	11.64	8.36	3.92	62.41	1.04	0.38	0.33	1.09	6.51	9.35	71.76	
LAWMA	18	18	6705413	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	18	18	6705414	A	Mainstem	6.38	8.79	10.23	13.09	11.64	8.36	3.92	62.41	1.04	0.38	0.33	1.09	6.51	9.35	71.76	
LAWMA	18	18	6705415	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	86	86.1	6705416	A	Mainstem	9.82	13.52	15.74	20.13	17.90	12.85	6.03	95.99	1.60	0.59	0.51	1.68	10.02	14.40	110.39	
LAWMA	86	86.1	6705417	A	Mainstem	6.65	9.16	10.66	13.64	12.13	8.71	4.09	65.04	1.09	0.40	0.35	1.14	6.79	9.77	74.81	
LAWMA	70.2	70.2	6705421	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	289	289	6705426	A	Big Sandy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	128	128	6705430	A	Big Sandy	14.82	20.41	23.76	30.40	27.03	19.40	9.11	144.93	2.42	0.89	0.78	2.54	15.12	21.75	166.68	
LAWMA	128	128	6705431	A	Big Sandy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	219	219	6705433	A	Big Sandy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	219	219	6705435	A	Big Sandy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	86	86.1	6705438	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	138	138	6705451	A	Mainstem	15.49	21.33	24.83	31.77	28.25	20.28	9.52	151.47	2.53	0.93	0.81	2.66	15.81	22.74	174.21	
LAWMA	138	138	6705452	A	Mainstem	11.62	16.00	18.63	23.83	21.19	15.21	7.14	113.62	1.90	0.70	0.61	1.99	11.85	17.05	130.67	
LAWMA	86.2	86.2	6705454	A	Mainstem	22.95	31.61	36.80	47.08	41.86	30.05	14.10	224.45	3.75	1.38	1.20	3.93	23.42	33.68	258.13	
LAWMA	112	112	6705455	A	Mainstem	19.00	26.16	30.46	38.97	34.65	24.87	11.68	185.79	3.10	1.14	0.99	3.26	19.39	27.88	213.67	
LAWMA	193	193	6705457	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	193	193	6705458	A	Mainstem	28.88	39.77	46.30	59.24	52.67	37.81	17.75	282.42	4.72	1.74	1.51	4.95	29.47	42.39	324.81	
LAWMA	59	59	6705459	A	Mainstem	57.68	79.44	92.48	118.31	105.19	75.51	35.45	564.06	9.42	3.47	3.02	9.89	58.86	84.66	648.72	
LAWMA	59	59	6705460	A	Mainstem	21.43	29.51	34.36	43.96	39.08	28.06	13.17	209.57	3.50	1.29	1.12	3.67	21.87	31.45	241.02	
LAWMA	193	193	6705461	A	Mainstem	31.03	42.74	49.75	63.65	56.59	40.62	19.07	303.45	5.07	1.87	1.62	5.32	31.67	45.55	349.00	
LAWMA	193	193	6705462	A	Mainstem	8.21	11.30	13.16	16.84	14.97	10.75	5.04	80.27	1.34	0.49	0.43	1.41	8.38	12.05	92.32	
LAWMA	193	193	6705463	A	Mainstem	38.63	53.20	61.94	79.24	70.45	50.57	23.74	377.77	6.31	2.33	2.02	6.62	39.42	56.70	434.47	
LAWMA	104	104	6705464	A	Mainstem	13.93	19.19	22.34	28.58	25.41	18.24	8.56	136.25	2.28	0.84	0.73	2.39	14.22	20.46	156.71	
LAWMA	146	146.1	6705466	A	Mainstem	5.07	6.98	8.12	10.39	9.24	6.63	3.11	49.54	0.83	0.31	0.27	0.87	5.17	7.45	56.99	
LAWMA	146	146.1	6705467	A	Mainstem	11.08	15.26	17.77	22.73	20.21	14.51	6.81	108.37	1.81	0.67	0.58	1.90	11.31	16.27	124.64	
LAWMA	5	5	6705474	A	Mainstem	2.69	3.71	4.32	5.53	4.91	3.53	1.66	26.35	0.44	0.16	0.14	0.46	2.75	3.95	30.30	
LAWMA	312.4	312.4	6705477	A	Mainstem	14.19	19.54	22.75	29.11	25.88	18.58	8.72	138.77	2.32	0.85	0.74	2.43	14.48	20.82	159.59	
LAWMA	312	312.3	6705478	A	Mainstem	14.42	19.86	23.12	29.58	26.30	18.88	8.86	141.02	2.35	0.87	0.76	2.47	14.72	21.17	162.19	
LAWMA	312	312.3	6705479	A	Mainstem	14.42	19.86	23.12	29.58	26.30	18.88	8.86	141.02	2.35	0.87	0.76	2.47	14.72	21.17	162.19	
LAWMA	312	312.2	6705480	A	Mainstem	12.19	16.80	19.55	25.02	22.24	15.97	7.49	119.26	1.99	0.73	0.64	2.09	12.45	17.90	137.16	
LAWMA	312	312.3	6705481	A	Mainstem	14.24	19.61	22.83	29.21	25.97	18.64	8.75	139.25	2.33	0.86	0.75	2.44	14.53	20.91	160.16	
LAWMA	312.4	312.4	6705482	A	Mainstem	14.24	19.61	22.83	29.21	25.97	18.64	8.75	139.25	2.33	0.86	0.75	2.44	14.53	20.91	160.16	
LAWMA	312	312.3	6705483	A	Mainstem	14.36	19.77	23.02	29.45	26.19	18.80	8.82	140.41	2.34	0.86	0.75	2.46	14.65	21.06	161.47	
LAWMA	312	365	6705484	A	Mainstem	27.69	38.14	44.40	56.80	50.50	36.25	17.02	270.80	4.52	1.67	1.45	4.75	28.26	40.65	311.45	
LAWMA	312	312.3	6705485	A	Mainstem	14.36	19.77	23.02	29.45	26.19	18.80	8.82	140.41	2.34	0.86	0.75	2.46	14.65	21.06	161.47	
LAWMA	312	312.3	6705486	A	Mainstem	14.36	19.77	23.02	29.45	26.19	18.80	8.82	140.41	2.34	0.86	0.75	2.46	14.65	21.06	161.47	
LAWMA	312	312.3	6705488	A	Mainstem	14.36	19.77	23.02	29.45	26.19	18.80	8.82	140.41	2.34	0.86	0.75	2.46	14.65	21.06	161.47	
LAWMA	312	312.3	6705489	A	Mainstem	14.36	19.77	23.02	29.45	26.19	18.80	8.82	140.41	2.34	0.86	0.75	2.46	14.65	21.06	161.47	
LAWMA	53.1	53.1	6705490	A	Mainstem	17.21	23.71	27.60	35.31	31.39	22.54	10.58	168.34	2.81	1.04	0.90	2.95	17.57	25.27	193.61	
LAWMA	312	312.3	6705491	A	Mainstem	14.36	19.77	23.02	29.45	26.19	18.80	8.82	140.41	2.34	0.86	0.75	2.46	14.65	21.06	161.47	
LAWMA	312	312.3	6705492	A	Mainstem	29.91	41.20	47.96	61.36	54.56	39.16	18.38	292.53	4.89	1.80	1.57	5.13	30.53	43.92	336.45	
LAWMA	31	31	6705493	A	Mainstem	41.91	57.72	67.20	85.97	76.44	54.87	25.76	409.87	6.84	2.52	2.19	7.18	42.77	61.50	471.37	
LAWMA	312	312.3	6705494	A	Mainstem	29.91	41.20	47.96	61.36	54.56	39.16	18.38	292.53	4.89	1.80	1.57	5.13	30.53	43.92	336.45	
LAWMA	31	31	6705496	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

Table 2a - Projected Pumping for Wells in Table 1

(sorted by Structure ID)

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Plan Association	Farm Group	Farm Unit	Structure ID	ID Suf	Mainstem / Tributary	2019 Plan Year Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Summer Season (Apr 19 - Oct 19)	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Winter Season (Nov 19 - Mar 20)	TOTAL (Apr 19 - Mar 20)	Comments
LAWMA	31	31	6705497	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	31	31	6705498	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	271	271	6705500	A	Mainstem	14.29	19.68	22.91	29.31	26.06	18.71	8.78	139.74	2.33	0.86	0.75	2.45	14.58	20.97	160.71	
LAWMA	271	271	6705501	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	271	271	6705502	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	271	271	6705503	A	Mainstem	25.10	34.57	40.24	51.49	45.78	32.86	15.43	245.47	4.10	1.51	1.31	4.30	25.61	36.83	282.30	
LAWMA	271	271	6705504	A	Mainstem	17.62	24.27	28.26	36.15	32.14	23.07	10.83	172.34	2.88	1.06	0.92	3.02	17.98	25.86	198.20	
LAWMA	271	271	6705505	A	Mainstem	27.23	37.51	43.67	55.87	49.67	35.66	16.74	266.35	4.45	1.64	1.43	4.67	27.79	39.98	306.33	
LAWMA	271	271	6705506	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	271	271	6705507	A	Mainstem	21.89	30.15	35.11	44.91	39.93	28.66	13.46	214.11	3.58	1.32	1.15	3.75	22.34	32.14	246.25	
LAWMA	271	271	6705508	A	Mainstem	16.82	23.17	26.97	34.51	30.68	22.02	10.34	164.51	2.75	1.01	0.88	2.88	17.17	24.69	189.20	
LAWMA	271	271	6705509	A	Mainstem	12.28	16.92	19.69	25.20	22.40	16.08	7.55	120.12	2.01	0.74	0.64	2.11	12.53	18.03	138.15	
LAWMA	271	271	6705510	A	Mainstem	16.91	23.30	27.12	34.70	30.85	22.14	10.40	165.42	2.76	1.02	0.89	2.90	17.26	24.83	190.25	
LAWMA	271	271	6705511	A	Mainstem	1.36	1.87	2.18	2.79	2.48	1.78	0.83	13.29	0.22	0.08	0.07	0.23	1.39	1.99	15.28	
LAWMA	271	271	6705512	A	Mainstem	14.36	19.78	23.03	29.47	26.20	18.81	8.83	140.48	2.35	0.87	0.75	2.46	14.66	21.09	161.57	
LAWMA	999	999	6705527	A	Mainstem	444.53	612.25	712.79	911.91	810.77	582.00	273.21	4347.46	72.60	26.77	23.28	76.20	453.68	652.53	4999.99	
LAWMA	160	160	6705535	A	Mainstem	22.22	30.61	35.64	45.59	40.53	29.10	13.66	217.35	3.63	1.34	1.16	3.81	22.68	32.62	249.97	
LAWMA	160	160	6705536	A	Mainstem	16.03	22.07	25.70	32.87	29.23	20.98	9.85	156.73	2.62	0.97	0.84	2.75	16.35	23.53	180.26	
LAWMA	160	160	6705537	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	312	312.3	6705538	A	Mainstem	14.36	19.77	23.02	29.45	26.19	18.80	8.82	140.41	2.34	0.86	0.75	2.46	14.65	21.06	161.47	
LAWMA	312	312.3	6705539	A	Mainstem	14.36	19.77	23.02	29.45	26.19	18.80	8.82	140.41	2.34	0.86	0.75	2.46	14.65	21.06	161.47	
LAWMA	242	242	6705540	A	Mainstem	18.09	24.91	29.00	37.10	32.99	23.68	11.12	176.89	2.95	1.09	0.95	3.10	18.46	26.55	203.44	
LAWMA	41	41	6705541	A	Mainstem	30.40	41.86	48.74	62.35	55.44	39.79	18.68	297.26	4.96	1.83	1.59	5.21	31.02	44.61	341.87	
LAWMA	312	312.2	6705542	A	Mainstem	12.31	16.96	19.74	25.26	22.46	16.12	7.57	120.42	2.01	0.74	0.64	2.11	12.57	18.07	138.49	
LAWMA	312	312.3	6705544	A	Mainstem	7.28	10.03	11.68	14.94	13.28	9.53	4.48	71.22	1.19	0.44	0.38	1.25	7.43	10.69	81.91	
LAWMA	312	312.2	6705547	A	Mainstem	12.47	17.17	19.99	25.57	22.73	16.32	7.66	121.91	2.04	0.75	0.65	2.14	12.72	18.30	140.21	
LAWMA	312	312.2	6705548	A	Mainstem	25.97	35.77	41.64	53.27	47.36	34.00	15.96	253.97	4.24	1.56	1.36	4.45	26.50	38.11	292.08	
LAWMA	242	242	6705549	A	Mainstem	7.38	10.16	11.83	15.13	13.46	9.66	4.53	72.15	1.20	0.44	0.39	1.26	7.53	10.82	82.97	
LAWMA	242	242	6705550	A	Mainstem	15.76	21.71	25.27	32.33	28.75	20.64	9.69	154.15	2.57	0.95	0.83	2.70	16.09	23.14	177.29	
LAWMA	52	52	6705551	A	Mainstem	4.86	6.70	7.80	9.98	8.87	6.37	2.99	47.57	0.79	0.29	0.25	0.83	4.96	7.12	54.69	
LAWMA	52	52	6705552	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	34	34	6705555	A	Mainstem	0.76	1.05	1.22	1.56	1.39	0.99	0.47	7.44	0.12	0.05	0.04	0.13	0.78	1.12	8.56	
LAWMA	202	202	6705557	A	Mainstem	4.58	6.31	7.34	9.40	8.35	6.00	2.81	44.79	0.75	0.28	0.24	0.79	4.67	6.73	51.52	
LAWMA	208.1	208.1	6705558	A	Mainstem	15.90	21.89	25.49	32.61	28.99	20.81	9.77	155.46	2.60	0.96	0.83	2.72	16.22	23.33	178.79	
LAWMA	208.1	208.1	6705559	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	338	338	6705565	A	Mainstem	1.89	2.60	3.02	3.87	3.44	2.47	1.16	18.45	0.31	0.11	0.10	0.32	1.92	2.76	21.21	
LAWMA	182	182	6705567	A	Wolf Creek	3.80	5.23	6.09	7.79	6.93	4.97	2.34	37.15	0.62	0.23	0.20	0.65	3.88	5.58	42.73	
LAWMA	272	272	6705592	A	Mainstem	0.27	0.37	0.43	0.55	0.49	0.35	0.17	2.63	0.04	0.02	0.01	0.05	0.27	0.39	3.02	
LAWMA	211	211	6705594	A	Mainstem	2.25	3.09	3.60	4.61	4.09	2.94	1.38	21.96	0.37	0.14	0.12	0.38	2.29	3.30	25.26	
LAWMA	274	274	6705595	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	131	53.2	6705597	A	Mainstem	69.97	96.37	112.20	143.54	127.62	91.61	43.01	684.32	11.43	4.21	3.66	12.00	71.41	102.71	787.03	
LAWMA	131	131	6705598	A	Mainstem	11.50	15.84	18.44	23.59	20.98	15.06	7.07	112.48	1.88	0.69	0.60	1.97	11.74	16.88	129.36	
LAWMA	65	65	6705599	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	242	242	6705601	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	252	252.1	6705606	A	Mainstem	5.66	7.79	9.07	11.61	10.32	7.41	3.48	55.34	0.92	0.34	0.30	0.97	5.77	8.30	63.64	
LAWMA	53.2	53.2	6705607	A	Mainstem	41.91	57.72	67.20	85.97	76.44	54.87	25.76	409.87	6.84	2.52	2.19	7.18	42.77	61.50	471.37	
LAWMA	53.2	53.2	6705611	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	53.2	53.2	6705613	A	Mainstem	25.07	34.53	40.20	51.43	45.73	32.82	15.41	245.19	4.09	1.51	1.31	4.30	25.59	36.80	281.99	
LAWMA	247	247	6705614	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	177	177	6705615	A	Mainstem	12.98	17.88	20.82	26.63	23.68	17.00	7.98	126.97	2.12	0.78	0.68	2.23	13.25	19.06	146.03	
LAWMA	162	162	6705617	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	162	162	6705618	A	Mainstem	19.00	26.16	30.46	38.97	34.65	24.87	11.68	185.79	3.10	1.14	0.99	3.26	19.39	27.88	213.67	
LAWMA	8	8	6705619	A	Mainstem	9.82	13.52	15.74	20.13	17.90	12.85	6.03	95.99	1.60	0.59	0.51	1.68	10.02	14.40	110.39	
LAWMA	113	113	6705631	A	Mainstem	8.98	12.37	14.40	18.42	16.38	11.76	5.52	87.83	1.47	0.54	0.47	1.54	9.17	13.19	101.02	
LAWMA	113	113	6705632	A	Mainstem	6.36	8.76	10.20	13.05	11.60	8.33	3.91	62.21	1.04	0.38	0.33	1.09	6.49	9.33	71.54	
LAWMA	191	191	6705635	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	191	191	6705636	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	191	191	6705637	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	191	191	6705638	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	28.1	28.1	6705642	A	Two Buttes	21.51	29.62	34.49	44.12	39.23	28.16	13.22	210.35	3.51	1.30	1.13	3.69	21.95	31.58	241.93	
LAWMA	28.1	28.1	6705645	A	Two Buttes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	28.1	28.1	6705646	A	Two Buttes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	2	2	6705652	A	Mainstem	7.29	10.05	11.70	14.96	13.30	9.55	4.48	71.33	1.19	0.44	0.38	1.25	7.44	10.70	82.03	
LAWMA	57	57	6705658	A	Mainstem	7.28	10.03	11.68	14.94	13.28	9.53	4.48	71.22	1.19	0.44	0.38	1.25	7.43	10.69	81.91	
LAWMA	41	41	6705660	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

Table 2a - Projected Pumping for Wells in Table 1

(sorted by Structure ID)

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Plan Association	Farm Group	Farm Unit	Structure ID	ID Suf	Mainstem / Tributary	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Summer Season (Apr 19 - Oct 19)	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Winter Season (Nov 19 - Mar 20)	TOTAL (Apr 19 - Mar 20)	Comments
						2019 Plan Year															
LAWMA	41	41	6705661	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	187	187	6705662	A	Mainstem	14.88	20.50	23.86	30.53	27.14	19.48	9.15	145.54	2.43	0.90	0.78	2.55	15.19	21.85	167.39	
LAWMA	70.2	70.2	6705663	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	70.2	70.2	6705664	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	70.2	70.2	6705665	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	70.2	70.2	6705668	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	70.2	70.2	6705669	A	Mainstem	15.20	20.93	24.37	31.18	27.72	19.90	9.34	148.64	2.48	0.92	0.80	2.61	15.51	22.32	170.96	
LAWMA	364	364	6705670	A	Mainstem	11.29	15.55	18.11	23.17	20.60	14.78	6.94	110.44	1.84	0.68	0.59	1.94	11.52	16.57	127.01	
LAWMA	302	302	6705671	A	Mainstem	0.69	0.94	1.10	1.41	1.25	0.90	0.42	6.71	0.11	0.04	0.04	0.12	0.70	1.01	7.72	
LAWMA	29	29	6705677	A	Mainstem	17.18	23.66	27.54	35.24	31.33	22.49	10.56	168.00	2.81	1.03	0.90	2.94	17.53	25.21	193.21	
LAWMA	70.1	70.1	6705678	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	29	29	6705679	A	Mainstem	16.78	23.11	26.91	34.42	30.61	21.97	10.31	164.11	2.74	1.01	0.88	2.88	17.13	24.64	188.75	
LAWMA	49.1	49	6705683	A	Mainstem	22.53	31.04	36.13	46.23	41.10	29.50	13.85	220.38	3.68	1.36	1.18	3.86	23.00	33.08	253.46	
LAWMA	49.1	49	6705684	A	Mainstem	7.69	10.59	12.32	15.77	14.02	10.06	4.72	75.17	1.26	0.46	0.40	1.32	7.84	11.28	86.45	
LAWMA	49.1	49	6705685	A	Mainstem	11.93	16.43	19.13	24.47	21.75	15.62	7.33	116.66	1.95	0.72	0.62	2.04	12.17	17.50	134.16	
LAWMA	49.1	49	6705686	A	Mainstem	7.95	10.95	12.75	16.31	14.50	10.41	4.89	77.76	1.30	0.48	0.42	1.36	8.12	11.68	89.44	
LAWMA	49.1	49	6705687	A	Mainstem	8.21	11.31	13.16	16.84	14.97	10.75	5.05	80.29	1.34	0.49	0.43	1.41	8.38	12.05	92.34	
LAWMA	49.1	49	6705688	A	Mainstem	16.58	22.83	26.58	34.01	30.24	21.71	10.19	162.14	2.71	1.00	0.87	2.84	16.92	24.34	186.48	
LAWMA	49.1	49	6705689	A	Mainstem	12.93	17.81	20.74	26.53	23.59	16.93	7.95	126.48	2.11	0.78	0.68	2.22	13.20	18.99	145.47	
LAWMA	49.1	49	6705690	A	Mainstem	20.23	27.86	32.43	41.49	36.89	26.48	12.43	197.81	3.30	1.22	1.06	3.47	20.64	29.69	227.50	
LAWMA	28.1	28.1	6705691	A	Two Buttes	13.34	18.37	21.38	27.36	24.32	17.46	8.20	130.43	2.18	0.80	0.70	2.29	13.61	19.58	150.01	
LAWMA	28.1	28.1	6705691	B	Two Buttes	8.89	12.24	14.26	18.24	16.22	11.64	5.46	86.95	1.45	0.54	0.47	1.52	9.07	13.05	100.00	
LAWMA	49.1	49	6705692	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	49.1	49	6705693	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	49.1	49	6705694	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	49.1	49	6705695	A	Mainstem	17.83	24.55	28.59	36.57	32.51	23.34	10.96	174.35	2.91	1.07	0.93	3.06	18.19	26.16	200.51	
LAWMA	342	342	6705696	A	Mainstem	9.18	12.65	14.72	18.84	16.75	12.02	5.64	89.80	1.50	0.55	0.48	1.57	9.37	13.47	103.27	
LAWMA	342	342	6705696	B	Mainstem	4.26	5.86	6.82	8.73	7.76	5.57	2.62	41.62	0.69	0.26	0.22	0.73	4.34	6.24	47.86	
LAWMA	342	342	6705697	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	130	130	6705698	A	Mainstem	21.85	30.10	35.04	44.83	39.86	28.61	13.43	213.72	3.57	1.32	1.14	3.75	22.30	32.08	245.80	
LAWMA	130	130	6705699	A	Mainstem	20.80	28.65	33.35	42.67	37.94	27.23	12.78	203.42	3.40	1.25	1.09	3.57	21.23	30.54	233.96	
LAWMA	43	43	6705700	A	Mainstem	23.75	32.71	38.08	48.71	43.31	31.09	14.59	232.24	3.88	1.43	1.24	4.07	24.23	34.85	267.09	
LAWMA	130	130	6705701	A	Mainstem	21.36	29.41	34.24	43.81	38.95	27.96	13.13	208.86	3.49	1.29	1.12	3.66	21.80	31.36	240.22	
LAWMA	130	130	6705702	A	Mainstem	19.70	27.13	31.59	40.41	35.93	25.79	12.11	192.66	3.22	1.19	1.03	3.38	20.11	28.93	221.59	
LAWMA	43	43	6705703	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	43	43	6705704	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	62	62	6705705	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	62	62	6705707	A	Mainstem	15.83	21.80	25.38	32.48	28.87	20.73	9.73	154.82	2.59	0.95	0.83	2.71	16.16	23.24	178.06	
LAWMA	130	130	6705708	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	312.1	312.1	6705715	A	Mainstem	28.05	38.63	44.98	57.54	51.16	36.73	17.24	274.33	4.58	1.69	1.47	4.81	28.63	41.18	315.51	
LAWMA	312.1	312.1	6705716	A	Mainstem	28.05	38.63	44.98	57.54	51.16	36.73	17.24	274.33	4.58	1.69	1.47	4.81	28.63	41.18	315.51	
LAWMA	312.1	312.1	6705717	A	Mainstem	32.72	45.07	52.47	67.12	59.68	42.84	20.11	320.01	5.34	1.97	1.71	5.61	33.39	48.02	368.03	
LAWMA	6	6	6705718	A	Mainstem	36.10	49.72	57.89	74.06	65.84	47.27	22.19	353.07	5.90	2.17	1.89	6.19	36.84	52.99	406.06	
LAWMA	6	6	6705719	A	Mainstem	36.10	49.72	57.89	74.06	65.84	47.27	22.19	353.07	5.90	2.17	1.89	6.19	36.84	52.99	406.06	
LAWMA	312.1	312.1	6705720	A	Mainstem	32.72	45.07	52.47	67.12	59.68	42.84	20.11	320.01	5.34	1.97	1.71	5.61	33.39	48.02	368.03	
LAWMA	96	96	6705721	A	Mainstem	24.07	33.15	38.59	49.37	43.90	31.51	14.79	235.38	3.93	1.45	1.26	4.13	24.56	35.33	270.71	
LAWMA	312.1	312.1	6705722	A	Mainstem	32.90	45.31	52.76	67.49	60.01	43.08	20.22	321.77	5.37	1.98	1.72	5.64	33.58	48.29	370.06	
LAWMA	312.1	312.1	6705723	A	Mainstem	32.90	45.31	52.76	67.49	60.01	43.08	20.22	321.77	5.37	1.98	1.72	5.64	33.58	48.29	370.06	
LAWMA	312.1	312.1	6705724	A	Mainstem	32.90	45.31	52.76	67.49	60.01	43.08	20.22	321.77	5.37	1.98	1.72	5.64	33.58	48.29	370.06	
LAWMA	312.1	312.1	6705725	A	Mainstem	33.02	45.48	52.95	67.74	60.22	43.23	20.29	322.93	5.39	1.99	1.73	5.66	33.70	48.47	371.40	
LAWMA	312.1	312.1	6705726	A	Mainstem	33.02	45.48	52.95	67.74	60.22	43.23	20.29	322.93	5.39	1.99	1.73	5.66	33.70	48.47	371.40	
LAWMA	312.1	312.1	6705727	A	Mainstem	33.02	45.48	52.95	67.74	60.22	43.23	20.29	322.93	5.39	1.99	1.73	5.66	33.70	48.47	371.40	
LAWMA	312.1	312.1	6705728	A	Mainstem	33.02	45.48	52.95	67.74	60.22	43.23	20.29	322.93	5.39	1.99	1.73	5.66	33.70	48.47	371.40	
LAWMA	312.1	312.1	6705729	A	Mainstem	33.02	45.48	52.95	67.74	60.22	43.23	20.29	322.93	5.39	1.99	1.73	5.66	33.70	48.47	371.40	
LAWMA	312.1	312.1	6705731	A	Mainstem	33.02	45.48	52.95	67.74	60.22	43.23	20.29	322.93	5.39	1.99	1.73	5.66	33.70	48.47	371.40	
LAWMA	312.1	312.1	6705733	A	Mainstem	33.02	45.48	52.95	67.74	60.22	43.23	20.29	322.93	5.39	1.99	1.73	5.66	33.70	48.47	371.40	
LAWMA	6	6	6705735	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	312.1	312.1	6705736	A	Mainstem	33.02	45.48	52.95	67.74	60.22	43.23	20.29	322.93	5.39	1.99	1.73	5.66	33.70	48.47	371.40	
LAWMA	312.1	312.1	6705737	A	Mainstem	43.96	60.54	70.49	90.18	80.18	57.55	27.02	429.92	7.18	2.65	2.30	7.54	44.86	64.53	494.45	
LAWMA	105	105	6705738	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	345	345	6705739	A	Mainstem	13.83	19.05	22.18	28.37	25.22	18.11	8.50	135.26	2.26	0.83	0.72	2.37	14.11	20.29	155.55	
LAWMA	345	345	6705740	A	Mainstem	13.83	19.05	22.18	28.37	25.22	18.11	8.50	135.26	2.26	0.83	0.72	2.37	14.11	20.29	155.55	
LAWMA	345	345	6705741	A	Mainstem	17.96	24.74	28.80	36.84	32.76	23.52	11.04	175.66	2.93	1.08	0.94	3.08	18.33	26.36	202.02	
LAWMA	345	345	6705742	A	Mainstem	17.96	24.74	28.80	36.84	32.76	23.52	11.04	175.66	2.93	1.08	0.94	3.08	18.33	26.36	202.02	
LAWMA	370	370	6705744	A	Mainstem	3.05	4.21	4.90	6.26	5.57	4.00	1.88	29.87	0.50	0.18	0.16	0.52	3.12	4.48	34.35	

Table 2a - Projected Pumping for Wells in Table 1

(sorted by Structure ID)

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Plan Association	Farm Group	Farm Unit	Structure ID	ID Suf	Mainstem / Tributary	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Summer Season (Apr 19 - Oct 19)	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Winter Season (Nov 19 - Mar 20)	TOTAL (Apr 19 - Mar 20)	Comments
						2019 Plan Year															
LAWMA	370	370	6705745	A	Mainstem	20.48	28.20	32.83	42.00	37.34	26.81	12.58	200.24	3.34	1.23	1.07	3.51	20.90	30.05	230.29	
LAWMA	370	370	6705746	A	Mainstem	26.94	37.11	43.20	55.27	49.14	35.27	16.56	263.49	4.40	1.62	1.41	4.62	27.50	39.55	303.04	
LAWMA	370	370	6705748	A	Mainstem	17.96	24.74	28.80	36.84	32.76	23.52	11.04	175.66	2.93	1.08	0.94	3.08	18.33	26.36	202.02	
LAWMA	370	370	6705749	A	Mainstem	18.14	24.98	29.09	37.21	33.09	23.75	11.15	177.41	2.96	1.09	0.95	3.11	18.51	26.62	204.03	
LAWMA	345	345	6705752	A	Mainstem	80.11	110.33	128.45	164.33	146.10	104.88	49.23	783.43	13.08	4.82	4.19	13.73	81.75	117.57	901.00	
LAWMA	213	213	6705773	A	Mainstem	5.66	7.79	9.07	11.61	10.32	7.41	3.48	55.34	0.92	0.34	0.30	0.97	5.77	8.30	63.64	
LAWMA	312.1	312.1	6705774	A	Mainstem	33.02	45.48	52.95	67.74	60.22	43.23	20.29	322.93	5.39	1.99	1.73	5.66	33.70	48.47	371.40	
LAWMA	312.1	312.1	6705775	A	Mainstem	33.02	45.48	52.95	67.74	60.22	43.23	20.29	322.93	5.39	1.99	1.73	5.66	33.70	48.47	371.40	
LAWMA	28.2	28.2	6705777	A	Mainstem	27.00	37.18	43.29	55.38	49.24	35.35	16.59	264.03	4.41	1.63	1.41	4.63	27.55	39.63	303.66	
LAWMA	28.3	28.3	6705778	A	Mainstem	22.15	30.50	35.51	45.44	40.40	29.00	13.61	216.61	3.62	1.33	1.16	3.80	22.60	32.51	249.12	
LAWMA	28.3	28.3	6705779	A	Mainstem	16.52	22.76	26.50	33.90	30.14	21.63	10.16	161.61	2.70	1.00	0.87	2.83	16.86	24.26	185.87	
LAWMA	28.3	28.3	6705780	A	Mainstem	15.86	21.85	25.43	32.54	28.93	20.77	9.75	155.13	2.59	0.96	0.83	2.72	16.19	23.29	178.42	
LAWMA	28.3	28.3	6705781	A	Mainstem	17.12	23.58	27.45	35.12	31.22	22.41	10.52	167.42	2.80	1.03	0.90	2.93	17.47	25.13	192.55	
LAWMA	28.3	28.3	6705782	A	Mainstem	20.89	28.77	33.50	42.86	38.10	27.35	12.84	204.31	3.41	1.26	1.09	3.58	21.32	30.66	234.97	
LAWMA	46	46	6705783	A	Mainstem	2.96	4.08	4.75	6.08	5.41	3.88	1.82	28.98	0.48	0.18	0.16	0.51	3.02	4.35	33.33	
LAWMA	131	131	6705784	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	65	65	6705787	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	65	65	6705788	A	Mainstem	0.37	0.52	0.60	0.77	0.68	0.49	0.23	3.66	0.06	0.02	0.02	0.06	0.38	0.54	4.20	
LAWMA	295	295	6705801	A	Mainstem	2.91	4.01	4.67	5.97	5.31	3.81	1.79	28.47	0.48	0.18	0.15	0.50	2.97	4.28	32.75	
LAWMA	295	295	6705802	A	Mainstem	23.72	32.66	38.03	48.65	43.26	31.05	14.58	231.95	3.87	1.43	1.24	4.07	24.20	34.81	266.76	
LAWMA	334.1	334.1	6705803	A	Mainstem	13.76	18.95	22.06	28.23	25.10	18.01	8.46	134.57	2.25	0.83	0.72	2.36	14.04	20.20	154.77	
LAWMA	334.1	334.1	6705804	A	Mainstem	13.76	18.95	22.06	28.23	25.10	18.01	8.46	134.57	2.25	0.83	0.72	2.36	14.04	20.20	154.77	
LAWMA	334.1	334.1	6705806	A	Mainstem	13.76	18.95	22.06	28.23	25.10	18.01	8.46	134.57	2.25	0.83	0.72	2.36	14.04	20.20	154.77	
LAWMA	334.1	334.1	6705810	A	Mainstem	16.81	23.16	26.96	34.49	30.66	22.01	10.33	164.42	2.75	1.01	0.88	2.88	17.16	24.68	189.10	
LAWMA	334.1	334.1	6705811	A	Mainstem	13.76	18.95	22.06	28.23	25.10	18.01	8.46	134.57	2.25	0.83	0.72	2.36	14.04	20.20	154.77	
LAWMA	250	250	6705814	A	Mainstem	1.50	2.06	2.40	3.07	2.73	1.96	0.92	14.64	0.24	0.09	0.08	0.26	1.53	2.20	16.84	
LAWMA	87	87	6705818	A	Mainstem	13.10	18.04	21.00	26.87	23.89	17.15	8.05	128.10	2.14	0.79	0.69	2.25	13.37	19.24	147.34	
LAWMA	100	100	6705820	A	Mainstem	14.82	20.41	23.76	30.40	27.03	19.40	9.11	144.93	2.42	0.89	0.78	2.54	15.12	21.75	166.68	
LAWMA	213	213	6705822	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	201	201	6705824	A	Mainstem	8.98	12.37	14.40	18.42	16.38	11.76	5.52	87.83	1.47	0.54	0.47	1.54	9.17	13.19	101.02	
LAWMA	9	9	6705825	A	Mainstem	15.72	21.65	25.20	32.24	28.66	20.58	9.66	153.71	2.57	0.95	0.82	2.69	16.04	23.07	176.78	
LAWMA	192	192	6705827	A	Mainstem	49.09	67.61	78.72	100.70	89.53	64.27	30.17	480.09	8.02	2.96	2.57	8.42	50.10	72.07	552.16	
LAWMA	12.2	12.2	6705828	A	Mainstem	10.48	14.43	16.80	21.49	19.11	13.72	6.44	102.47	1.71	0.63	0.55	1.80	10.69	15.38	117.85	
LAWMA	251	101	6705829	A	Mainstem	9.73	13.40	15.60	19.96	17.74	12.74	5.98	95.15	1.59	0.59	0.51	1.67	9.93	14.29	109.44	
LAWMA	12.2	12.2	6705831	A	Mainstem	10.85	14.95	17.40	22.26	19.79	14.21	6.67	106.13	1.77	0.65	0.57	1.86	11.07	15.92	122.05	
LAWMA	251	101	6705832	A	Mainstem	5.21	7.17	8.35	10.69	9.50	6.82	3.20	50.94	0.85	0.31	0.27	0.89	5.32	7.64	58.58	
LAWMA	341	341	6705833	A	Mainstem	24.00	33.06	38.49	49.24	43.78	31.42	14.75	234.74	3.92	1.45	1.26	4.11	24.49	35.23	269.97	
LAWMA	190	190	6705838	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	100	100	6705839	A	Mainstem	17.29	23.81	27.73	35.47	31.54	22.64	10.63	169.11	2.82	1.04	0.91	2.96	17.65	25.38	194.49	
LAWMA	190	190	6705840	A	Mainstem	8.33	11.48	13.36	17.09	15.20	10.91	5.12	81.49	1.36	0.50	0.44	1.43	8.50	12.23	93.72	
LAWMA	190	190	6705841	A	Mainstem	7.99	11.00	12.80	16.38	14.56	10.45	4.91	78.09	1.30	0.48	0.42	1.37	8.15	11.72	89.81	
LAWMA	61	61	6705854	A	Mainstem	19.22	26.47	30.82	39.42	35.05	25.16	11.81	187.95	3.14	1.16	1.01	3.29	19.61	28.21	216.16	
LAWMA	35.1	35.1	6705855	A	Mainstem	8.23	11.34	13.20	16.89	15.01	10.78	5.06	80.51	1.34	0.50	0.43	1.41	8.40	12.08	92.59	
LAWMA	35.1	35.1	6705856	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	203	203	6705857	A	Mainstem	5.61	7.73	9.00	11.51	10.24	7.35	3.45	54.89	0.92	0.34	0.29	0.96	5.73	8.24	63.13	
LAWMA	191	337	6705858	A	Mainstem	13.47	18.55	21.60	27.63	24.57	17.64	8.28	131.74	2.20	0.81	0.71	2.31	13.75	19.78	151.52	
LAWMA	191	337	6705859	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	191	337	6705860	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	191	337	6705861	A	Mainstem	13.47	18.55	21.60	27.63	24.57	17.64	8.28	131.74	2.20	0.81	0.71	2.31	13.75	19.78	151.52	
LAWMA	49.1	49.3	6705867	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	49.1	49.3	6705868	A	Mainstem	35.86	49.39	57.50	73.56	65.40	46.95	22.04	350.70	5.86	2.16	1.88	6.15	36.60	52.65	403.35	
LAWMA	197	197	6705869	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	197	197	6705870	A	Mainstem	4.34	5.98	6.96	8.91	7.92	5.69	2.67	42.47	0.71	0.26	0.23	0.74	4.43	6.37	48.84	
LAWMA	199	199	6705871	A	Mainstem	5.24	7.22	8.40	10.75	9.55	6.86	3.22	51.24	0.86	0.32	0.27	0.90	5.35	7.70	58.94	
LAWMA	199	199	6705872	A	Mainstem	2.62	3.61	4.20	5.37	4.78	3.43	1.61	25.62	0.43	0.16	0.14	0.45	2.67	3.85	29.47	
LAWMA	199	199	6705873	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	251	251	6705874	A	Mainstem	13.85	19.08	22.21	28.42	25.27	18.14	8.51	135.48	2.26	0.83	0.73	2.37	14.14	20.33	155.81	
LAWMA	35	35	6705875	A	Mainstem	19.51	26.87	31.28	40.02	35.58	25.54	11.99	190.79	3.19	1.18	1.02	3.34	19.91	28.64	219.43	
LAWMA	35	35	6705876	A	Mainstem	19.51	26.87	31.28	40.02	35.58	25.54	11.99	190.79	3.19	1.18	1.02	3.34	19.91	28.64	219.43	
LAWMA	35.1	35.1	6705877	A	Mainstem	3.95	5.44	6.34	8.11	7.21	5.17	2.43	38.65	0.65	0.24	0.21	0.68	4.03	5.81	44.46	
LAWMA	35.1	35.1	6705878	A	Mainstem	3.95	5.44	6.34	8.11	7.21	5.17	2.43	38.65	0.65	0.24	0.21	0.68	4.03	5.81	44.46	
LAWMA	49.1	49.3	6705879	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	344	344	6705881	A	Mainstem	2.99	4.12	4.80	6.14	5.46	3.92	1.84	29.27	0.49	0.18	0.16	0.51	3.06	4.40	33.67	
LAWMA	200	200	6705889	A	Mainstem	2.51	3.46	4.03	5.16	4.59	3.29	1.55	24.59	0.41	0.15	0.13	0.43	2.57	3.69	28.28	
LAWMA	248	248	6705915	A	Mainstem	3.15	4.34	5.05	6.46	5.75	4.12	1.94	30.81	0.51	0.19	0.16	0.54	3.22	4.62	35.43	

Table 2a - Projected Pumping for Wells in Table 1

(sorted by Structure ID)

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Plan Association	Farm Group	Farm Unit	Structure ID	ID Suf	Mainstem / Tributary	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Summer Season (Apr 19 - Oct 19)	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Winter Season (Nov 19 - Mar 20)	TOTAL (Apr 19 - Mar 20)	Comments
						2019 Plan Year															
LAWMA	180	180	6705918	A	Mainstem	3.48	4.80	5.58	7.14	6.35	4.56	2.14	34.05	0.57	0.21	0.18	0.60	3.55	5.11	39.16	
LAWMA	49.6	49.6	6705920	A	Big Sandy	2.96	4.08	4.75	6.08	5.41	3.88	1.82	28.98	0.48	0.18	0.16	0.51	3.02	4.35	33.33	
LAWMA	49.6	49.6	6705921	A	Big Sandy	2.96	4.08	4.75	6.08	5.41	3.88	1.82	28.98	0.48	0.18	0.16	0.51	3.02	4.35	33.33	
LAWMA	49.6	49.6	6705922	A	Big Sandy	2.96	4.08	4.75	6.08	5.41	3.88	1.82	28.98	0.48	0.18	0.16	0.51	3.02	4.35	33.33	
LAWMA	49.6	49.6	6705923	A	Big Sandy	2.96	4.08	4.75	6.08	5.41	3.88	1.82	28.98	0.48	0.18	0.16	0.51	3.02	4.35	33.33	
LAWMA	49.6	49.6	6705924	A	Big Sandy	2.96	4.08	4.75	6.08	5.41	3.88	1.82	28.98	0.48	0.18	0.16	0.51	3.02	4.35	33.33	
LAWMA	195	195	6705936	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	195	195	6705937	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	99	99	6705938	A	Mainstem	6.02	8.29	9.65	12.34	10.97	7.88	3.70	58.85	0.98	0.36	0.32	1.03	6.14	8.83	67.68	
LAWMA	195	195	6705943	A	Mainstem	8.58	11.81	13.75	17.59	15.64	11.23	5.27	83.87	1.40	0.52	0.45	1.47	8.75	12.59	96.46	
LAWMA	196	196	6705944	A	Mainstem	2.04	2.81	3.27	4.18	3.72	2.67	1.25	19.94	0.33	0.12	0.11	0.35	2.08	2.99	22.93	
LAWMA	220	220	6705945	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	220	220	6705946	A	Mainstem	4.43	6.11	7.11	9.09	8.08	5.80	2.72	43.34	0.72	0.27	0.23	0.76	4.52	6.50	49.84	
LAWMA	146	146	6705949	A	Mainstem	5.02	6.91	8.04	10.29	9.15	6.57	3.08	49.06	0.82	0.30	0.26	0.86	5.12	7.36	56.42	
LAWMA	146	146	6705950	A	Mainstem	4.86	6.70	7.80	9.98	8.87	6.37	2.99	47.57	0.79	0.29	0.25	0.83	4.96	7.12	54.69	
LAWMA	146	146	6705951	A	Mainstem	4.41	6.07	7.07	9.04	8.04	5.77	2.71	43.11	0.72	0.27	0.23	0.76	4.50	6.48	49.59	
LAWMA	146	146	6705952	A	Mainstem	2.28	3.14	3.66	4.68	4.16	2.98	1.40	22.30	0.37	0.14	0.12	0.39	2.33	3.35	25.65	
LAWMA	137	137	6705956	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	164	164	6705958	A	Mainstem	7.28	10.03	11.68	14.94	13.28	9.53	4.48	71.22	1.19	0.44	0.38	1.25	7.43	10.69	81.91	
LAWMA	136	136	6705959	A	Mainstem	4.53	6.23	7.26	9.28	8.25	5.92	2.78	44.25	0.74	0.27	0.24	0.78	4.62	6.65	50.90	
LAWMA	136	136	6705960	A	Mainstem	13.81	19.03	22.15	28.34	25.20	18.09	8.49	135.11	2.26	0.83	0.72	2.37	14.10	20.28	155.39	
LAWMA	136	136	6705962	A	Mainstem	10.72	14.76	17.19	21.99	19.55	14.03	6.59	104.83	1.75	0.65	0.56	1.84	10.94	15.74	120.57	
LAWMA	134	134	6705963	A	Mainstem	14.56	20.06	23.35	29.88	26.56	19.07	8.95	142.43	2.38	0.88	0.76	2.50	14.86	21.38	163.81	
LAWMA	134	134	6705964	A	Mainstem	5.70	7.85	9.14	11.69	10.39	7.46	3.50	55.73	0.93	0.34	0.30	0.98	5.82	8.37	64.10	
LAWMA	154	154	6705965	A	Mainstem	4.75	6.54	7.62	9.74	8.66	6.22	2.92	46.45	0.78	0.29	0.25	0.81	4.85	6.98	53.43	
LAWMA	367	367	6705967	A	Mainstem	5.70	7.85	9.14	11.69	10.39	7.46	3.50	55.73	0.93	0.34	0.30	0.98	5.82	8.37	64.10	
LAWMA	108	108	6705969	A	Mainstem	7.60	10.47	12.18	15.59	13.86	9.95	4.67	74.32	1.24	0.46	0.40	1.30	7.76	11.16	85.48	
LAWMA	108	108	6705970	A	Mainstem	6.97	9.59	11.17	14.29	12.70	9.12	4.28	68.12	1.14	0.42	0.36	1.19	7.11	10.22	78.34	
LAWMA	108	108	6705971	A	Mainstem	1.23	1.69	1.97	2.52	2.24	1.61	0.75	12.01	0.20	0.07	0.06	0.21	1.25	1.79	13.80	
LAWMA	108	108	6705972	A	Mainstem	5.07	6.98	8.12	10.39	9.24	6.63	3.11	49.54	0.83	0.31	0.27	0.87	5.17	7.45	56.99	
LAWMA	152	152	6705973	A	Mainstem	9.18	12.65	14.72	18.84	16.75	12.02	5.64	89.80	1.50	0.55	0.48	1.57	9.37	13.47	103.27	
LAWMA	196	196	6705975	A	Mainstem	2.13	2.93	3.41	4.36	3.88	2.79	1.31	20.81	0.35	0.13	0.11	0.36	2.17	3.12	23.93	
LAWMA	196	196	6705976	A	Mainstem	1.52	2.09	2.44	3.12	2.77	1.99	0.93	14.86	0.25	0.09	0.08	0.26	1.55	2.23	17.09	
LAWMA	196	196	6705977	A	Mainstem	3.50	4.81	5.60	7.17	6.38	4.58	2.15	34.19	0.57	0.21	0.18	0.60	3.57	5.13	39.32	
LAWMA	304	304	6705981	A	Mainstem	13.61	18.75	21.83	27.93	24.83	17.82	8.37	133.14	2.22	0.82	0.71	2.33	13.89	19.97	153.11	
LAWMA	305	305	6705983	A	Mainstem	4.43	6.11	7.11	9.09	8.08	5.80	2.72	43.34	0.72	0.27	0.23	0.76	4.52	6.50	49.84	
LAWMA	217	217	6705984	A	Mainstem	4.74	6.30	7.34	8.35	8.58	7.66	5.80	48.77	5.14	4.35	4.02	3.82	4.41	21.74	70.51	
LAWMA	137	137	6705987	A	Mainstem	8.23	11.34	13.20	16.89	15.01	10.78	5.06	80.51	1.34	0.50	0.43	1.41	8.40	12.08	92.59	
LAWMA	137	137	6705988	A	Mainstem	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	49.1	49.3	6706023	A	Mainstem	6.38	8.79	10.24	13.09	11.64	8.36	3.92	62.42	1.04	0.38	0.33	1.09	6.51	9.35	71.77	
LAWMA	34	34	6706030	A	Mainstem	0.76	1.05	1.22	1.56	1.39	0.99	0.47	7.44	0.12	0.05	0.04	0.13	0.78	1.12	8.56	
LAWMA	241	241	6706038	A	Clay Creek	3.36	4.47	5.21	5.92	6.08	5.43	4.11	34.58	3.64	3.08	2.85	2.71	3.13	15.41	49.99	
LAWMA	241	241	6706039	A	Clay Creek	6.72	8.94	10.41	11.85	12.17	10.86	8.23	69.18	7.28	6.17	5.70	5.42	6.25	30.82	100.00	
LAWMA	235	235	6706058	A	Big Sandy	13.17	18.14	21.12	27.02	24.02	17.24	8.10	128.81	2.15	0.79	0.69	2.26	13.44	19.33	148.14	
LAWMA	255	255	6706059	A	Big Sandy	26.67	36.73	42.77	54.71	48.65	34.92	16.39	260.84	4.36	1.61	1.40	4.57	27.22	39.16	300.00	
LAWMA	255	255	6706061	A	Big Sandy	17.78	24.49	28.51	36.48	32.43	23.28	10.93	173.90	2.90	1.07	0.93	3.05	18.15	26.10	200.00	
LAWMA	255	255	6706062	A	Big Sandy	20.74	28.57	33.26	42.56	37.84	27.16	12.75	202.88	3.39	1.25	1.09	3.56	21.17	30.46	233.34	
LAWMA	255	255	6706063	A	Big Sandy	20.74	28.57	33.26	42.56	37.84	27.16	12.75	202.88	3.39	1.25	1.09	3.56	21.17	30.46	233.34	
LAWMA	235	235	6706064	A	Big Sandy	8.89	12.24	14.26	18.24	16.22	11.64	5.46	86.95	1.45	0.54	0.47	1.52	9.07	13.05	100.00	
LAWMA	235	235	6706065	A	Big Sandy	8.89	12.24	14.26	18.24	16.22	11.64	5.46	86.95	1.45	0.54	0.47	1.52	9.07	13.05	100.00	
LAWMA	255	255	6706066	A	Big Sandy	20.74	28.57	33.26	42.56	37.84	27.16	12.75	202.88	3.39	1.25	1.09	3.56	21.17	30.46	233.34	
LAWMA	255	255	6706067	A	Big Sandy	20.74	28.57	33.26	42.56	37.84	27.16	12.75	202.88	3.39	1.25	1.09	3.56	21.17	30.46	233.34	
LAWMA	128	128	6706076	A	Buffalo	11.85	16.33	19.01	24.32	21.62	15.52	7.29	115.94	1.94	0.71	0.62	2.03	12.10	17.40	133.34	
LAWMA	343	343	6706080	A	Big Sandy	17.78	24.49	28.51	36.48	32.43	23.28	10.93	173.90	2.90	1.07	0.93	3.05	18.15	26.10	200.00	
LAWMA	235	235	6706087	A	Big Sandy	17.78	24.49	28.51	36.48	32.43	23.28	10.93	173.90	2.90	1.07	0.93	3.05	18.15	26.10	200.00	
LAWMA	117	117	6706089	A	Big Sandy	1.68	2.23	2.60	2.96	3.04	2.72	2.06	17.29	1.82	1.54	1.43	1.35	1.56	7.70	24.99	
LAWMA	117	117	6706094	A	Big Sandy	2.24	2.98	3.47	3.95	4.06	3.62	2.74	23.06	2.43	2.06	1.90	1.81	2.08	10.28	33.34	
LAWMA	117	117	6706094	B	Big Sandy	1.68	2.23	2.60	2.96	3.04	2.72	2.06	17.29	1.82	1.54	1.43	1.35	1.56	7.70	24.99	
LAWMA	117	117	6706095	A	Big Sandy	1.68	2.23	2.60	2.96	3.04	2.72	2.06	17.29	1.82	1.54	1.43	1.35	1.56	7.70	24.99	
LAWMA	117	117	6706097	A	Big Sandy	3.36	4.47	5.21	5.92	6.08	5.43	4.11	34.58	3.64	3.08	2.85	2.71	3.13	15.41	49.99	
LAWMA	117	117	6706098	A	Big Sandy	1.68	2.23	2.60	2.96	3.04	2.72	2.06	17.29	1.82	1.54	1.43	1.35	1.56	7.70	24.99	
LAWMA	117	117	6706099	A	Big Sandy	1.68	2.23	2.60	2.96	3.04	2.72	2.06	17.29	1.82	1.54	1.43	1.35	1.56	7.70	24.99	
LAWMA	117	117	6706100	A	Big Sandy	1.68	2.23	2.60	2.96	3.04	2.72	2.06	17.29	1.82	1.54	1.43	1.35	1.56	7.70	24.99	
LAWMA	307	307	6706103	A	Big Sandy	3.36	4.47	5.21	5.92	6.08	5.43	4.11	34.58	3.64	3.08	2.85	2.71	3.13	15.41	49.99	
LAWMA	307	307	6706144	A	Big Sandy	1.68	2.23	2.60	2.96	3.04	2.72	2.06	17.29	1.82	1.54	1.43	1.35	1.56	7.70	24.99	

Table 2a - Projected Pumping for Wells in Table 1

(sorted by Structure ID)

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

						2019 Plan Year															
Plan Association	Farm Group	Farm Unit	Structure ID	ID Suf	Mainstem / Tributary	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Summer Season (Apr 19 - Oct 19)	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Winter Season (Nov 19 - Mar 20)	TOTAL (Apr 19 - Mar 20)	Comments
LAWMA	307	307	6706145	A	Big Sandy	2.24	2.98	3.47	3.95	4.06	3.62	2.74	23.06	2.43	2.06	1.90	1.81	2.08	10.28	33.34	
LAWMA	307	307	6706146	A	Big Sandy	2.77	3.69	4.29	4.89	5.02	4.48	3.39	28.53	3.00	2.54	2.35	2.23	2.58	12.70	41.23	
LAWMA	307	307	6706148	A	Big Sandy	3.36	4.47	5.21	5.92	6.08	5.43	4.11	34.58	3.64	3.08	2.85	2.71	3.13	15.41	49.99	
LAWMA	307	307	6706149	A	Big Sandy	2.96	4.08	4.75	6.08	5.41	3.88	1.82	28.98	0.48	0.18	0.16	0.51	3.02	4.35	33.33	
LAWMA	307	307	6706150	A	Big Sandy	2.96	4.08	4.75	6.08	5.41	3.88	1.82	28.98	0.48	0.18	0.16	0.51	3.02	4.35	33.33	
LAWMA	32	32	6706170	A	Big Sandy	8.89	12.24	14.26	18.24	16.22	11.64	5.46	86.95	1.45	0.54	0.47	1.52	9.07	13.05	100.00	
LAWMA	88	88	6706171	A	Big Sandy	8.89	12.24	14.26	18.24	16.22	11.64	5.46	86.95	1.45	0.54	0.47	1.52	9.07	13.05	100.00	
LAWMA	88	88	6706172	A	Big Sandy	4.45	6.12	7.13	9.12	8.11	5.82	2.73	43.48	0.73	0.27	0.23	0.76	4.54	6.53	50.01	
LAWMA	119	119	6706182	A	Big Sandy	3.36	4.47	5.21	5.92	6.08	5.43	4.11	34.58	3.64	3.08	2.85	2.71	3.13	15.41	49.99	
LAWMA	119	119	6706183	A	Big Sandy	5.04	6.70	7.81	8.89	9.13	8.15	6.17	51.89	5.46	4.63	4.28	4.06	4.69	23.12	75.01	
LAWMA	221	221	6706184	A	Big Sandy	2.85	3.92	4.57	5.85	5.20	3.73	1.75	27.87	0.47	0.17	0.15	0.49	2.91	4.19	32.06	
LAWMA	19	19	6706188	A	Big Sandy	3.36	4.47	5.21	5.92	6.08	5.43	4.11	34.58	3.64	3.08	2.85	2.71	3.13	15.41	49.99	
LAWMA	19	19	6706189	A	Big Sandy	3.36	4.47	5.21	5.92	6.08	5.43	4.11	34.58	3.64	3.08	2.85	2.71	3.13	15.41	49.99	
LAWMA	288	288	6706190	A	Big Sandy	2.96	4.08	4.75	6.08	5.41	3.88	1.82	28.98	0.48	0.18	0.16	0.51	3.02	4.35	33.33	
LAWMA	32	32	6706191	A	Big Sandy	17.78	24.49	28.51	36.48	32.43	23.28	10.93	173.90	2.90	1.07	0.93	3.05	18.15	26.10	200.00	
LAWMA	32	32	6706192	A	Big Sandy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAWMA	363	363	6706199	A	Big Sandy	8.89	12.24	14.26	18.24	16.22	11.64	5.46	86.95	1.45	0.54	0.47	1.52	9.07	13.05	100.00	
LAWMA	363	363	6706200	A	Big Sandy	8.89	12.24	14.26	18.24	16.22	11.64	5.46	86.95	1.45	0.54	0.47	1.52	9.07	13.05	100.00	
LAWMA	363	363	6706201	A	Big Sandy	5.93	8.16	9.50	12.16	10.81	7.76	3.64	57.96	0.97	0.36	0.31	1.02	6.05	8.71	66.67	
LAWMA	139	139	6706203	A	Big Sandy	4.45	6.12	7.13	9.12	8.11	5.82	2.73	43.48	0.73	0.27	0.23	0.76	4.54	6.53	50.01	
LAWMA	139	139	6706204	A	Big Sandy	4.45	6.12	7.13	9.12	8.11	5.82	2.73	43.48	0.73	0.27	0.23	0.76	4.54	6.53	50.01	
LAWMA	115	115	6706205	A	Big Sandy	4.45	6.12	7.13	9.12	8.11	5.82	2.73	43.48	0.73	0.27	0.23	0.76	4.54	6.53	50.01	
LAWMA	115	115	6706206	A	Big Sandy	2.96	4.08	4.75	6.08	5.41	3.88	1.82	28.98	0.48	0.18	0.16	0.51	3.02	4.35	33.33	
LAWMA	115	115	6706207	A	Big Sandy	2.96	4.08	4.75	6.08	5.41	3.88	1.82	28.98	0.48	0.18	0.16	0.51	3.02	4.35	33.33	
LAWMA	140	140	6706208	A	Big Sandy	3.36	4.47	5.21	5.92	6.08	5.43	4.11	34.58	3.64	3.08	2.85	2.71	3.13	15.41	49.99	
LAWMA	140	140	6706209	A	Big Sandy	3.36	4.47	5.21	5.92	6.08	5.43	4.11	34.58	3.64	3.08	2.85	2.71	3.13	15.41	49.99	
LAWMA	140	140	6706210	A	Big Sandy	1.68	2.23	2.60	2.96	3.04	2.72	2.06	17.29	1.82	1.54	1.43	1.35	1.56	7.70	24.99	
LAWMA	140	140	6706211	A	Big Sandy	1.68	2.23	2.60	2.96	3.04	2.72	2.06	17.29	1.82	1.54	1.43	1.35	1.56	7.70	24.99	
LAWMA	140	140	6706212	A	Big Sandy	1.68	2.23	2.60	2.96	3.04	2.72	2.06	17.29	1.82	1.54	1.43	1.35	1.56	7.70	24.99	
LAWMA	140	140	6706213	A	Big Sandy	1.68	2.23	2.60	2.96	3.04	2.72	2.06	17.29	1.82	1.54	1.43	1.35	1.56	7.70	24.99	
LAWMA	237	237	6706225	A	Big Sandy	4.45	6.12	7.13	9.12	8.11	5.82	2.73	43.48	0.73	0.27	0.23	0.76	4.54	6.53	50.01	
LAWMA	275	275	6706226	A	Big Sandy	14.82	20.41	23.76	30.40	27.03	19.40	9.11	144.93	2.42	0.89	0.78	2.54	15.12	21.75	166.68	
LAWMA	115	115	6706289	A	Big Sandy	32.60	44.90	52.27	66.87	59.46	42.68	20.04	318.82	5.32	1.96	1.71	5.59	33.27	47.85	366.67	
LAWMA	239	239	6706316	A	Rush Creek	5.93	8.16	9.50	12.16	10.81	7.76	3.64	57.96	0.97	0.36	0.31	1.02	6.05	8.71	66.67	
LAWMA	239	239	6706317	A	Rush Creek	5.93	8.16	9.50	12.16	10.81	7.76	3.64	57.96	0.97	0.36	0.31	1.02	6.05	8.71	66.67	
LAWMA	239	239	6706318	A	Rush Creek	5.93	8.16	9.50	12.16	10.81	7.76	3.64	57.96	0.97	0.36	0.31	1.02	6.05	8.71	66.67	
LAWMA	323	323	6706324	A	Rush Creek	47.42	65.31	76.03	97.27	86.48	62.08	29.14	463.73	7.74	2.86	2.48	8.13	48.39	69.60	533.33	
LAWMA	323	323	6706325	A	Rush Creek	47.42	65.31	76.03	97.27	86.48	62.08	29.14	463.73	7.74	2.86	2.48	8.13	48.39	69.60	533.33	
LAWMA	256	256	6706346	A	Mainstem	2.77	3.82	4.45	5.69	5.06	3.63	1.70	27.12	0.45	0.17	0.15	0.48	2.83	4.08	31.20	
LAWMA	307	307	6706390	A	Big Sandy	5.93	8.16	9.50	12.16	10.81	7.76	3.64	57.96	0.97	0.36	0.31	1.02	6.05	8.71	66.67	
LAWMA	307	307	6706392	A	Big Sandy	4.45	6.12	7.13	9.12	8.11	5.82	2.73	43.48	0.73	0.27	0.23	0.76	4.54	6.53	50.01	
LAWMA	307	307	6706393	A	Big Sandy	4.45	6.12	7.13	9.12	8.11	5.82	2.73	43.48	0.73	0.27	0.23	0.76	4.54	6.53	50.01	
Totals						5,860.20	8,040.25	9,361.06	11,834.37	10,679.30	7,871.26	3,996.08	57,642.52	1,552.87	908.24	822.35	1,415.34	5,921.71	10,620.51	68,263.03	

Table 2b - Rule 13 Information

(sorted by Structure ID)

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

							Irrigation												
									% of Total Acres Under Each Irrigation Method								Surface Water Source		
									Flood		Sprinkler		Drip		Other				
Plan Association	Farm Group	Farm Unit	Structure ID	ID Suf	Current PDF	Well Use Code	Irrigation Method(s)	Total # of Acres	% SS	% Supp	% SS	% Supp	% SS	% Supp	%	Type	Ditch Name	No. of Shares	Comments
LAWMA	368.3	368.3	1705032	A	0.360	I	SUP	119	0	1	0	0	0	0	0		FT LYON	372	
LAWMA	368.4	368.4	1705078	A	0.360	I	SUP	160	0	1	0	0	0	0	0		FT LYON	144	
LAWMA	368.4	368.4	1705079	A	0.360	I	SUP	160	0	1	0	0	0	0	0		FT LYON	144	
LAWMA	368.3	368.3	1705356	A	0.360	I	SUP	400	0	1	0	0	0	0	0		FT LYON	790	
LAWMA	369	369	1705438	A	0.750	I	SS	26	0	0	1	0	0	0	0			2	
LAWMA	369	369	1705439	A	0.750	I	SS	40	0	0	1	0	0	0	0			2	
LAWMA	574	368.2	1705644	A	0.750	I	SUP	150	0	0	0	1	0	0	0		FT LYON	288	
LAWMA	368.5	368.5	1705649	A	0.360	I	SUP	160	0	1	0	0	0	0	0		FT LYON	282	
LAWMA	368.5	368.5	1705650	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	144	
LAWMA	368.5	368.5	1705651	A	0.360	I	SUP	160	0	1	0	0	0	0	0		FT LYON	138	
LAWMA	368.6	368.6	1705656	A	0.360	I	SUP	368	0	1	0	0	0	0	0		FT LYON	801	
LAWMA	368.6	368.6	1705657	A	0.360	I	SUP	368	0	1	0	0	0	0	0		FT LYON	801	
LAWMA	368.6	368.6	1705661	A	0.360	I	SUP	147	0	1	0	0	0	0	0		FT LYON	288	
LAWMA	368.6	368.6	1705662	A	0.360	I	SUP	70	0	1	0	0	0	0	0		FT LYON	100	
LAWMA	368.7	368.7	1705688	A	0.360	I	SUP	320	0	1	0	0	0	0	0		FT LYON	372	
LAWMA	368.7	368.7	1705689	A	0.360	I	SUP	320	0	1	0	0	0	0	0		FT LYON	372	
LAWMA	368.7	368.7	1705690	A	0.360	I	SUP	320	0	1	0	0	0	0	0		FT LYON	372	
LAWMA	368.2	368.2	1705765	A	0.360	I	SUP	120	0	1	0	0	0	0	0		FT LYON	210	
LAWMA	368.7	368.7	1705861	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON		
LAWMA	368.8	368.8	1705900	A	0.360	I	SUP	82	0	1	0	0	0	0	0		FT LYON	144	
LAWMA	158	158	6705000	A	0.360	I	SUP	282	0	1	0	0	0	0	0		FT LYON	240	
LAWMA	179	179	6705002	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	264	
LAWMA	179	179	6705003	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	264	
LAWMA	179	179	6705004	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	264	
LAWMA	158	158	6705010	A	0.360	I	SUP	320	0	1	0	0	0	0	0		FT LYON	240	
LAWMA	384	384	6705011	A	0.500	I	SUP	0	1	0	0	0	0	0	0		FT LYON	0	
LAWMA	384	384	6705012	A	0.360	I	SUP	510	0	1	0	0	0	0	0		FT LYON	758	
LAWMA	384	384	6705013	A	0.500	I	SUP	0	1	0	0	0	0	0	0		FT LYON	0	
LAWMA	384	384	6705015	A	0.500	I	SUP	0	1	0	0	0	0	0	0		FT LYON	0	
LAWMA	158	158	6705016	A	0.360	I	SUP	320	0	1	0	0	0	0	0		FT LYON	240	
LAWMA	158	158	6705017	A	0.360	I	SUP	90	0	1	0	0	0	0	0			0	
LAWMA	158	158	6705018	A	0.360	I	SUP	155	0	1	0	0	0	0	0		FT LYON	144	
LAWMA	158	158	6705019	A	0.360	I	SUP	155	0	1	0	0	0	0	0		FT LYON	144	
LAWMA	188	188	6705020	A	0.513	I	SUP	263	0	0.608	0	0.392	0	0	0		FT LYON	210	
LAWMA	147	147	6705060	A	0.750	I	SS	47	0	0	1	0	0	0	0		FT BENT	100	
LAWMA	42	42	6705062	A	0.360	I	SUP	80	0	1	0	0	0	0	0				
LAWMA	121	121	6705063	A	0.360	I	SUP	0	0	1	0	0	0	0	0				
LAWMA	368.1	368.1	6705066	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON		
LAWMA	368.1	368.1	6705069	A	0.360	I	SUP	70	0	1	0	0	0	0	0		FT LYON	144	
LAWMA	574	368.1	6705071	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	1,162	
LAWMA	574	243	6705072	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	1,162	
LAWMA	42	42	6705074	A	0.360	I	SUP	125	0	1	0	0	0	0	0				
LAWMA	368.1	368.1	6705082	A	0.360	I	SUP	153	0	1	0	0	0	0	0		FT LYON	153	
LAWMA	368.1	368.1	6705086	A	0.360	I	SUP	139	0	1	0	0	0	0	0		FT LYON	245	
LAWMA	340	340	6705101	A	0.360	I	SUP	0	0	1	0	0	0	0	0				
LAWMA	17	17	6705107	B	0.665	I/C	SS	0	0.34	0	0.66	0	0	0	0				
LAWMA	278	278	6705111	A	0.676	I	MIX	455	0.297	0	0	0.703	0	0	0				
LAWMA	278	278	6705112	A	0.676	I	MIX	455	0.297	0	0	0.703	0	0	0				
LAWMA	84	84	6705114	A	0.360	I	SUP	84	0	1	0	0	0	0	0				
LAWMA	73	73	6705117	A	0.360	I	SUP	144	0	1	0	0	0	0	0				
LAWMA	269	269	6705118	A	0.360	I	SUP	0	0	1	0	0	0	0	0				
LAWMA	368.1	368.1	6705119	A	0.360	I	SUP	480	0	1	0	0	0	0	0		FT LYON	1,296	
LAWMA	368.1	368.1	6705120	A	0.360	I	SUP	240	0	1	0	0	0	0	0		FT LYON	1,296	
LAWMA	49.2	49.2	6705123	A	0.360	I	SUP	90	0	1	0	0	0	0	0		FT BENT	130	
LAWMA	161	161	6705125	A	0.500	I	SS	43	1	0	0	0	0	0	0				
LAWMA	49.2	49.2	6705127	A	0.750	I	SS	200	0	0	1	0	0	0	0				
LAWMA	49.2	49.2	6705128	A	0.360	I	SUP	90	0	1	0	0	0	0	0				
LAWMA	362	362	6705129	A	0.500	I	SS	4	1	0	0	0	0	0	0				
LAWMA	253	253	6705130	A	0.360	I	SUP	35	0	1	0	0	0	0	0		FT BENT	714	
LAWMA	155	155	6705131	A	0.500	I	SS	8	1	0	0	0	0	0	0				
LAWMA	303	303	6705132	A	0.360	I	SUP	0	0	1	0	0	0	0	0				
LAWMA	283	283	6705140	A	0.750	I	SS	5	0	0	1	0	0	0	0				
LAWMA	283	283	6705140	B	0.750	I	SS	5	0	0	1	0	0	0	0				
LAWMA	175	175	6705143	A	0.500	I	SS	8	1	0	0	0	0	0	0				
LAWMA	1	1	6705145	A	0.360	I	SUP	0	0	1	0	0	0	0	0		AMITY	196	
LAWMA	103	103	6705146	A	0.360	I	SUP	171	0	1	0	0	0	0	0			5	

Table 2b - Rule 13 Information

(sorted by Structure ID)

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Plan Association	Farm Group	Farm Unit	Structure ID	ID Suf	Current PDF	Well Use Code	Irrigation Method(s)	Total # of Acres	Flood % SS	Flood % Supp	Sprinkler % SS	Sprinkler % Supp	Drip % SS	Drip % Supp	Other %	Other Type	Ditch Name	No. of Shares	Comments
LAWMA	103	103	6705147	A	0.360	I	SUP	171	0	1	0	0	0	0	0			0	
LAWMA	1	1	6705148	A	0.575	I	SUP	0	0	0.45	0	0.55	0	0	0		AMITY	196	
LAWMA	1	1	6705149	A	0.575	I	SUP	0	0	0.45	0	0.55	0	0	0		AMITY	196	
LAWMA	1	1	6705150	A	0.650	I	MIX	0	0.4	0	0	0.6	0	0	0		AMITY	196	
LAWMA	1	1	6705151	A	0.750	I	SUP	0	0	0	0	1	0	0	0		AMITY	196	
LAWMA	247	247	6705152	A	0.750	I	SS	72	0	0	1	0	0	0	0		AMITY	100	
LAWMA	233	233	6705153	A	0.360	I	SUP	0	0	1	0	0	0	0	0		AMITY	39	
LAWMA	75	75	6705155	A	0.360	I	SUP	56	0	1	0	0	0	0	0		AMITY	12	
LAWMA	233	233	6705170	A	0.360	I	SUP	0	0	1	0	0	0	0	0		AMITY	39	
LAWMA	233	233	6705171	A	0.360	I	SUP	0	0	1	0	0	0	0	0		AMITY	39	
LAWMA	247	247	6705172	A	0.360	I	SUP	0	0	1	0	0	0	0	0		AMITY	100	
LAWMA	296	296	6705185	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON		
LAWMA	296	296	6705186	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON		
LAWMA	296	296	6705187	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON		
LAWMA	49.4	49.4	6705189	A	0.750	I	SUP	505	0	0	0	1	0	0	0		FT LYON	150	
LAWMA	49.4	49.4	6705190	A	0.750	I	SUP	505	0	0	0	1	0	0	0		FT LYON	150	
LAWMA	49.4	49.4	6705191	A	0.750	I	SUP	505	0	0	0	1	0	0	0		FT LYON	150	
LAWMA	49.4	49.4	6705192	A	0.750	I	SUP	505	0	0	0	1	0	0	0		FT LYON	150	
LAWMA	122	122	6705193	A	0.500	I	SS	0	1	0	0	0	0	0	0				
LAWMA	122	122	6705194	A	0.500	I	SS	0	1	0	0	0	0	0	0		FT LYON	302	
LAWMA	122	122	6705195	A	0.500	I	SS	0	1	0	0	0	0	0	0		FT LYON	302	
LAWMA	122	122	6705196	A	0.500	I	SS	0	1	0	0	0	0	0	0		FT LYON	302	
LAWMA	296	296	6705197	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	216	
LAWMA	122	122	6705198	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	302	
LAWMA	49.4	49.4	6705199	A	0.671	I	SUP	137	0	0.203	0	0.797	0	0	0		FT LYON	156	
LAWMA	49.4	49.4	6705200	A	0.671	I	SUP	137	0	0.203	0	0.797	0	0	0				
LAWMA	122	122	6705201	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	302	
LAWMA	368	368	6705202	A	0.360	I	SUP	148	0	1	0	0	0	0	0		FT LYON	100	
LAWMA	368	368	6705203	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	100	
LAWMA	122	122	6705204	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	302	
LAWMA	122	122	6705205	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	302	
LAWMA	122	122	6705206	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	302	
LAWMA	296	296	6705207	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	216	
LAWMA	296	296	6705208	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	216	
LAWMA	296	296	6705209	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	216	
LAWMA	296	296	6705210	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	216	
LAWMA	296	296	6705211	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	216	
LAWMA	296	296	6705217	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	216	
LAWMA	210	210	6705227	A	0.750	O	SS	3	0	0	1	0	0	0	0				
LAWMA	136	135	6705234	A	1.000	C	SS	0	0	0	0	0	0	0	1	COMMERCIAL			
LAWMA	212	212	6705235	A	0.750	O	SS	1	0	0	1	0	0	0	0		AMITY	72	
LAWMA	49.1	49.1	6705239	A	0.360	I	SUP	97	0	1	0	0	0	0	0		AMITY	29	
LAWMA	49.1	49.1	6705240	A	0.360	I	SUP	120	0	1	0	0	0	0	0		AMITY	0	
LAWMA	15	15	6705272	A	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	15	15	6705272	B	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	15	15	6705272	C	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	15	15	6705273	A	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	15	15	6705275	A	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	15	15	6705276	A	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	15	15	6705278	A	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	15	15	6705279	A	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	15	15	6705280	A	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	15	15	6705281	A	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	15	15	6705282	A	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	15	15	6705283	A	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	15	15	6705284	A	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	15	15	6705285	A	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	15	15	6705286	A	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	15	15	6705287	A	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	15	15	6705288	A	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	15	15	6705289	A	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	48	48	6705290	A	0.360	I	SUP	0	0	1	0	0	0	0	0		LAMAR	16	
LAWMA	122	122	6705312	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	0	
LAWMA	122	122	6705314	A	0.500	I	SS	0	1	0	0	0	0	0	0		FT LYON	0	
LAWMA	122	122	6705315	A	0.500	I	SS	0	1	0	0	0	0	0	0		FT LYON	0	
LAWMA	92	92	6705331	A	0.500	I	SS	50	1	0	0	0	0	0	0				

Table 2b - Rule 13 Information

(sorted by Structure ID)

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Plan Association	Farm Group	Farm Unit	Structure ID	ID Suf	Current PDF	Well Use Code	Irrigation Method(s)	Total # of Acres	Flood % SS	Flood % Supp	Sprinkler % SS	Sprinkler % Supp	Drip % SS	Drip % Supp	Other %	Other Type	Surface Water Source Ditch Name	Surface Water Source No. of Shares	Comments
LAWMA	33	33	6705343	A	0.360	I	SUP	114	0	1	0	0	0	0	0				
LAWMA	15	15	6705349	A	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL	LAMAR	3,500	
LAWMA	312	312	6705350	A	0.750	I	SS	1270	0	0	0.23	0.77	0	0	0		LAMAR	3,500	
LAWMA	312	312	6705355	A	0.750	I	SS	1270	0	0	0.23	0.77	0	0	0		LAMAR	3,500	
LAWMA	312	312	6705355	B	1.000	C	SS	0	0	0	0	0	0	0	1		LAMAR	3,500	
LAWMA	219	219	6705364	A	0.750	O	SS	0	0	0	1	0	0	0	0				
LAWMA	312	312	6705373	A	0.750	I	SS	1270	0	0	0.23	0.77	0	0	0		LAMAR	3,500	
LAWMA	312	312	6705374	A	0.750	I	SS	1270	0	0	0.23	0.77	0	0	0		LAMAR	3,500	
LAWMA	42	42.1	6705375	A	0.500	I	SS	2	1	0	0	0	0	0	0		FT BENT	42	
LAWMA	229	229	6705376	A	0.500	I	SS	0	1	0	0	0	0	0	0				
LAWMA	172	172	6705391	A	0.750	I	SS	0	0	0	1	0	0	0	0				
LAWMA	172	172	6705392	A	0.750	I	SS	0	0	0	1	0	0	0	0				
LAWMA	172	172	6705393	A	0.750	I	SS	0	0	0	1	0	0	0	0				
LAWMA	36	36	6705400	A	0.500	I	SS	0	1	0	0	0	0	0	0		HYDE / AMITY	40	
LAWMA	292	292	6705401	A	0.360	I	SUP	56	0	1	0	0	0	0	0		AMITY	66	
LAWMA	70.2	70.2	6705404	A	0.750	I	SUP	68	0	0	1	0	0	0	0		HYDE	200	
LAWMA	30	30	6705410	A	0.750	I	SS	95	0	0	1	0	0	0	0				
LAWMA	18	18	6705411	A	0.500	I	SS	215	1	0	0	0	0	0	0				
LAWMA	18	18	6705413	A	0.500	I	SS	0	1	0	0	0	0	0	0				
LAWMA	18	18	6705414	A	0.500	I	SS	215	1	0	0	0	0	0	0				
LAWMA	18	18	6705415	A	0.500	I	SS	0	1	0	0	0	0	0	0				
LAWMA	86	86.1	6705416	A	0.360	I	SUP	112	0	1	0	0	0	0	0		HYDE	200	
LAWMA	86	86.1	6705417	A	0.360	I	SUP	112	0	1	0	0	0	0	0		HYDE	200	
LAWMA	70.2	70.2	6705421	A	0.360	I	SUP	0	0	1	0	0	0	0	0		HYDE	325	
LAWMA	289	289	6705426	A	0.500	I	SS	0	1	0	0	0	0	0	0				
LAWMA	128	128	6705430	A	0.750	O	SS	0	0	0	1	0	0	0	0				
LAWMA	128	128	6705431	A	0.500	I	SS	0	1	0	0	0	0	0	0				
LAWMA	219	219	6705433	A	0.750	O	SS	0	0	0	1	0	0	0	0				
LAWMA	219	219	6705435	A	0.750	O	SS	0	0	0	1	0	0	0	0				
LAWMA	86	86.1	6705438	A	0.500	I	SS	0	1	0	0	0	0	0	0		HYDE	0	
LAWMA	138	138	6705451	A	0.677	I	MIX	92	0	0.187	0.813	0	0	0	0				Wells irrigate through center pivot
LAWMA	138	138	6705452	A	0.677	I	MIX	92	0	0.187	0.813	0	0	0	0				Wells irrigate through center pivot
LAWMA	86.2	86.2	6705454	A	0.750	I	SS	115	0	0	1	0	0	0	0				
LAWMA	112	112	6705455	A	0.360	I	SUP	160	0	1	0	0	0	0	0		FT LYON	288	
LAWMA	193	193	6705457	A	0.750	I	SS	130	0	0	1	0	0	0	0		FT LYON	691	
LAWMA	193	193	6705458	A	0.750	I	SS	14	0	0	1	0	0	0	0		FT LYON	691	
LAWMA	59	59	6705459	A	0.500	I	SS	23	1	0	0	0	0	0	0				
LAWMA	59	59	6705460	A	0.500	I	SS	95	1	0	0	0	0	0	0				
LAWMA	193	193	6705461	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	691	
LAWMA	193	193	6705462	A	0.597	I	MIX	0	0	0.392	0.608	0	0	0	0		FT LYON	691	
LAWMA	193	193	6705463	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	691	
LAWMA	104	104	6705464	A	0.360	I	SUP	354	0	1	0	0	0	0	0		AMITY	344	
LAWMA	146	146.1	6705466	A	0.360	I	SUP	300	0	1	0	0	0	0	0		FT LYON	217	
LAWMA	146	146.1	6705467	A	0.360	I	SUP	300	0	1	0	0	0	0	0		FT LYON	244	
LAWMA	5	5	6705474	A	0.500	I	SS	0	1	0	0	0	0	0	0				
LAWMA	312.4	312.4	6705477	A	0.750	I	SUP	151	0	0	1	0	0	0	0			3	
LAWMA	312	312.3	6705478	A	0.750	I	SUP	1281	0	0	0	1	0	0	0			1,284	
LAWMA	312	312.3	6705479	A	0.750	I	SUP	1281	0	0	0	1	0	0	0			1,284	
LAWMA	312	312.2	6705480	A	0.750	I	SUP	251	0	0	0	1	0	0	0		LAMAR	500	
LAWMA	312	312.3	6705481	A	0.750	I	SUP	0	0	0	0	1	0	0	0		LAMAR	180	
LAWMA	312.4	312.4	6705482	A	0.750	I	SUP	151	0	0	1	0	0	0	0			3	
LAWMA	312	312.3	6705483	A	0.750	I	SUP	1281	0	0	0	1	0	0	0			1,284	
LAWMA	312	365	6705484	A	0.360	I	SUP	348	0	1	0	0	0	0	0			360	
LAWMA	312	312.3	6705485	A	0.750	I	SUP	1281	0	0	0	1	0	0	0			1,284	
LAWMA	312	312.3	6705486	A	0.750	I	SUP	0	0	0	0	1	0	0	0		LAMAR	100	
LAWMA	312	312.3	6705488	A	0.750	I	SUP	1281	0	0	0	1	0	0	0			1,284	
LAWMA	312	312.3	6705489	A	0.750	I	SUP	1281	0	0	0	1	0	0	0			1,284	
LAWMA	53.1	53.1	6705490	A	0.360	I	SS	90	0	1	0	0	0	0	0		LAMAR	480	
LAWMA	312	312.3	6705491	A	0.750	I	SUP	1281	0	0	0	1	0	0	0			1,284	
LAWMA	312	312.3	6705492	A	0.360	I	SUP	1281	0	1	0	0	0	0	0			1,284	
LAWMA	31	31	6705493	A	0.360	I	SUP	242	0	1	0	0	0	0	0		LAMAR	264	
LAWMA	312	312.3	6705494	A	0.360	I	SUP	150	0	1	0	0	0	0	0			150	
LAWMA	31	31	6705496	A	0.750	I	SUP	131	0	0	0	1	0	0	0		LAMAR	264	
LAWMA	31	31	6705497	A	0.360	I	SUP	0	0	1	0	0	0	0	0		LAMAR	264	
LAWMA	31	31	6705498	A	0.360	I	SUP	0	0	1	0	0	0	0	0		LAMAR	264	
LAWMA	271	271	6705500	A	0.500	I	SS	161	1	0	0	0	0	0	0			0	

Table 2b - Rule 13 Information

(sorted by Structure ID)

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Plan Association	Farm Group	Farm Unit	Structure ID	ID Suf	Current PDF	Well Use Code	Irrigation Method(s)	Total # of Acres	Irrigation: % of Total Acres Under Each Irrigation Method: Flood % SS	Flood % Supp	Sprinkler % SS	Sprinkler % Supp	Drip % SS	Drip % Supp	Other %	Other Type	Surface Water Source: Ditch Name	No. of Shares	Comments
LAWMA	271	271	6705501	A	0.500	I	SS	229	1	0	0	0	0	0	0			0	
LAWMA	271	271	6705502	A	0.500	I	SS	229	1	0	0	0	0	0	0			0	
LAWMA	271	271	6705503	A	0.643	I	SS	229	0.43	0	0.57	0	0	0	0			0	
LAWMA	271	271	6705504	A	0.643	I	SS	229	0.43	0	0.57	0	0	0	0			0	
LAWMA	271	271	6705505	A	0.643	I	SS	191	0.43	0	0.57	0	0	0	0			0	
LAWMA	271	271	6705506	A	0.643	I	SS	151	0.43	0	0.57	0	0	0	0			0	
LAWMA	271	271	6705507	A	0.643	I	SS	191	0.43	0	0.57	0	0	0	0			0	
LAWMA	271	271	6705508	A	0.643	I	SS	137	0.43	0	0.57	0	0	0	0			0	
LAWMA	271	271	6705509	A	0.643	I	SS	137	0.43	0	0.57	0	0	0	0			0	
LAWMA	271	271	6705510	A	0.653	I	SS	240	0.39	0	0.61	0	0	0	0			0	
LAWMA	271	271	6705511	A	0.710	I	SS	76	0.16	0	0.84	0	0	0	0			0	
LAWMA	271	271	6705512	A	0.643	I	SS	137	0.43	0	0.57	0	0	0	0			0	
LAWMA	999	999	6705527	A	1.000	I	SS	0	0	0	0	0	0	0	1	BANK WELL			
LAWMA	160	160	6705535	A	0.500	I	SS	280	1	0	0	0	0	0	0			13	
LAWMA	160	160	6705536	A	0.500	I	SS	280	1	0	0	0	0	0	0			13	
LAWMA	160	160	6705537	A	0.500	I	SS	0	1	0	0	0	0	0	0			3	
LAWMA	312	312.3	6705538	A	0.750	I	SUP	0	0	0	0	1	0	0	0		LAMAR	120	
LAWMA	312	312.3	6705539	A	0.750	I	SUP	0	0	0	0	1	0	0	0		LAMAR	120	
LAWMA	242	242	6705540	A	0.750	I	SUP	0	0	0	0	1	0	0	0		LAMAR	200	
LAWMA	41	41	6705541	A	0.360	I	SUP	0	0	1	0	0	0	0	0		LAMAR	200	
LAWMA	312	312.2	6705542	A	0.750	I	SS	0	0	0	0.72	0.28	0	0	0				
LAWMA	312	312.3	6705544	A	0.360	I	SUP	0	0	1	0	0	0	0	0		LAMAR	144	
LAWMA	312	312.2	6705547	A	0.750	I	SUP	0	0	0	0	1	0	0	0		LAMAR	350	
LAWMA	312	312.2	6705548	A	0.360	I	SUP	0	0	1	0	0	0	0	0		LAMAR	197	
LAWMA	242	242	6705549	A	0.680	I	MIX	360	0	0.18	0	0.82	0	0	0		LAMAR	200	
LAWMA	242	242	6705550	A	0.680	I	MIX	360	0	0.18	0	0.82	0	0	0		LAMAR	200	
LAWMA	52	52	6705551	A	0.360	I	SUP	160	0	1	0	0	0	0	0		LAMAR	160	
LAWMA	52	52	6705552	A	0.360	I	SUP	0	0	1	0	0	0	0	0		LAMAR	154	
LAWMA	34	34	6705555	A	0.750	M	SS	10	0	0	1	0	0	0	0				
LAWMA	202	202	6705557	A	0.500	I	SS	12	1	0	0	0	0	0	0				
LAWMA	208.1	208.1	6705558	A	0.500	I	SS	0	1	0	0	0	0	0	0				
LAWMA	208.1	208.1	6705559	A	0.500	I	SS	0	1	0	0	0	0	0	0				
LAWMA	338	338	6705565	A	0.500	I	SS	64	1	0	0	0	0	0	0			55	
LAWMA	182	182	6705567	A	0.750	I	SS	0	0	0	1	0	0	0	0				
LAWMA	272	272	6705592	A	0.500	I	SS	11	1	0	0	0	0	0	0				
LAWMA	211	211	6705594	A	0.360	I	SUP	0	0	1	0	0	0	0	0			10	
LAWMA	274	274	6705595	A	0.360	I	SUP	0	0	1	0	0	0	0	0		AMITY	46	
LAWMA	131	53.2	6705597	A	0.360	I	SUP	394	0	1	0	0	0	0	0		BUFFALO	114	
LAWMA	131	131	6705598	A	0.360	I	SUP	0	0	1	0	0	0	0	0		BUFFALO	94	
LAWMA	65	65	6705599	A	0.360	I	SUP	0	0	1	0	0	0	0	0		BUFFALO	1,516	
LAWMA	242	242	6705601	A	0.500	I	SS	0	1	0	0	0	0	0	0		LAMAR	500	
LAWMA	252	252.1	6705606	A	0.500	I	SS	60	1	0	0	0	0	0	0		AMITY	150	
LAWMA	53.2	53.2	6705607	A	0.360	I	SUP	540	0	1	0	0	0	0	0		BUFFALO	540	
LAWMA	53.2	53.2	6705611	A	0.360	I	SUP	540	0	1	0	0	0	0	0		BUFFALO	540	
LAWMA	53.2	53.2	6705613	A	0.360	I	SUP	540	0	1	0	0	0	0	0		BUFFALO	540	
LAWMA	247	247	6705614	A	0.360	I	SUP	0	0	1	0	0	0	0	0		AMITY	100	
LAWMA	177	177	6705615	A	0.360	I	SUP	169	0	1	0	0	0	0	0		AMITY	185	
LAWMA	162	162	6705617	A	0.360	I	SUP	0	0	1	0	0	0	0	0		AMITY	514	
LAWMA	162	162	6705618	A	0.360	I	SUP	0	0	1	0	0	0	0	0		AMITY	514	
LAWMA	8	8	6705619	A	0.360	I	SUP	215	0	1	0	0	0	0	0		AMITY	172	
LAWMA	113	113	6705631	A	0.360	I	SUP	255	0	1	0	0	0	0	0		AMITY	260	
LAWMA	113	113	6705632	A	0.360	I	SUP	255	0	1	0	0	0	0	0		AMITY	260	
LAWMA	191	191	6705635	A	0.360	I	SUP	0	0	1	0	0	0	0	0		AMITY	1,000	
LAWMA	191	191	6705636	A	0.360	I	SUP	0	0	1	0	0	0	0	0		AMITY	1,000	
LAWMA	191	191	6705637	A	0.360	I	SUP	0	0	1	0	0	0	0	0		AMITY	1,000	
LAWMA	191	191	6705638	A	0.360	I	SUP	0	0	1	0	0	0	0	0		AMITY	35	
LAWMA	28.1	28.1	6705642	A	0.620	O	SS	126	0.52	0	0.48	0	0	0	0				
LAWMA	28.1	28.1	6705645	A	0.633	NA	SS	126	0.47	0	0.53	0	0	0	0				
LAWMA	28.1	28.1	6705646	A	0.633	NA	SS	126	0.47	0	0.53	0	0	0	0				
LAWMA	2	2	6705652	A	0.500	I	SS	0	1	0	0	0	0	0	0				
LAWMA	57	57	6705658	A	0.360	I	SUP	0	0	1	0	0	0	0	0		LAMAR	144	
LAWMA	41	41	6705660	A	0.360	I	SUP	383	0	1	0	0	0	0	0		LAMAR	412	
LAWMA	41	41	6705661	A	0.500	I	SS	0	1	0	0	0	0	0	0			250	
LAWMA	187	187	6705662	A	0.360	I	SUP	0	0	1	0	0	0	0	0		LAMAR	450	
LAWMA	70.2	70.2	6705663	A	0.750	I	SS	0	0	0	1	0	0	0	0				
LAWMA	70.2	70.2	6705664	A	0.750	I	SS	0	0	0	1	0	0	0	0				

Table 2b - Rule 13 Information

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LAWMA	70.2	70.2	6705665	A	0.738	I	MIX	478	0.05	0	0.95	0	0	0	0		HYDE	325	
LAWMA	70.2	70.2	6705668	A	0.738	I	MIX	352	0.05	0	0.95	0	0	0	0		HYDE	325	
LAWMA	70.2	70.2	6705669	A	0.750	I	SS	248	0	0	1	0	0	0	0		HYDE	325	
LAWMA	364	364	6705670	A	0.505	I	MIX	82	0	0.629	0.371	0	0	0	0		AMITY	80	
LAWMA	302	302	6705671	A	0.360	I	SUP	0	0	1	0	0	0	0	0		AMITY	40	
LAWMA	29	29	6705677	A	0.405	I	MIX	211	0.32	0.68	0	0	0	0	0		AMITY	179	
LAWMA	70.1	70.1	6705678	A	0.360	I	SUP	0	0	1	0	0	0	0	0		AMITY	688	
LAWMA	29	29	6705679	A	0.360	I	SUP	213	0	1	0	0	0	0	0		AMITY	179	
LAWMA	49.1	49	6705683	A	0.653	I	SS	320	0.39	0	0.61	0	0	0	0				
LAWMA	49.1	49	6705684	A	0.653	I	SS	320	0.39	0	0.61	0	0	0	0				
LAWMA	49.1	49	6705685	A	0.593	I	SS	320	0.63	0	0.37	0	0	0	0				
LAWMA	49.1	49	6705686	A	0.645	I	SS	320	0.42	0	0.58	0	0	0	0				
LAWMA	49.1	49	6705687	A	0.653	I	SS	320	0.39	0	0.61	0	0	0	0				
LAWMA	49.1	49	6705688	A	0.688	I	SS	320	0.25	0	0.75	0	0	0	0				
LAWMA	49.1	49	6705689	A	0.688	I	SS	320	0.25	0	0.75	0	0	0	0				
LAWMA	49.1	49	6705690	A	0.688	I	SS	320	0.25	0	0.75	0	0	0	0				
LAWMA	28.1	28.1	6705691	A	0.500	I	SS	0	1	0	0	0	0	0	0				
LAWMA	28.1	28.1	6705691	B	0.500	I	SS	0	1	0	0	0	0	0	0				
LAWMA	49.1	49	6705692	A	0.500	I	SS	0	1	0	0	0	0	0	0				
LAWMA	49.1	49	6705693	A	0.688	I	SS	320	0.25	0	0.75	0	0	0	0				
LAWMA	49.1	49	6705694	A	0.500	I	SS	0	1	0	0	0	0	0	0				
LAWMA	49.1	49	6705695	A	0.723	I	SS	320	0.11	0	0.89	0	0	0	0				
LAWMA	342	342	6705696	A	0.360	I	SUP	0	0	1	0	0	0	0	0		AMITY	160	
LAWMA	342	342	6705696	B	0.750	I	SS	0	0	0	1	0	0	0	0		AMITY	160	
LAWMA	342	342	6705697	A	0.360	I	SUP	0	0	1	0	0	0	0	0		AMITY	0	
LAWMA	130	130	6705698	A	0.689	I	MIX	507	0.026	0.141	0.64	0.193	0	0	0				
LAWMA	130	130	6705699	A	0.685	I	SS	170	0.26	0	0.74	0	0	0	0				
LAWMA	43	43	6705700	A	0.360	I	SUP	220	0	1	0	0	0	0	0		AMITY	220	
LAWMA	130	130	6705701	A	0.689	I	MIX	507	0.026	0.141	0.64	0.193	0	0	0				
LAWMA	130	130	6705702	A	0.689	I	MIX	507	0.026	0.141	0.64	0.193	0	0	0		AMITY	125	
LAWMA	43	43	6705703	A	0.360	I	SUP	220	0	1	0	0	0	0	0		AMITY	220	
LAWMA	43	43	6705704	A	0.360	I	SUP	220	0	1	0	0	0	0	0		AMITY	220	
LAWMA	62	62	6705705	A	0.360	I	SUP	300	0	1	0	0	0	0	0		AMITY	300	
LAWMA	62	62	6705707	A	0.360	I	SUP	300	0	1	0	0	0	0	0		AMITY	300	
LAWMA	130	130	6705708	A	0.360	I	SUP	0	0	1	0	0	0	0	0		AMITY	160	
LAWMA	312.1	312.1	6705715	A	0.750	I	SS	0	0	0	1	0	0	0	0				
LAWMA	312.1	312.1	6705716	A	0.750	I	SS	0	0	0	1	0	0	0	0				
LAWMA	312.1	312.1	6705717	A	0.750	I	SS	0	0	0	1	0	0	0	0	xx			
LAWMA	6	6	6705718	A	0.750	I	SS	120	0	0	1	0	0	0	0				
LAWMA	6	6	6705719	A	0.750	I	SS	480	0	0	1	0	0	0	0				
LAWMA	312.1	312.1	6705720	A	0.750	I	SS	0	0	0	1	0	0	0	0	xx			
LAWMA	96	96	6705721	A	0.750	I	SS	129	0	0	1	0	0	0	0				
LAWMA	312.1	312.1	6705722	A	0.750	I	SS	0	0	0	1	0	0	0	0	xx			
LAWMA	312.1	312.1	6705723	A	0.750	I	SS	0	0	0	1	0	0	0	0	xx			
LAWMA	312.1	312.1	6705724	A	0.750	I	SS	0	0	0	1	0	0	0	0	xx			
LAWMA	312.1	312.1	6705725	A	0.750	I	SS	126	0	0	1	0	0	0	0	xx			
LAWMA	312.1	312.1	6705726	A	0.750	I	SS	126	0	0	1	0	0	0	0	xx			
LAWMA	312.1	312.1	6705727	A	0.750	I	SS	0	0	0	1	0	0	0	0	xx			
LAWMA	312.1	312.1	6705728	A	0.750	I	SS	125	0	0	1	0	0	0	0	xx			
LAWMA	312.1	312.1	6705729	A	0.750	I	SS	127	0	0	1	0	0	0	0	xx			
LAWMA	312.1	312.1	6705731	A	0.750	I	SS	0	0	0	1	0	0	0	0	xx			
LAWMA	312.1	312.1	6705733	A	0.750	I	SS	0	0	0	1	0	0	0	0	xx			
LAWMA	6	6	6705735	A	0.750	I	SS	480	0	0	1	0	0	0	0				
LAWMA	312.1	312.1	6705736	A	0.750	I	SS	253	0	0	1	0	0	0	0	xx			
LAWMA	312.1	312.1	6705737	A	0.750	I	SS	0	0	0	1	0	0	0	0	xx			
LAWMA	105	105	6705738	A	0.750	I	SS	155	0	0	1	0	0	0	0				
LAWMA	345	345	6705739	A	0.750	I	SS	123	0	0	1	0	0	0	0				
LAWMA	345	345	6705740	A	0.750	I	SS	125	0	0	1	0	0	0	0				
LAWMA	345	345	6705741	A	0.750	I	SS	276	0	0	1	0	0	0	0				
LAWMA	345	345	6705742	A	0.750	I	SS	122	0	0	1	0	0	0	0				
LAWMA	370	370	6705744	A	0.750	I	SS	0	0	0	1	0	0	0	0				
LAWMA	370	370	6705745	A	0.750	I	SS	155	0	0	1	0	0	0	0				
LAWMA	370	370	6705746	A	0.750	I	SS	124	0	0	1	0	0	0	0				
LAWMA	370	370	6705748	A	0.750	I	SS	258	0	0	1	0	0	0	0				
LAWMA	370	370	6705749	A	0.750	I	SS	0	0	0	1	0	0	0	0				
LAWMA	345	345	6705752	A	0.750	I	SS	0	0	0	1	0	0	0	0				

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LAWMA	213	213	6705773	A	0.500	I	SS	0	1	0	0	0	0	0	0				
LAWMA	312.1	312.1	6705774	A	0.750	I	SS	0	0	0	1	0	0	0	0	xx			
LAWMA	312.1	312.1	6705775	A	0.750	I	SS	0	0	0	1	0	0	0	0	xx			
LAWMA	28.2	28.2	6705777	A	0.500	I	SS	129	1	0	0	0	0	0	0				
LAWMA	28.3	28.3	6705778	A	0.750	I	SS	125	0	0	1	0	0	0	0				
LAWMA	28.3	28.3	6705779	A	0.750	I	SS	116	0	0	1	0	0	0	0				
LAWMA	28.3	28.3	6705780	A	0.750	I	SS	118	0	0	1	0	0	0	0				
LAWMA	28.3	28.3	6705781	A	0.750	I	SS	123	0	0	1	0	0	0	0				
LAWMA	28.3	28.3	6705782	A	0.750	I	SS	36	0	0	1	0	0	0	0				
LAWMA	46	46	6705783	A	0.500	I	SS	13	1	0	0	0	0	0	0				
LAWMA	131	131	6705784	A	0.500	I	SS	0	1	0	0	0	0	0	0		BUFFALO	40	
LAWMA	65	65	6705787	A	0.360	I	SUP	0	0	1	0	0	0	0	0		BUFFALO	1,516	
LAWMA	65	65	6705788	A	0.360	I	SUP	0	0	1	0	0	0	0	0		BUFFALO	1,516	
LAWMA	295	295	6705801	A	0.648	I	SS	111	0.41	0	0.59	0	0	0	0				
LAWMA	295	295	6705802	A	0.648	I	SS	126	0.41	0	0.59	0	0	0	0				
LAWMA	334.1	334.1	6705803	A	0.750	I	SS	0	0	0	1	0	0	0	0				
LAWMA	334.1	334.1	6705804	A	0.750	I	SS	98	0	0	1	0	0	0	0				
LAWMA	334.1	334.1	6705806	A	0.750	I	SS	0	0	0	1	0	0	0	0				
LAWMA	334.1	334.1	6705810	A	0.750	I	SUP	0	0	0	0	1	0	0	0				
LAWMA	334.1	334.1	6705811	A	0.750	I	SS	147	0	0	1	0	0	0	0				
LAWMA	250	250	6705814	A	0.360	I	SUP	80	0	1	0	0	0	0	0		BUFFALO	80	
LAWMA	87	87	6705818	A	0.360	I	SUP	97	0	1	0	0	0	0	0		AMITY	65	
LAWMA	100	100	6705820	A	0.500	I	SS	0	1	0	0	0	0	0	0				
LAWMA	213	213	6705822	A	0.500	NA	SS	0	1	0	0	0	0	0	0	N/A			
LAWMA	201	201	6705824	A	0.360	I	SUP	0	0	1	0	0	0	0	0		AMITY	130	
LAWMA	9	9	6705825	A	0.360	I	SUP	177	0	1	0	0	0	0	0		AMITY	91	
LAWMA	192	192	6705827	A	0.692	I	SUP	250	0	0.15	0	0.85	0	0	0		AMITY	0	
LAWMA	12.2	12.2	6705828	A	0.360	I	SUP	55	0	1	0	0	0	0	0		AMITY	170	
LAWMA	251	101	6705829	A	0.360	I	SUP	0	0	1	0	0	0	0	0		AMITY	180	
LAWMA	12.2	12.2	6705831	A	0.360	I	SUP	55	0	1	0	0	0	0	0		AMITY	170	
LAWMA	251	101	6705832	A	0.750	I	SS	127	0	0	1	0	0	0	0		AMITY	95	
LAWMA	341	341	6705833	A	0.674	I	SS	156	0.306	0	0.694	0	0	0	0				
LAWMA	190	190	6705838	A	0.388	I	MIX	276	0.2	0.8	0	0	0	0	0		AMITY	220	
LAWMA	100	100	6705839	A	0.670	I	SS	0	0.32	0	0.68	0	0	0	0				
LAWMA	190	190	6705840	A	0.388	I	MIX	276	0.2	0.8	0	0	0	0	0		AMITY	220	
LAWMA	190	190	6705841	A	0.388	I	MIX	276	0.2	0.8	0	0	0	0	0		AMITY	220	
LAWMA	61	61	6705854	A	0.750	I	SS	0	0	0	1	0	0	0	0				
LAWMA	35.1	35.1	6705855	A	0.360	I	SUP	558	0	1	0	0	0	0	0		AMITY	1,035	
LAWMA	35.1	35.1	6705856	A	0.360	I	SUP	558	0	1	0	0	0	0	0		AMITY	1,034	
LAWMA	203	203	6705857	A	0.360	I	SUP	80	0	1	0	0	0	0	0		AMITY	80	
LAWMA	191	337	6705858	A	0.360	I	SUP	0	0	1	0	0	0	0	0		AMITY	280	
LAWMA	191	337	6705859	A	0.360	I	SUP	280	0	1	0	0	0	0	0		AMITY	270	
LAWMA	191	337	6705860	A	0.360	I	SUP	280	0	1	0	0	0	0	0		AMITY	270	
LAWMA	191	337	6705861	A	0.360	I	SUP	0	0	1	0	0	0	0	0		AMITY	270	
LAWMA	49.1	49.3	6705867	A	0.718	I	SS	240	0.13	0	0.87	0	0	0	0				
LAWMA	49.1	49.3	6705868	A	0.718	I	SS	240	0.13	0	0.87	0	0	0	0				
LAWMA	197	197	6705869	A	0.750	I	SUP	0	0	0	0	1	0	0	0		AMITY	270	
LAWMA	197	197	6705870	A	0.465	I	SUP	300	0	0.73	0	0.27	0	0	0		AMITY	270	
LAWMA	199	199	6705871	A	0.360	I	SUP	204	0	1	0	0	0	0	0		AMITY	204	
LAWMA	199	199	6705872	A	0.360	I	SUP	204	0	1	0	0	0	0	0		AMITY	204	
LAWMA	199	199	6705873	A	0.360	I	SUP	204	0	1	0	0	0	0	0		AMITY	204	
LAWMA	251	251	6705874	A	0.564	I	MIX	134	0	0.477	0.523	0	0	0	0		AMITY	30	
LAWMA	35	35	6705875	A	0.750	I	SS	209	0	0	1	0	0	0	0			0	
LAWMA	35	35	6705876	A	0.750	I	SUP	0	0	0	1	0	0	0	0			0	
LAWMA	35.1	35.1	6705877	A	0.750	I	SS	124	0	0	1	0	0	0	0				
LAWMA	35.1	35.1	6705878	A	0.750	I	SS	111	0	0	1	0	0	0	0				
LAWMA	49.1	49.3	6705879	A	0.718	I	SS	240	0.13	0	0.87	0	0	0	0				
LAWMA	344	344	6705881	A	0.360	I	SUP	100	0	1	0	0	0	0	0		AMITY	90	
LAWMA	200	200	6705889	A	0.750	I	SS	0	0	0	1	0	0	0	0				
LAWMA	248	248	6705915	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	100	
LAWMA	180	180	6705918	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	0	
LAWMA	49.6	49.6	6705920	A	0.750	O	SS	960	0	0	1	0	0	0	0				
LAWMA	49.6	49.6	6705921	A	0.750	O	SS	960	0	0	1	0	0	0	0				
LAWMA	49.6	49.6	6705922	A	0.750	O	SS	960	0	0	1	0	0	0	0				
LAWMA	49.6	49.6	6705923	A	0.750	O	SS	950	0	0	1	0	0	0	0				
LAWMA	49.6	49.6	6705924	A	0.750	O	SS	960	0	0	1	0	0	0	0				

Table 2b - Rule 13 Information

(sorted by Structure ID)

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Plan Association	Farm Group	Farm Unit	Structure ID	ID Suf	Current PDF	Well Use Code	Irrigation: Irrigation Method(s)	Irrigation: Total # of Acres	% of Total Acres Under Each Irrigation Method: Flood % SS	Flood % Supp	Sprinkler % SS	Sprinkler % Supp	Drip % SS	Drip % Supp	Other %	Other Type	Surface Water Source: Ditch Name	No. of Shares	Comments
LAWMA	195	195	6705936	A	0.715	I	SUP	0	0	0.091	0	0.909	0	0	0		FT LYON	144	
LAWMA	195	195	6705937	A	0.715	I	SUP	0	0	0.091	0	0.909	0	0	0		FT LYON	144	
LAWMA	99	99	6705938	A	0.360	I	SUP	100	0	1	0	0	0	0	0		FT LYON	50	
LAWMA	195	195	6705943	A	0.505	I	SUP	224	0	0.628	0	0.372	0	0	0		FT LYON	144	
LAWMA	196	196	6705944	A	0.559	I	SUP	180	0	0.49	0	0.51	0	0	0		FT LYON	144	
LAWMA	220	220	6705945	A	0.360	NA	SS	0	0	1	0	0	0	0	0		FT LYON	144	Assumed 100% PDF for inactive well
LAWMA	220	220	6705946	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	144	
LAWMA	146	146	6705949	A	0.750	I	SS	200	0	0	1	0	0	0	0				
LAWMA	146	146	6705950	A	0.750	I	SS	100	0	0	1	0	0	0	0				
LAWMA	146	146	6705951	A	0.750	I	SS	100	0	0	1	0	0	0	0				
LAWMA	146	146	6705952	A	0.750	I	SS	100	0	0	1	0	0	0	0				
LAWMA	137	137	6705956	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	152	
LAWMA	164	164	6705958	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	144	
LAWMA	136	136	6705959	A	0.479	I	SUP	570	0	0.696	0	0.304	0	0	0		FT LYON	192	
LAWMA	136	136	6705960	A	0.479	I	SUP	570	0	0.696	0	0.304	0	0	0		FT LYON	192	
LAWMA	136	136	6705962	A	0.479	I	SUP	570	0	0.696	0	0.304	0	0	0		FT LYON	192	
LAWMA	134	134	6705963	A	0.360	I	SUP	436	0	1	0	0	0	0	0		FT LYON	192	
LAWMA	134	134	6705964	A	0.360	I	SUP	436	0	1	0	0	0	0	0		FT LYON	200	
LAWMA	154	154	6705965	A	0.360	I	SUP	223	0	1	0	0	0	0	0		FT LYON	240	
LAWMA	367	367	6705967	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	152	
LAWMA	108	108	6705969	A	0.360	I	SUP	380	0	1	0	0	0	0	0		FT LYON	261	
LAWMA	108	108	6705970	A	0.360	I	SUP	380	0	1	0	0	0	0	0		FT LYON	243	
LAWMA	108	108	6705971	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	243	
LAWMA	108	108	6705972	A	0.360	I	SUP	100	0	1	0	0	0	0	0		FT LYON	261	
LAWMA	152	152	6705973	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	486	
LAWMA	196	196	6705975	A	0.750	I	SUP	276	0	0	0	1	0	0	0		FT LYON	216	
LAWMA	196	196	6705976	A	0.750	I	SUP	276	0	0	0	1	0	0	0		FT LYON	432	
LAWMA	196	196	6705977	A	0.750	I	SUP	276	0	0	0	1	0	0	0		FT LYON	216	
LAWMA	304	304	6705981	A	0.360	I	SUP	305	0	1	0	0	0	0	0		FT LYON	260	
LAWMA	305	305	6705983	A	0.360	I	SUP	156	0	1	0	0	0	0	0		FT LYON	166	
LAWMA	217	217	6705984	A	1.000	C	SS	0	0	0	0	0	0	0	1	COMMERCIAL			
LAWMA	137	137	6705987	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	152	
LAWMA	137	137	6705988	A	0.360	I	SUP	0	0	1	0	0	0	0	0		FT LYON	152	
LAWMA	49.1	49.3	6706023	A	0.718	I	SS	240	0.13	0	0.87	0	0	0	0				
LAWMA	34	34	6706030	A	0.750	M	SS	10	0	0	1	0	0	0	0				
LAWMA	241	241	6706038	A	0.500	C	SS	0	1	0	0	0	0	0	0	COMMERCIAL			
LAWMA	241	241	6706039	A	0.500	C	SS	0	1	0	0	0	0	0	0	COMMERCIAL			
LAWMA	235	235	6706058	A	0.675	I	SS	181	0.3	0	0.7	0	0	0	0				
LAWMA	255	255	6706059	A	0.500	I	SS	0	1	0	0	0	0	0	0				
LAWMA	255	255	6706061	A	0.750	O	SS	0	0	0	1	0	0	0	0				
LAWMA	255	255	6706062	A	0.750	O	SS	0	0	0	1	0	0	0	0				
LAWMA	255	255	6706063	A	0.750	O	SS	0	0	0	1	0	0	0	0				
LAWMA	235	235	6706064	A	0.750	O	SS	0	0	0	1	0	0	0	0				
LAWMA	235	235	6706065	A	0.750	O	SS	0	0	0	1	0	0	0	0				
LAWMA	255	255	6706066	A	0.750	O	SS	0	0	0	1	0	0	0	0				
LAWMA	255	255	6706067	A	0.750	O	SS	0	0	0	1	0	0	0	0				
LAWMA	128	128	6706076	A	0.750	O	SS	0	0	0	1	0	0	0	0				
LAWMA	343	343	6706080	A	0.500	I	SS	20	1	0	0	0	0	0	0				
LAWMA	235	235	6706087	A	0.500	I	SS	0	1	0	0	0	0	0	0				
LAWMA	117	117	6706089	A	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	117	117	6706094	A	0.750	M	SS	0	0	0	1	0	0	0	0	GOLF COURSE			
LAWMA	117	117	6706094	B	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	117	117	6706095	A	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	117	117	6706097	A	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	117	117	6706098	A	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	117	117	6706099	A	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	117	117	6706100	A	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	307	307	6706103	A	1.000	C	SS	0	0	0	0	0	0	0	1	COMMERCIAL			
LAWMA	307	307	6706144	A	1.000	C	SS	0	0	0	0	0	0	0	1	COMMERCIAL			
LAWMA	307	307	6706145	A	0.750	C	SS	0	0	0	1	0	0	0	0	COMMERCIAL			
LAWMA	307	307	6706146	A	1.000	C	SS	0	0	0	0	0	0	0	1	COMMERCIAL			
LAWMA	307	307	6706148	A	1.000	C	SS	0	0	0	0	0	0	0	1	COMMERCIAL			
LAWMA	307	307	6706149	A	0.750	O	SS	0	0	0	1	0	0	0	0				
LAWMA	307	307	6706150	A	0.750	O	SS	0	0	0	1	0	0	0	0				
LAWMA	32	32	6706170	A	0.750	O	SS	160	0	0	1	0	0	0	0				
LAWMA	88	88	6706171	A	0.500	I	SS	120	1	0	0	0	0	0	0				

Table 2b - Rule 13 Information

(sorted by Structure ID)

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Plan Association	Farm Group	Farm Unit	Structure ID	ID Suf	Current PDF	Well Use Code	Irrigation Method(s)	Total # of Acres	Irrigation: % of Total Acres Under Each Irrigation Method: Flood % SS	Flood % Supp	Sprinkler % SS	Sprinkler % Supp	Drip % SS	Drip % Supp	Other %	Other Type	Surface Water Source: Ditch Name	No. of Shares	Comments
LAWMA	88	88	6706172	A	0.500	I	SS	0	1	0	0	0	0	0	0				
LAWMA	119	119	6706182	A	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	119	119	6706183	A	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	221	221	6706184	A	1.000	C	SS	0	0	0	0	0	0	0	1				
LAWMA	19	19	6706188	A	0.500	C	SS	0	1	0	0	0	0	0	0	COMMERCIAL			
LAWMA	19	19	6706189	A	0.500	C	SS	0	1	0	0	0	0	0	0	COMMERCIAL			
LAWMA	288	288	6706190	A	0.750	O	SS	24	0	0	1	0	0	0	0				
LAWMA	32	32	6706191	A	0.750	O	SS	160	0	0	1	0	0	0	0				
LAWMA	32	32	6706192	A	0.750	O	SS	160	0	0	1	0	0	0	0				
LAWMA	363	363	6706199	A	0.750	I	SS	100	0	0	1	0	0	0	0				
LAWMA	363	363	6706200	A	0.750	I	SS	100	0	0	1	0	0	0	0				
LAWMA	363	363	6706201	A	0.750	I	SS	100	0	0	1	0	0	0	0				
LAWMA	139	139	6706203	A	0.500	I	SS	0	1	0	0	0	0	0	0				
LAWMA	139	139	6706204	A	0.500	I	SS	0	1	0	0	0	0	0	0				
LAWMA	115	115	6706205	A	0.500	O	SS	0	1	0	0	0	0	0	0				
LAWMA	115	115	6706206	A	0.750	O	SS	0	0	0	1	0	0	0	0				
LAWMA	115	115	6706207	A	0.750	O	SS	0	0	0	1	0	0	0	0				
LAWMA	140	140	6706208	A	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	140	140	6706209	A	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	140	140	6706210	A	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	140	140	6706211	A	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	140	140	6706212	A	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	140	140	6706213	A	1.000	M	SS	0	0	0	0	0	0	0	1	MUNICIPAL			
LAWMA	237	237	6706225	A	0.500	I	SS	0	1	0	0	0	0	0	0				
LAWMA	275	275	6706226	A	0.750	O	SS	60	0	0	1	0	0	0	0				
LAWMA	115	115	6706289	A	0.750	O	SS	0	0	0	1	0	0	0	0				
LAWMA	239	239	6706316	A	0.750	I	SS	0	0	0	1	0	0	0	0				
LAWMA	239	239	6706317	A	0.750	I	SS	0	0	0	1	0	0	0	0				
LAWMA	239	239	6706318	A	0.750	I	SS	0	0	0	1	0	0	0	0				
LAWMA	323	323	6706324	A	0.750	O	SS	87	0	0	1	0	0	0	0				
LAWMA	323	323	6706325	A	0.750	O	SS	320	0	0	1	0	0	0	0				
LAWMA	256	256	6706346	A	0.575	I	MIX	207	0	0.448	0.552	0	0	0	0		HYDE	320	
LAWMA	307	307	6706390	A	0.750	C	SS	0	0	0	1	0	0	0	0	COMMERCIAL			
LAWMA	307	307	6706392	A	1.000	C	SS	0	0	0	0	0	0	0	1	COMMERCIAL			
LAWMA	307	307	6706393	A	1.000	C/I	SS	0	0	0	0	0	0	0	1	COM/IRR			

Table 3a - Projected Stream Depletions from Pumping Prior to April 2019

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Rule 3 Wells - Using Groundwater Accounting Model

Month	Rch 1	Rch 2	Rch 3	Rch 4	Rch 5	Rch 6	Rch 7	Rch 8	Rch 9	Rch 10	Rch 11	Rch 12	Rch 13	Rch 14	Rch 15	Rch 16	Rch 17	Rch 18	Rch 19	Rch 20	Total
Apr-19	0.00	0.00	0.00	0.00	0.00	0.00	2.39	5.69	4.41	3.95	15.19	29.57	122.74	104.72	62.49	78.45	160.75	417.77	0.00	0.00	1,008.10
May-19	0.00	0.00	0.00	0.00	0.00	0.00	1.71	4.25	3.36	3.50	13.50	25.98	103.65	91.91	56.22	73.45	145.61	347.22	0.00	0.00	870.35
Jun-19	0.00	0.00	0.00	0.00	0.00	0.00	1.25	3.58	2.60	3.04	12.42	23.82	93.53	83.41	48.60	68.39	135.55	298.71	0.00	0.00	774.92
Jul-19	0.00	0.00	0.00	0.00	0.00	0.00	0.94	3.12	2.13	2.69	11.51	22.03	85.77	76.24	41.96	63.75	127.00	260.56	0.00	0.00	697.71
Aug-19	0.00	0.00	0.00	0.00	0.00	0.00	0.71	2.75	1.82	2.42	10.69	20.43	79.26	69.99	36.46	59.57	119.44	229.16	0.00	0.00	632.70
Sep-19	0.00	0.00	0.00	0.00	0.00	0.00	0.55	2.44	1.61	2.20	9.96	19.00	73.65	64.51	31.92	55.80	112.65	202.78	0.00	0.00	577.08
Oct-19	0.00	0.00	0.00	0.00	0.00	0.00	0.43	2.17	1.46	2.03	9.29	17.71	68.75	59.68	28.15	52.36	106.42	180.42	0.00	0.00	528.89
Nov-19	0.00	0.00	0.00	0.00	0.00	0.00	0.35	1.94	1.34	1.88	8.67	16.53	64.35	55.34	25.01	49.22	100.69	161.35	0.00	0.00	486.67
Dec-19	0.00	0.00	0.00	0.00	0.00	0.00	0.28	1.74	1.25	1.76	8.09	15.41	60.31	51.39	22.38	46.35	95.45	145.08	0.00	0.00	449.49
Jan-20	0.00	0.00	0.00	0.00	0.00	0.00	0.23	1.56	1.17	1.65	7.54	14.36	56.61	47.79	20.15	43.69	90.53	130.98	0.00	0.00	416.26
Feb-20	0.00	0.00	0.00	0.00	0.00	0.00	0.19	1.40	1.11	1.56	7.05	13.41	53.28	44.54	18.24	41.23	85.95	118.73	0.00	0.00	386.68
Mar-20	0.00	0.00	0.00	0.00	0.00	0.00	0.16	1.26	1.05	1.48	6.57	12.50	50.15	41.51	16.59	38.95	81.68	108.09	0.00	0.00	359.98
Total	0.00	0.00	0.00	0.00	0.00	0.00	9.19	31.91	23.33	28.16	120.48	230.75	912.06	791.03	408.17	671.19	1,361.71	2,600.84	0.00	0.00	7,188.82
Apr-Oct	0.00	0.00	0.00	0.00	0.00	0.00	7.99	24.01	17.40	19.83	82.55	158.54	627.36	550.46	305.80	451.76	907.42	1,936.62	0.00	0.00	5,089.74
Nov-Mar	0.00	0.00	0.00	0.00	0.00	0.00	1.20	7.90	5.93	8.34	37.93	72.21	284.70	240.57	102.37	219.43	454.29	664.22	0.00	0.00	2,099.07

Note: Stream depletions resulting from mainstem (gray area) agricultural pumping with an allowance for pre-compact pumping and in priority alternate point pumping.

Table 3b - Projected Stream Depletions from Pumping April 2019 through March 2020

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Rule 3 Wells - Using Groundwater Accounting Model

Month	Rch 1	Rch 2	Rch 3	Rch 4	Rch 5	Rch 6	Rch 7	Rch 8	Rch 9	Rch 10	Rch 11	Rch 12	Rch 13	Rch 14	Rch 15	Rch 16	Rch 17	Rch 18	Rch 19	Rch 20	Total
Apr-19	0.00	0.00	0.00	0.00	0.00	0.00	1.01	2.38	1.68	1.25	2.25	4.99	32.58	18.61	9.94	18.34	67.74	134.68	0.00	0.00	295.45
May-19	0.00	0.00	0.00	0.00	0.00	0.00	3.50	8.16	5.87	4.47	6.25	13.72	83.07	53.16	35.80	60.69	188.43	380.90	0.00	0.00	844.03
Jun-19	0.00	0.00	0.00	0.00	0.00	0.00	6.22	14.46	10.49	8.35	9.93	21.50	127.86	85.34	69.06	109.13	290.88	604.54	0.00	0.00	1,357.77
Jul-19	0.00	0.00	0.00	0.00	0.00	0.00	8.94	21.10	15.14	12.57	14.19	30.52	184.64	121.78	106.20	161.64	402.60	850.95	0.00	0.00	1,930.28
Aug-19	0.00	0.00	0.00	0.00	0.00	0.00	11.27	27.22	19.20	16.56	17.62	37.59	224.72	151.92	141.81	208.97	487.08	1,041.75	0.00	0.00	2,385.70
Sep-19	0.00	0.00	0.00	0.00	0.00	0.00	12.09	30.22	20.86	18.88	18.61	39.22	227.45	161.70	164.70	233.94	499.29	1,078.15	0.00	0.00	2,505.10
Oct-19	0.00	0.00	0.00	0.00	0.00	0.00	11.25	29.71	19.79	19.07	17.33	35.95	200.17	151.77	168.44	230.73	447.97	969.12	0.00	0.00	2,301.31
Nov-19	0.00	0.00	0.00	0.00	0.00	0.00	9.28	26.73	16.89	17.57	14.80	30.10	159.45	129.95	154.83	205.21	361.53	780.22	0.00	0.00	1,906.56
Dec-19	0.00	0.00	0.00	0.00	0.00	0.00	7.21	23.35	13.84	15.54	12.57	25.15	125.57	109.31	132.95	173.69	288.62	612.02	0.00	0.00	1,539.82
Jan-20	0.00	0.00	0.00	0.00	0.00	0.00	5.61	20.63	11.60	13.78	11.14	22.04	104.69	94.52	111.29	147.88	243.31	498.81	0.00	0.00	1,285.30
Feb-20	0.00	0.00	0.00	0.00	0.00	0.00	4.60	18.81	10.33	12.58	10.43	20.55	95.25	85.83	94.28	131.03	220.39	436.98	0.00	0.00	1,141.06
Mar-20	0.00	0.00	0.00	0.00	0.00	0.00	5.12	20.16	11.51	13.16	12.01	24.15	119.52	96.57	90.75	135.25	261.41	518.37	0.00	0.00	1,307.98
Total	0.00	0.00	0.00	0.00	0.00	0.00	86.10	242.93	157.21	153.78	147.12	305.49	1,684.98	1,260.45	1,280.08	1,816.51	3,759.23	7,906.50	0.00	0.00	18,800.38
Apr-Oct	0.00	0.00	0.00	0.00	0.00	0.00	54.28	133.25	93.04	81.15	86.17	183.50	1,080.49	744.28	695.97	1,023.45	2,383.98	5,060.09	0.00	0.00	11,619.66
Nov-Mar	0.00	0.00	0.00	0.00	0.00	0.00	31.82	109.68	64.17	72.63	60.95	121.99	604.49	516.17	584.11	793.06	1,375.25	2,846.41	0.00	0.00	7,180.72

Note: Stream depletions resulting from mainstem (gray area) agricultural pumping with an allowance for pre-compact pumping and in priority alternate point pumping.

Table 4a - Projected Stream Depletions from Pumping Prior to April 2019

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Rule 4 Wells - Using Groundwater Accounting Model

Month	Rch 1	Rch 2	Rch 3	Rch 4	Rch 5	Rch 6	Rch 7	Rch 8	Rch 9	Rch 10	Rch 11	Rch 12	Rch 13	Rch 14	Rch 15	Rch 16	Rch 17	Rch 18	Rch 19	Rch 20	Total
Apr-19	0.00	0.00	0.00	0.00	0.00	0.00	2.51	6.37	5.06	4.81	16.98	33.02	132.04	113.36	65.55	84.76	168.77	421.71	0.00	0.00	1,054.95
May-19	0.00	0.00	0.00	0.00	0.00	0.00	1.81	4.84	3.96	4.31	15.12	29.08	112.15	99.73	58.81	79.43	153.32	350.98	0.00	0.00	913.54
Jun-19	0.00	0.00	0.00	0.00	0.00	0.00	1.33	4.11	3.15	3.82	13.91	26.67	101.40	90.59	50.83	74.06	142.95	302.30	0.00	0.00	815.13
Jul-19	0.00	0.00	0.00	0.00	0.00	0.00	1.00	3.59	2.65	3.43	12.89	24.66	93.10	82.87	43.89	69.13	134.11	263.99	0.00	0.00	735.31
Aug-19	0.00	0.00	0.00	0.00	0.00	0.00	0.76	3.18	2.32	3.12	11.98	22.89	86.13	76.14	38.14	64.68	126.27	232.43	0.00	0.00	668.04
Sep-19	0.00	0.00	0.00	0.00	0.00	0.00	0.59	2.83	2.08	2.88	11.16	21.29	80.10	70.24	33.40	60.66	119.22	205.91	0.00	0.00	610.37
Oct-19	0.00	0.00	0.00	0.00	0.00	0.00	0.47	2.53	1.91	2.67	10.41	19.85	74.79	65.01	29.48	56.99	112.74	183.42	0.00	0.00	560.27
Nov-19	0.00	0.00	0.00	0.00	0.00	0.00	0.38	2.26	1.77	2.50	9.72	18.52	70.02	60.31	26.20	53.63	106.77	164.20	0.00	0.00	516.30
Dec-19	0.00	0.00	0.00	0.00	0.00	0.00	0.30	2.03	1.66	2.35	9.07	17.27	65.65	56.03	23.46	50.56	101.30	147.80	0.00	0.00	477.50
Jan-20	0.00	0.00	0.00	0.00	0.00	0.00	0.25	1.83	1.57	2.22	8.45	16.09	61.61	52.10	21.13	47.72	96.15	133.58	0.00	0.00	442.70
Feb-20	0.00	0.00	0.00	0.00	0.00	0.00	0.21	1.64	1.49	2.11	7.89	15.02	57.96	48.55	19.13	45.08	91.36	121.22	0.00	0.00	411.66
Mar-20	0.00	0.00	0.00	0.00	0.00	0.00	0.17	1.48	1.42	2.01	7.37	14.01	54.58	45.28	17.41	42.63	86.89	110.47	0.00	0.00	383.70
Total	0.00	0.00	0.00	0.00	0.00	0.00	9.78	36.69	29.03	36.23	134.97	258.36	989.53	860.21	427.43	729.35	1,439.88	2,638.02	0.00	0.00	7,589.48
Apr-Oct	0.00	0.00	0.00	0.00	0.00	0.00	8.47	27.44	21.12	25.03	92.46	177.46	679.71	597.94	320.10	489.73	957.40	1,960.75	0.00	0.00	5,357.61
Nov-Mar	0.00	0.00	0.00	0.00	0.00	0.00	1.31	9.25	7.91	11.19	42.50	80.90	309.82	262.28	107.34	239.62	482.48	677.27	0.00	0.00	2,231.87

Note: Stream depletion resulting from all mainstem (gray area) pumping with an allowance for in priority alternate point pumping.

Table 4b - Projected Stream Depletions from Pumping April 2019 through March 2020

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Rule 4 Wells - Using Groundwater Accounting Model

Month	Rch 1	Rch 2	Rch 3	Rch 4	Rch 5	Rch 6	Rch 7	Rch 8	Rch 9	Rch 10	Rch 11	Rch 12	Rch 13	Rch 14	Rch 15	Rch 16	Rch 17	Rch 18	Rch 19	Rch 20	Total
Apr-19	0.00	0.00	0.00	0.00	0.00	0.00	1.29	3.05	2.12	1.57	2.34	5.44	107.60	20.61	9.95	18.35	67.78	136.24	0.00	0.00	376.35
May-19	0.00	0.00	0.00	0.00	0.00	0.00	3.99	9.28	6.64	5.08	6.75	16.01	301.96	61.09	35.85	61.70	191.98	395.30	0.00	0.00	1,095.61
Jun-19	0.00	0.00	0.00	0.00	0.00	0.00	6.69	15.56	11.24	9.02	10.66	25.81	464.04	99.53	69.20	111.29	297.10	624.45	0.00	0.00	1,744.58
Jul-19	0.00	0.00	0.00	0.00	0.00	0.00	9.52	22.52	16.06	13.40	14.87	36.20	619.30	140.85	106.41	163.98	408.43	863.28	0.00	0.00	2,414.83
Aug-19	0.00	0.00	0.00	0.00	0.00	0.00	11.86	28.74	20.16	17.47	18.36	44.73	747.14	175.89	142.06	211.45	493.83	1,051.52	0.00	0.00	2,963.20
Sep-19	0.00	0.00	0.00	0.00	0.00	0.00	12.63	31.69	21.75	19.80	19.40	47.54	802.26	189.68	164.99	236.45	506.36	1,086.82	0.00	0.00	3,139.37
Oct-19	0.00	0.00	0.00	0.00	0.00	0.00	11.69	31.03	20.55	19.92	18.13	44.86	774.92	181.89	168.76	232.96	454.34	977.18	0.00	0.00	2,936.21
Nov-19	0.00	0.00	0.00	0.00	0.00	0.00	9.61	27.85	17.49	18.30	15.57	38.95	708.18	160.57	155.15	207.03	366.97	787.53	0.00	0.00	2,513.20
Dec-19	0.00	0.00	0.00	0.00	0.00	0.00	7.46	24.34	14.34	16.19	13.31	33.57	647.89	139.73	133.25	175.19	293.14	618.36	0.00	0.00	2,116.76
Jan-20	0.00	0.00	0.00	0.00	0.00	0.00	5.80	21.50	12.02	14.36	11.85	29.92	600.57	124.57	111.57	149.14	246.87	504.04	0.00	0.00	1,832.21
Feb-20	0.00	0.00	0.00	0.00	0.00	0.00	4.76	19.58	10.71	13.10	11.12	27.92	570.86	115.60	94.53	132.09	223.18	441.21	0.00	0.00	1,664.67
Mar-20	0.00	0.00	0.00	0.00	0.00	0.00	5.24	20.85	11.85	13.64	12.70	31.13	590.30	126.50	90.98	136.16	263.69	521.82	0.00	0.00	1,824.87
Total	0.00	0.00	0.00	0.00	0.00	0.00	90.54	255.98	164.92	161.84	155.05	382.08	6,935.02	1,536.51	1,282.70	1,835.78	3,813.67	8,007.75	0.00	0.00	24,621.86
Apr-Oct	0.00	0.00	0.00	0.00	0.00	0.00	57.67	141.86	98.51	86.25	90.50	220.60	3,817.22	869.55	697.22	1,036.17	2,419.82	5,134.79	0.00	0.00	14,670.15
Nov-Mar	0.00	0.00	0.00	0.00	0.00	0.00	32.87	114.12	66.41	75.59	64.55	161.48	3,117.80	666.96	585.48	799.62	1,393.85	2,872.96	0.00	0.00	9,951.71

Note: Stream depletion resulting from all mainstem (gray area) pumping with an allowance for in priority alternate point pumping.

Table 6 - Tributary Stream Depletions

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Rule 5 Wells - Using Model that 4% of Wellhead Depletions Affect the Mainstem of the Arkansas River
(see text for description of analysis to support 4% factor)

Tributary	Clay Creek		Big Sandy Creek		Rush Creek		Buffalo Creek		Wolf Creek		Two Buttes Creek	
Mainstem Reach	Reach 14		Reach 15		Reach 15		Reach 16		Reach 16		Reach 18	
Month	Local Call? (Y/N)	Stream Depletion	Local Call? (Y/N)	Stream Depletion	Local Call? (Y/N)	Stream Depletion	Local Call? (Y/N)	Stream Depletion	Local Call? (Y/N)	Stream Depletion	Local Call? (Y/N)	Stream Depletion
Apr-19	N	0.20	N	13.09	N	3.38	N	0.36	N	0.11	N	0.98
May-19	N	0.27	N	17.93	N	4.65	N	0.49	N	0.16	N	1.35
Jun-19	N	0.31	N	20.87	N	5.42	N	0.57	N	0.18	N	1.57
Jul-19	N	0.36	N	26.23	N	6.93	N	0.73	N	0.23	N	2.01
Aug-19	N	0.37	N	23.84	N	6.16	N	0.65	N	0.21	N	1.78
Sep-19	N	0.33	N	17.79	N	4.42	N	0.47	N	0.15	N	1.28
Oct-19	N	0.25	N	9.34	N	2.08	N	0.22	N	0.07	N	0.60
Nov-19	N	0.22	N	4.10	N	0.55	N	0.06	N	0.02	N	0.16
Dec-19	N	0.19	N	2.61	N	0.20	N	0.02	N	0.01	N	0.06
Jan-20	N	0.17	N	2.38	N	0.18	N	0.02	N	0.01	N	0.05
Feb-20	N	0.16	N	3.59	N	0.58	N	0.06	N	0.02	N	0.17
Mar-20	N	0.19	N	13.16	N	3.45	N	0.36	N	0.12	N	1.00
Total		3.02		154.93		38.00		4.01		1.29		11.01
Apr-Oct		2.09		129.09		33.04		3.49		1.11		9.57
Nov-Mar		0.93		25.84		4.96		0.52		0.18		1.44

Notes:
Stream depletion resulting from all tributary (white area) pumping.
All stream depletions are included in Table 7b totals for the appropriate reach on the mainstem. Sources for replacement are shown in Table 8.

Table 7a - Replacement Water Requirements from Pumping Prior to April 2019
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

(values in ac-ft)

REPLACEMENT REQUIREMENTS																		
River Reach	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Total	Apr 19 - Oct 19 Total	Nov 19 - Mar 20 Total
Las Animas to John Martin Dam 1)	3	4	13	19	15	12	11	9	8	8	6	5	5	5	4	107	82	25
John Martin Dam to Lamar Canal 2)	63	58	60	182	156	142	131	121	113	105	31	29	27	26	24	1,087	950	137
Lamar Canal to Buffalo Canal 3)	100	91	94	264	238	215	196	179	164	151	45	42	39	36	34	1,603	1,407	196
Buffalo Canal to Stateline 4)	260	229	218	474	404	356	317	285	258	235	91	84	77	71	66	2,718	2,329	389
In State Total	3	4	13	465	409	369	338	309	285	264	6	5	5	5	4	2,464	2,439	25
Stateline Total	423	378	372	474	404	356	317	285	258	235	167	155	143	133	124	3,051	2,329	722
Total	426	382	385	939	813	725	655	594	543	499	173	160	148	138	128	5,515	4,768	747

The above calculations assume a call on the river upstream of the Buffalo Canal Headgate April through October.

Notes

1) Apr-Oct = Rch 7 + Rch 8 + Rch 9 + Rch 10 from Table 4.
   Nov-Mar = (Rch7 + Rch 8 from Table 4) + (Rch 9 + Rch 10 from Table 3)
2) Apr-Oct = Rch 11 + Rch 12 + Rch 13 from Table 4
   Nov-Mar =(Rch 11 + Rch 12 + Rch 13 from Table 3) x .349
3) Apr-Oct = (Rch 14 + Rch 15 + Rch 16 from Table 4) + (Rch 14 + Rch 15 + Rch 16 from Table 6)
   Nov-Mar = {(Rch 14 + Rch 15 + Rch 16 from Table 3)+(Rch 14 + Rch 15 + Rch 16 from Table 6)} x .349
4) Apr- Oct = (Rch 17 + Rch 18 from Table 3) x .819
   Nov -Mar = (Rch 17 + Rch 18 from Table 3) x .349

Table 7b - Replacement Water Requirements from Pumping April 2019 through March 2020
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

(values in ac-ft)

REPLACEMENT REQUIREMENTS																		
River Reach	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Total	Apr 19 - Oct 19 Total	Nov 19 - Mar 20 Total
Las Animas to John Martin Dam 1)				8	25	43	61	78	86	83	72	61	53	47	51	668	384	284
John Martin Dam to Lamar Canal 2)				115	325	501	670	810	869	838	71	57	48	44	54	4,402	4,128	274
Lamar Canal to Buffalo Canal 3)				66	182	307	446	561	614	596	173	146	124	110	119	3,444	2,772	672
Buffalo Canal to Stateline 4)				166	466	733	1,027	1,252	1,292	1,161	398	314	259	229	272	7,569	6,097	1,472
In State Total				189	532	851	1,177	1,449	1,569	1,517	72	61	53	47	51	7,568	7,284	284
Stateline Total				166	466	733	1,027	1,252	1,292	1,161	642	517	431	383	445	8,515	6,097	2,418
Total				355	998	1,584	2,204	2,701	2,861	2,678	714	578	484	430	496	16,083	13,381	2,702

The above calculations assume a call on the river upstream of the Buffalo Canal Headgate April through October.

Notes

1) Apr-Oct = Rch 7 + Rch 8 + Rch 9 + Rch 10 from Table 4.
   Nov-Mar = (Rch7 + Rch 8 from Table 4) + (Rch 9 + Rch 10 from Table 3)
2) Apr-Oct = Rch 11 + Rch 12 + Rch 13 from Table 4
   Nov-Mar =(Rch 11 + Rch 12 + Rch 13 from Table 3) x .349
3) Apr-Oct = (Rch 14 + Rch 15 + Rch 16 from Table 4) + (Rch 14 + Rch 15 + Rch 16 from Table 6)
   Nov-Mar = {(Rch 14 + Rch 15 + Rch 16 from Table 3)+(Rch 14 + Rch 15 + Rch 16 from Table 6)} x .349
4) Apr- Oct = (Rch 17 + Rch 18 from Table 3) x .819
   Nov -Mar = (Rch 17 + Rch 18 from Table 3) x .349

Table 8a - Consumable Water Delivered for Replacement Purposes for Pumping Prior to April 2019

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

(values in ac-ft)

Row	REPLACEMENT REQUIREMENTS River Reach	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Total Apr-Mar
	In State Replacement Obligations													
1	Rule 14 Plan Replacement Obligation	465	409	369	338	309	285	264	6	5	5	5	4	2,464
2	LAWMA Aug. Plan Replacement Obligation	173	146	131	119	110	103	96	8	7	7	7	7	914
3	**Sub-Total**	**638**	**555**	**500**	**457**	**419**	**388**	**360**	**14**	**12**	**12**	**12**	**11**	**3,378**
	Stateline Replacement Obligation													
4	Rule 14 Plan Replacement Obligation	474	404	356	317	285	258	235	167	155	143	133	124	3,051
5	LAWMA Aug. Plan Replacement Obligation	243	200	169	144	124	106	92	163	149	162	147	135	1,834
6	500 ac-ft of water Required to Fund Offset Account	0	0	0	0	0	0	0	0	0	0	0	0	0
7	**Sub-Total**	**717**	**604**	**525**	**461**	**409**	**364**	**327**	**330**	**304**	**305**	**280**	**259**	**4,885**
8	**Total**	**1,355**	**1,159**	**1,025**	**918**	**828**	**752**	**687**	**344**	**316**	**317**	**292**	**270**	**8,263**

Note: See Table 7a for explanation of river reaches for in-state and stateline replacement locations.

Row	REPLACEMENT SOURCES Replacement Source	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Total Apr-Mar
	In State Replacement Sources													
9	Fry-Ark Project Water	22	62	61	74	76	64	57	5	5	5	4	3	438
10	Highland Canal Direct Flow (02CW181)	0	0	0	0	0	0	0	0	0	0	0	0	0
11	Highland Canal Direct Flow (10CW85)	0	0	0	0	0	0	0	0	0	0	0	0	0
12	Highland Ditch Transit Loss	0	0	0	0	0	0	0	0	0	0	0	0	0
13	Fort Lyon Canal (6,080 of 7,509 shares - Pending)													0
14	Farm 60 Recharge Site	20	30	40	40	30	20	10	5	0	0	0	0	195
15	Horse Creek Augmentation Station	110	130	180	150	110	80	40	40	0	0	0	40	880
16	Farm 27 Augmentation Station	90	100	150	150	140	80	40	30	0	0	0	20	800
17	Farm 36 Augmentation Station	25	25	30	30	30	30	20	10	0	0	0	0	200
18	Farm 132/133 Augmentation Station	25	50	50	50	42	40	25	0	0	0	0	0	282
19	Farm 132/133 Recharge Site	20	20	20	20	20	20	20	10	0	0	0	10	160
20	Limestone Creek Aug Station	20	20	15	10	10	10	10	0	0	0	0	0	95
21	Farm 65 Recharge Site	5	5	5	5	5	5	5	0	0	0	0	0	35
22	McClave Lateral Aug Station	25	60	50	30	20	10	5	0	0	0	0	0	200
23	Graveyard Creek Aug Station	25	25	50	30	20	10	5	0	0	0	0	0	165
24	Riverview Drain Aug Station	25	25	50	30	20	10	5	0	0	0	0	0	165
25	Farm 110 Recharge Site	0	0	0	0	0	0	0	0	0	0	0	0	0
26	Farm 63b Recharge Site	22	22	25	10	20	10	5	0	0	0	0	0	114
27	Wheatridge Aug Station	0	0	0	0	0	0	0	0	0	0	0	0	0
28	Keesee II Direct Flow (05CW52)	100	100	100	100	80	80	64	0	0	0	0	0	624
29	Fort Bent-LAWMA Aug Station (02CW181)	77	0	0	0	0	0	0	0	0	0	0	0	77
30	Fort Bent-LAWMA Aug Station (10CW85)	9	0	0	0	0	0	0	0	0	0	0	0	9
31	Fort Bent-LAWMA Aug Station (17CW3068 Pending)	16	0	0	0	0	0	0	0	0	0	0	0	16
32	City of Lamar Excess Credits	0	0	0	0	0	0	0	0	0	0	0	0	0
33	Lamar shares at Aug Stations (02CW181)	11	0	0	0	0	0	0	0	0	0	0	0	11
34	Lamar shares at Aug Station (897 shares 15CW3067)	0	0	0	0	0	0	0	0	0	0	0	0	0
35	West Farm Gravel Pit	0	0	0	0	0	0	0	0	0	0	0	0	0
36	Manvel Article II at Aug Stations (02CW181)	0	0	0	0	0	0	0	0	0	0	0	0	0
37	Misc. Other Supplies	0	0	0	0	0	0	0	0	0	0	0	0	0
38	Consumable Water in John Martin (Article II Accounts)	0	0	0	0	0	0	52	0	7	7	8	0	74
39	**Sub-Total**	**647**	**674**	**826**	**729**	**623**	**469**	**363**	**100**	**12**	**12**	**12**	**73**	**4,540**
	Stateline Replacement Sources													

Table 8a - Consumable Water Delivered for Replacement Purposes for Pumping Prior to April 2019

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

(values in ac-ft)

40	Excess In-State Credits	6	116	323	269	201	78	64	86	0	0	0	62	1,205
41	GIC shares at Aug Stations (783.5 shares - 15CW3067)	234	144	152	157	144	153	93	0	0	0	0	0	1,077
42	X-Y Ditch Direct Flow (02CW181)	318	206	52	0	0	0	177	0	0	0	0	0	753
43	X-Y Ditch Direct Flow (15CW3067)	0	0	0	0	0	0	0	0	0	0	0	0	0
44	Manvel Ditch Direct Flow	0	0	0	0	0	0	0	0	0	0	0	0	0
45	Stubbs Ditch Direct Flow	0	0	0	0	0	0	0	0	0	0	0	0	0
46	Sisson Ditch Direct Flow	0	0	0	0	0	0	0	0	0	0	0	0	0
47	Offset Accnt Release-Transit Loss	0	0	0	0	0	0	0	0	0	0	0	0	0
48	Consumable Water in John Martin (combination of Offset Account, Article II Accounts or Offset Credit at the Stateline)	161	140	0	37	66	135	0	239	304	305	280	197	1,864
49	**Sub-Total**	**719**	**606**	**527**	**463**	**411**	**366**	**334**	**325**	**304**	**305**	**280**	**259**	**4,899**
50	**Total Replacement Sources**	**1,360**	**1,164**	**1,030**	**923**	**833**	**757**	**633**	**339**	**316**	**317**	**292**	**270**	**8,234**

		IN-STATE ACCOUNTING												**Total**
Row	Item	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-Mar
51	Total of Replacement Sources (+)	647	674	826	729	623	469	363	100	12	12	12	73	4,540
52	Credit From Last Month (+)	0	0	0	0	0	0	0	0	0	0	0	0	0
53	Total Replacement Obligation (-)	638	555	500	457	419	388	360	14	12	12	12	11	3,378
54	In-State Credits delivered below Buffalo Canal	6	116	323	269	201	78	0	86	0	0	0	62	1,141
55	In-State Credit Lost due to One Month Carry Forward Limit (-)	0	0	0	0	0	0	0	0	0	0	0	0	0
56	Transit Loss for Month (-)	3	3	3	3	3	3	3	0	0	0	0	0	21
57	Debit From Last Month (-)	0	0	0	0	0	0	0	0	0	0	0	0	0
58	Balance - Sum of (+) and (-) in above rows	0	0	0	0	0	0	0	0	0	0	0	0	0
59	Credit Carried Forward to Next Month	0	0	0	0	0	0	0	0	0	0	0	0	
60	Debit Carried Forward to Next Month	0	0	0	0	0	0	0	0	0	0	0	0	

		STATELINE ACCOUNTING												**Total**
Row	Item	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-Mar
61	Total of Replacement Sources (+)	719	606	527	463	411	366	334	325	304	305	280	259	4,899
62	Credit From Last Month (+)	0	0	0	0	0	0	0	5	0	0	0	0	5
63	Total Replacement Obligation (-)	717	604	525	461	409	364	327	330	304	305	280	259	4,885
64	Stateline Credit Delivered to Stateline (-)	0	0	0	0	0	0	0	0	0	0	0	0	0
65	Transit Loss for Month (-)	2	2	2	2	2	2	2	0	0	0	0	0	14
66	Debit From Last Month (-)	0	0	0	0	0	0	0	0	0	0	0	0	0
67	Balance - Sum of (+) and (-) in above rows	0	0	0	0	0	0	5	0	0	0	0	0	5
68	Credit Carried Forward to Next Month	0	0	0	0	0	0	5	0	0	0	0	0	
69	Debit Carried Forward to Next Month	0	0	0	0	0	0	0	0	0	0	0	0	

		CONSUMABLE WATER IN JOHN MARTIN												**Total**
Row	Item	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-Mar
70	Offset account Inflow from Highland													
71	Keesee Direct Flow													
72	Account Inflow from Article II Water													
73	This Month Depletions paid with CU Account													
74	Evap Loss and other Losses													
75	End of Month Storage													

Table 8a - Consumable Water Delivered for Replacement Purposes for Pumping Prior to April 2019

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

(values in ac-ft)

Row Explanations

1 In-State river replacement obligation from well pumping in LAWMA's 2019 Rule 14 plan.
2 In-State river replacement obligation from well pumping from LAWMA's 2019 augmentation plan.
3 Equals Sum of Rows 1 through 2
4 Stateline river replacement obligation from well pumping in LAWMA's 2019 Rule 14 plan.
5 Stateline river replacement obligation from well pumping in LAWMA's 2019 augmentation plan.
6 The amount of water delivered to the Offset Account / Charge Sub-Account for the establishment of the 2019 Offset Account.
7 Sum of Rows 4 through 6
8 Sum of Row 3 and Row 7
9 Fry-Ark Return flows purchased from SECWCD for 2019 and return flows from 2018 Fort Lyon Canal project water delivered in 2019.
10 Estimated yield of the Highland Canal water right changed in Case No. 02CW181. Yield estimated at 100% of average.
11 Estimated yield of the Highland Canal water right changed in Case No. 10CW85. Yield estimated at 100% of average.
12 Estimated transit loss for Highland Canal water measured at the Purgatoire River below the Highland Dam to the Purgatoire River near Las Animas as calculated by the DEO.
13 Fort Lyon Canal water delivered through various augmentation stations and recharge sites. Yield estimated at 100% of average. USED IN RULE 14 PLAN ONLY.
14 Fort Lyon Canal water delivered through the Farm 60 Recharge site.
15 Fort Lyon Canal water delivered through the Horse Creek Augmentation Station.
16 Fort Lyon Canal water delivered through the Farm 27 Augmentation Station.
17 Fort Lyon Canal water delivered through the Farm 36 Augmentation Station.
18 Fort Lyon Canal water delivered through the Farm 132/133 Augmentation Station.
19 Fort Lyon Canal water delivered through the Farm 132/133 Recharge Site.
20 Fort Lyon Canal water delivered through the Limestone Creek Augmentation Station.
21 Fort Lyon Canal water delivered through the Farm 65 Recharge Site.
22 Fort Lyon Canal water delivered through the Mclave Lateral Augmentation Station.
23 Fort Lyon Canal water delivered through the Graveyard Creek Augmentation Station.
24 Fort Lyon Canal water delivered through the Riverview Drain Augmentation Station.
25 Fort Lyon Canal water delivered through the Farm 110 Recharge Site.
26 Fort Lyon Canal water delivered through the Farm 63b Recharge Site.
27 Fort Lyon Canal water delivered through the Wheatridge Augmentation Station.
28 One half of the Keesee Ditch water rights changed in Case No. 05CW52 delivered to the river. Yield estimated at 100% of average.
29 Fort Bent Ditch water delivered to the Fort Bent Augmentation station from Fort Bent shares changed in Case No. 02CW181. Yield estimated at 100% of average.
30 Fort Bent Ditch water delivered to the Fort Bent Augmentation station from Fort Bent shares changed in Case No. 10CW85. Yield estimated at 100% of average.
31 Fort Bent Ditch water delivered to the Fort Bent augmentation station in pending Case No. 17CW3068. Yield estimated at 100% of average. USED IN RULE 14 PLAN ONLY
32 Excess credits from the City of Lamar's Rule 14 and Augmentation Plan. USED IN RULE 14 PLAN ONLY
33 Lamar Canal water delivered to the West Farm and Center Farm augmentation stations changed in Case No. 02CW181. Yield estimated at 100% of average.
34 Lamar Canal water delivered to the West Farm augmentation station in Case No. 15CW3067. Yield estimated at 100% of average.
35 Consumable water delivered from the West Farm Gravel pit.
36 Manvel Article II water released from John Martin Reservoir and delivered to the Lamar Canal for delivery through the West Farm Augmentation Station.
37 Miscellaneous Other Supplies for example the Busk-Ivanhoe lagged return flows LAWMA acquired in 2013 that has a residual return flow amount in 2019.
38 Release of Article II account water from John Martin Reservoir to meet an outstanding replacement obligations from Row 1
39 Sum of Rows 9 through 38
40 Consumptive use credits not used to replace in-state replacement obligations. Row 39 - Row 3 - Row 56
41 Granada Irrigation Company water delivered to the Granada East & West augmentation stations in Case No. 15CW3067. Yield estimated at 100% of average.
42 Estimated yield of the 67 / 69 cfs of the X-Y Ditch direct flow water right changed in Case No. 02CW181. Yield estimated at 100% of average.
43 Estimated yield of 2.0 / 69 cfs of the X-Y Ditch direct flow water rights in Case No. 15CW3067. Yield estimated at 100% of average.
44 Estimated yield of the Manvel Ditch direct flow water right changed in Case No. 02CW181. Estimated yield based on volumetric limits.
45 Estimated yield of the Stubbs Ditch direct flow water right changed in Case No. 02CW181. Estimated yield based on Colorado-Kansas Agreement regarding Sisson-Stubbs water rights.
46 Estimated yield of the Sisson Ditch direct flow water right changed in Case No. 10CW85. Estimated yield based on Colorado-Kansas Agreement regarding Sisson-Stubbs water rights.
47 Transit loss credits calculated from delivery of the Offset Account consumable water to the Stateline. Estimated yield based on past Offset Account deliveries.
48 Use of water delivered to the Stateline from the Offset Account, Article II Account releases or use of Stateline Credits already delivered to the Offset Account to meet Stateline Replacement Obligations. It should be noted that this total is typically used during the non-irrigation season.
49 Sum of Rows 40 through 48
50 Calculated as Row 39 + Row 49 - Row 40. Excess in-state credits is removed from the total to not account for in-state credits twice.
51 Calculated from Row 39
52 Calculated from previous month Row 59

Table 8a - Consumable Water Delivered for Replacement Purposes for Pumping Prior to April 2019

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

(values in ac-ft)

53 Calculated from Row 3
54 Calculated as Row 51 - Row 53 - Row 56
55 Calculated as the maximum of the previous month Row 59 - Row 3 or zero.
56 Estimated transits loss of delivery of consumptive use credits. Estimate from previous years deliveries.
57 Calculated from previous month Row 60
58 Calculated as Row 51 + Row 52 - Row 53 - Row 54 - Row 55 - Row 56 - Row 57
59 Calculated as the maximum of Row 58 or zero.
60 Calculated as the minimum of Row 58 or zero.
61 Calculated as Row 49
62 Calculated from previous month Row 68
63 Calculated from Row 7
64 Calculated as maximum of previous month Row 68 - Row 7 or zero.
65 Estimated transits loss of delivery of consumptive use credits. Estimate from previous years deliveries.
66 Calculated from previous month Row 69
67 Calculated as Row 61 + Row 62 - Row 63 - Row 64 - Row 65 - Row 66
68 Calculated as the maximum of Row 67 or zero.
69 Calculated as the minimum of Row 67 or zero.
70 Estimated yield of the Highland Canal water right changed in Case No. 02CW181 not used for in-state replacement. Yield estimated at 100% of average.
71 Estimated yield of one half of the Keesee Ditch water rights changed in Case No. 02CW181 delivered to the Offset Account. Yield estimated at 100% of average.
72 Estimated accrual of water into John Martin Reservoir Article II accounts owned by LAWMA.
73 The amount of water delivered from the Article II accounts, Offset Account to the Stateline during the year, or Stateline Credits from previous years Offset Account deliveries.
74 Estimated evaporation and other transit losses for delivery of storage water.
75 End of month storage amount that includes Article II accounts, Offset Account water to the Stateline during the year, or Stateline Credits from previous years Offset Account deliveries.

Table 8b - Consumable Water Delivered for Replacement Purposes for Pumping April 2019 through March 2020

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

(values in ac-ft)

Row	River Reach	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Total Apr-Mar
		REPLACEMENT REQUIREMENTS												
	In State Replacement Obligation													
1	Rule 14 Plan Replacement Obligation	189	532	851	1,177	1,449	1,569	1,517	72	61	53	47	51	7,568
2	LAWMA Aug. Plan Replacement Obligation	155	200	298	324	362	370	277	35	30	26	23	26	2,126
3	LAWMA SWSP Plan Replacement Obligation	0	0	1	1	1	1	1	1	1	0	0	0	8
4	**Sub-Total**	**344**	**732**	**1,150**	**1,502**	**1,812**	**1,940**	**1,795**	**108**	**92**	**79**	**70**	**77**	**9,701**
	Stateline Replacement Obligation													
5	Rule 14 Plan Replacement Obligation	166	466	733	1,027	1,252	1,292	1,161	642	517	431	383	445	8,515
6	LAWMA Aug. Plan Replacement Obligation	80	230	360	498	603	622	561	697	509	424	371	458	5,413
7	LAWMA SWSP Plan Replacement Obligation	0	0	0	0	0	0	0	0	0	0	0	0	1
8	500 ac-ft of water Required to Fund Offset Account	0	0	0	0	250	250	0	0	0	0	0	0	500
9	**Sub-Total**	**246**	**696**	**1,093**	**1,525**	**2,105**	**2,164**	**1,722**	**1,339**	**1,026**	**855**	**754**	**903**	**14,429**
10	**Total**	**590**	**1,429**	**2,243**	**3,027**	**3,917**	**4,104**	**3,517**	**1,447**	**1,118**	**934**	**824**	**980**	**24,131**

Row	Replacement Source	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Total Apr-Mar
		REPLACEMENT SOURCES												
	In State Replacement Sources													
11	Fry-Ark Project Water	41	25	30	71	125	116	84	111	94	81	72	65	916
12	Highland Canal Direct Flow (02CW181)	0	0	0	0	0	0	0	0	0	0	0	0	0
13	Highland Canal Direct Flow (10CW85)	20	26	39	50	59	28	7	0	0	0	0	0	228
14	Highland Ditch Transit Loss	10	10	10	10	10	10	10	0	0	0	0	0	70
15	Fort Lyon Canal (Pending)													
16	Farm 60 Recharge Site	17	15	14	8	10	7	10	9	6	5	5	12	120
17	Horse Creek Augmentation Station	79	118	139	130	116	56	46	5	0	0	0	2	692
18	Farm 27 Augmentation Station	34	64	62	37	12	13	20	3	0	0	0	7	252
19	Farm 36 Augmentation Station	16	29	39	31	20	1	1	2	0	0	0	10	148
20	Farm 132/133 Augmentation Station	34	26	47	36	28	3	4	17	0	0	0	15	210
21	Farm 132/133 Recharge Site	28	40	55	46	34	15	4	5	3	2	2	3	238
22	Limestone Creek Aug Station	5	12	25	25	19	8	2	7	0	0	0	7	110
23	Farm 65 Recharge Site	14	19	24	21	16	9	5	7	2	2	2	6	126
24	McClave Lateral Aug Station	25	5	33	43	39	27	19	14	0	0	0	13	218
25	Graveyard Creek Aug Station	15	28	17	29	28	20	15	11	0	0	0	10	173
26	Riverview Drain Aug Station	16	29	19	30	29	20	16	12	0	0	0	10	182
27	Farm 110 Recharge Site	0	0	0	0	0	0	0	0	0	0	0	0	0
28	Farm 63b Recharge Site	9	18	26	34	16	12	10	9	0	0	0	8	141
29	Wheatridge Aug Station	0	0	0	0	0	0	0	0	0	0	0	0	0
30	Keesee II Direct Flow (05CW52)	37	119	102	160	157	127	85	0	0	0	0	0	787
31	Fort Bent-LAWMA Aug Station (02CW181)	5	112	137	158	142	97	65	0	0	0	0	0	715
32	Fort Bent-LAWMA Aug Station (10CW85)	2	14	18	21	18	10	6	0	0	0	0	0	90
33	Fort Bent-LAWMA Aug Station (17CW3068 Pending)	2	25	30	35	32	21	14	0	0	0	0	0	159
34	City of Lamar Excess Credits	5	5	5	6	9	8	9	11	13	12	9	8	100
35	Lamar shares at Aug Stations (02CW181)	935	1,148	1,495	1,548	1,298	1,002	784	0	0	0	0	0	8,209
36	Lamar shares at Aug Stations (897 shares 15CW3067)	105	128	169	173	138	99	72	0	0	0	0	0	882
37	West Farm Gravel Pit	0	0	0	0	250	250	250	0	0	0	0	0	750
38	Manvel Article II at Aug Stations (02CW181)	0	0	0	0	0	250	250	0	0	0	0	0	500

Table 8b - Consumable Water Delivered for Replacement Purposes for Pumping April 2019 through March 2020

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

(values in ac-ft)

39	Misc. Other Supplies		0	0	0	0	0	0	0	0	0	0	0	0	0
40	Consumable Water in John Martin (Article II Accounts)		0	0	0	0	0	0	12	0	0	0	0	0	12
41	**Sub-Total**		**1,455**	**2,013**	**2,535**	**2,703**	**2,606**	**2,208**	**1,798**	**223**	**117**	**103**	**91**	**179**	**16,029**
	Stateline Replacement Sources														
42	Excess In-State Credits		1,111	1,280	1,385	1,201	794	268	3	115	25	24	20	101	6,328
43	GIC shares at Aug Stations (783.5 shares - 15CW3067)		19	166	275	277	181	50	21	0	0	0	0	0	988
44	X-Y Ditch Direct Flow (02CW181)		0	248	454	563	662	521	202	0	0	0	0	0	2,651
45	X-Y Ditch Direct Flow (15CW3067)		9	13	15	16	19	15	11	0	0	0	0	0	99
46	Manvel Ditch Direct Flow		150	150	150	150	150	0	0	0	0	0	0	0	750
47	Stubbs Ditch Direct Flow		36	36	36	36	36	36	36	0	0	0	0	0	252
48	Sisson Ditch Direct Flow		36	36	36	36	36	36	36	0	0	0	0	0	252
49	Offset Accnt Release-Transit Loss		0	0	0	100	100	100	0	0	0	0	0	0	300
50	Consumable Water in John Martin (combination of Offset Account, Article II Accounts or Offset Credit at the Stateline)		0	0	0	0	0	0	579	1,224	1,001	831	734	802	5,171
51	**Sub-Total**		**1,361**	**1,930**	**2,351**	**2,380**	**1,978**	**1,026**	**888**	**1,339**	**1,026**	**855**	**754**	**903**	**16,791**
52	**Total Replacement Sources**		**1,706**	**2,662**	**3,500**	**3,882**	**3,790**	**2,966**	**2,683**	**1,447**	**1,118**	**934**	**824**	**980**	**26,492**

			IN-STATE ACCOUNTING												**Total**
Row	Item		Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-Mar
53	Total of Replacement Sources (+)		1,455	2,013	2,535	2,703	2,606	2,208	1,798	223	117	103	91	179	16,029
54	Credit From Last Month (+)		0	0	0	0	0	0	0	0	0	0	0	0	0
55	Total Replacement Obligation (-)		344	732	1,150	1,502	1,812	1,940	1,795	108	92	79	70	77	9,701
56	In-State Credits delivered below Buffalo Canal		1,108	1,277	1,382	1,198	791	265	0	115	25	24	20	101	6,307
57	In State Credit Lost due to One Month Carry Forward Limit (-)		0	0	0	0	0	0	0	0	0	0	0	0	0
58	Transit Loss for Month (-)		3	3	3	3	3	3	3	0	0	0	0	0	21
59	Debit From Last Month (-)		0	0	0	0	0	0	0	0	0	0	0	0	0
60	Balance - Sum of (+) and (-) in above rows		0	0	0	0	0	0	0	0	0	0	0	0	
61	Credit Carried Forward to Next Month	0	0	0	0	0	0	0	0	0	0	0	0	0	
62	Debit Carried Forward to Next Month	0	0	0	0	0	0	0	0	0	0	0	0	0	

			STATELINE ACCOUNTING												**Total**
Row	Item		Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-Mar
63	Total of Replacement Sources (+)		1,361	1,930	2,351	2,380	1,978	1,026	888	1,339	1,026	855	754	903	16,791
64	Credit From Last Month (+)		0	1,113	1,928	2,349	2,378	1,976	836	0	0	0	0	0	10,579
65	Total Replacement Obligation (-)		246	696	1,093	1,525	2,105	2,164	1,722	1,339	1,026	855	754	903	14,429
66	Stateline Credit Delivered to Stateline (-)		0	417	835	823	273	0	0	0	0	0	0	0	2,348
67	Transit Loss for Month (-)		2	2	2	2	2	2	2	0	0	0	0	0	14
68	Debit From Last Month (-)		0	0	0	0	0	0	0	0	0	0	0	0	0
69	Balance - Sum of (+) and (-) in above rows		1,113	1,928	2,349	2,378	1,976	836	0	0	0	0	0	0	
70	Credit Carried Forward to Next Month	0	1,113	1,928	2,349	2,378	1,976	836	0	0	0	0	0	0	
71	Debit Carried Forward to Next Month	0	0	0	0	0	0	0	0	0	0	0	0	0	

Table 8b - Consumable Water Delivered for Replacement Purposes for Pumping April 2019 through March 2020

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

(values in ac-ft)

			CONSUMABLE WATER IN JOHN MARTIN												Total
Row	Item		Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-Mar
72	Offset account Inflow from Highland		402	446	670	857	1,021	474	116	0	0	0	0	0	3,986
73	Keesee Direct Flow		137	219	202	260	237	207	149	0	0	0	0	0	1,411
74	Account Inflow from Article II Water		1,653	0	0	0	0	0	0	0	0	0	0	647	2,300
75	This Month Depletions paid with CU Account		161	140	0	37	66	135	643	1,463	1,312	1,143	1,022	999	7,121
76	Evap Loss and other Losses		217	217	217	217	217	217	217	106	28	25	48	90	1,818
77	End of Month Storage	9,303	11,117	11,842	13,331	15,018	16,265	16,594	15,998	14,428	13,088	11,920	10,850	10,408	

Row Explanations

1. In-State river replacement obligation from well pumping in LAWMA's 2019 Rule 14 plan.
2. In-State river replacement obligation from well pumping from LAWMA's 2019 augmentation plan.
3. In-State river replacement obligation from well pumping from LAWMA's 2019 SWSPs using LAWMA shares.
4. Equals Sum of Rows 1 through 3
5. Stateline river replacement obligation from well pumping in LAWMA's 2019 Rule 14 plan.
6. Stateline river replacement obligation from well pumping in LAWMA's 2019 augmentation plan.
7. Stateline river replacement obligation from well pumping in LAWMA's 2019 SWSPs using LAWMA shares.
8. The amount of water delivered to the Offset Account / Charge Sub-Account for the establishment of the 2019 Offset Account.
9. Sum of Rows 5 through 8
10. Sum of Row 4 and Row 9
11. Fry-Ark Return flows purchased from SECWCD for 2019 and return flows from 2018 Fort Lyon Canal project water delivered in 2019.
12. Estimated yield of the Highland Canal water right changed in Case No. 02CW181. Yield estimated at 100% of average.
13. Estimated yield of the Highland Canal water right changed in Case No. 10CW85. Yield estimated at 100% of average.
14. Estimated transit loss for Highland Canal water measured at the Purgatoire River below the Highland Dam to the Purgatoire River near Las Animas as calculated by the DEO.
15. Fort Lyon Canal water delivered through various augmentation stations and recharge sites. Yield estimated at 100% of average. USED IN RULE 14 PLAN ONLY.
16. Fort Lyon Canal water delivered through the Farm 60 Recharge site.
17. Fort Lyon Canal water delivered through the Horse Creek Augmentation Station.
18. Fort Lyon Canal water delivered through the Farm 27 Augmentation Station.
19. Fort Lyon Canal water delivered through the Farm 36 Augmentation Station.
20. Fort Lyon Canal water delivered through the Farm 132/133 Augmentation Station.
21. Fort Lyon Canal water delivered through the Farm 132/133 Recharge Site.
22. Fort Lyon Canal water delivered through the Limestone Creek Augmentation Station.
23. Fort Lyon Canal water delivered through the Farm 65 Recharge Site.
24. Fort Lyon Canal water delivered through the Mclave Lateral Augmentation Station.
25. Fort Lyon Canal water delivered through the Graveyard Creek Augmentation Station.
26. Fort Lyon Canal water delivered through the Riverview Drain Augmentation Station.
27. Fort Lyon Canal water delivered through the Farm 110 Recharge Site.
28. Fort Lyon Canal water delivered through the Farm 63b Recharge Site.
29. Fort Lyon Canal water delivered through the Wheatridge Augmentation Station.
30. One half of the Keesee Ditch water rights changed in Case No. 05CW52 delivered to the river. Yield estimated at 100% of average.
31. Fort Bent Ditch water delivered to the Fort Bent Augmentation station from Fort Bent shares changed in Case No. 02CW181. Yield estimated at 100% of average.
32. Fort Bent Ditch water delivered to the Fort Bent Augmentation station from Fort Bent shares changed in Case No. 10CW85. Yield estimated at 100% of average.
33. Fort Bent Ditch water delivered to the Fort Bent augmentation station in pending Case No. 17CW3068. Yield estimated at 100% of average. USED IN RULE 14 PLAN ONLY
34. Excess credits from the City of Lamar's Rule 14 and Augmentation Plan. USED IN RULE 14 PLAN ONLY
35. Lamar Canal water delivered to the Lamar Canal augmentation stations changed in Case No. 02CW181. Yield estimated at 100% of average.
36. Lamar Canal water delivered to the Lamar Canal augmentation stations in Case No. 15CW3067. Yield estimated at 100% of average. USED IN RULE 14 PLAN ONLY
37. Consumable water delivered from the West Farm Gravel pit.
38. Manvel Article II water released from John Martin Reservoir and delivered to the Lamar Canal for delivery through the West Farm Augmentation Station.
39. Miscellaneous Other Supplies for example the Busk-Ivanhoe lagged return flows LAWMA acquired in 2013 that has a residual return flow amount in 2019.
40. Release of Article II account water from John Martin Reservoir to meet an outstanding replacement obligations from Row 3
41. Sum of Rows 11 through 40
42. Consumptive use credits not used to replace in-state replacement obligations. Row 41 - Row 4
43. Lamar Canal water delivered to the Lamar Canal augmentation stations in Case No. 15CW3067. Yield estimated at 100% of average. USED IN RULE 14 PLAN ONLY

Table 8b - Consumable Water Delivered for Replacement Purposes for Pumping April 2019 through March 2020

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

(values in ac-ft)

44 Estimated yield of the 67 / 69 cfs of the X-Y Ditch direct flow water right changed in Case No. 02CW181. Yield estimated at 100% of average.
45 Estimated yield of 2.0 / 69 cfs of the X-Y Ditch direct flow water rights in Case No. 15CW3067. Yield estimated at 100% of average. USED IN RULE 14 PLAN ONLY
46 Estimated yield of the Manvel Ditch direct flow water right changed in Case No. 02CW181. Estimated yield based on volumetric limits.
47 Estimated yield of the Stubbs Ditch direct flow water right changed in Case No. 02CW181. Estimated yield based on Colorado-Kansas Agreement regarding Sisson-Stubbs water rights.
48 Estimated yield of the Sisson Ditch direct flow water right changed in Case No. 10CW85. Estimated yield based on Colorado-Kansas Agreement regarding Sisson-Stubbs water rights.
49 Transit loss credits calculated from delivery of the Offset Account consumable water to the Stateline. Estimated yield based on past Offset Account deliveries.
50 Use of water delivered to the Stateline from the Offset Account, Article II Account releases or use of Stateline Credits already delivered to the Offset Account to meet Stateline Replacement Obligations. It should be noted that this total is typically used during the non-irrigation season.
51 Sum of Rows 42 through 50
52 Calculated as Row 41 + Row 51 - Row 42. Excess in-state credits is removed from the total to not account for in-state credits twice.
53 Calculated from Row 41
54 Calculated from previous month Row 61
55 Calculated from Row 4
56 Calculated as Row 53 - Row 55 - Row 58
57 Calculated as the maximum of the previous month Row 61 - Row 4 or zero.
58 Estimated transits loss of delivery of consumptive use credits. Estimate from previous years deliveries.
59 Calculated from previous month Row 62
60 Calculated as Row 53 + Row 54 - Row 55 - Row 56 - Row 57 - Row 58 - Row 59
61 Calculated as the maximum of Row 60 or zero.
62 Calculated as the minimum of Row 60 or zero.
63 Calculated as Row 51
64 Calculated from previous month Row 70
65 Calculated from Row 9
66 Calculated as maximum of previous month Row 70 - Row 9 or zero.
67 Estimated transits loss of delivery of consumptive use credits. Estimate from previous years deliveries.
68 Calculated from previous month Row 71
69 Calculated as Row 63 + Row 64 - Row 65 - Row 66 - Row 67 - Row 68
70 Calculated as the maximum of Row 69 or zero.
71 Calculated as the minimum of Row 69 or zero.
72 Estimated yield of the Highland Canal water right changed in Case No. 02CW181 not used for in-state replacement. Yield estimated at 100% of average.
73 Estimated yield of one half of the Keesee Ditch water rights changed in Case No. 02CW181 delivered to the Offset Account. Yield estimated at 100% of average.
74 Estimated accrual of water into John Martin Reservoir Article II accounts owned by LAWMA.
75 The amount of water delivered from the Article II accounts, Offset Account to the Stateline during the year, or Stateline Credits from previous years Offset Account deliveries.
76 Estimated evaporation and other transit losses for delivery of storage water.
77 End of month storage amount that includes Article II accounts, Offset Account water to the Stateline during the year, or Stateline Credits from previous years Offset Account deliveries.

TABLE 9
POST PLAN 2019 REPLACEMENT REQUIREMENTS
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION
(values in ac-ft)

River Reach	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	Total	Apr 20 - Oct 20 Total	Nov 20 - Mar 21 Total
REPLACEMENT REQUIREMENTS - 2020															
Las Animas to John Martin Dam 1)	57.2	49.2	43.3	38.7	35.0	31.9	29.2	26.9	24.9	23.1	21.6	20.1	401.2	284.5	116.7
John Martin Dam to Lamar Canal 2)	643.4	498.8	422.5	367.1	323.5	287.9	257.9	37.2	34.6	32.3	30.2	28.3	2,963.8	2,801.1	162.7
Lamar Canal to Buffalo Canal 3)	454.7	401.2	354.7	316.9	286.0	260.0	237.9	68.6	63.1	58.2	53.9	50.0	2,605.0	2,311.3	293.7
Buffalo Canal to Stateline 4)	787.8	614.0	522.1	456.6	405.0	362.3	326.3	125.9	114.6	104.8	96.1	88.5	4,004.0	3,474.1	529.9
Instate Replacement Requirement	1,155.2	949.2	820.5	722.8	644.5	579.8	525.0	26.9	24.9	23.1	21.6	20.1	5,513.7	5,397.0	116.7
Stateline Replacement Requirement	787.8	614.0	522.1	456.6	405.0	362.3	326.3	231.7	212.3	195.3	180.2	166.8	4,460.3	3,474.1	986.2
Total Replacement Requirement	1,943.0	1,563.2	1,342.6	1,179.4	1,049.5	942.2	851.3	258.6	237.3	218.4	201.8	186.9	9,974.0	8,871.1	1,102.9
REPLACEMENT SOURCES - 2020															
Instate Replacement Sources															
Fry-Ark Project Water Return Flows	33.2	30.8	28.7	26.9	25.2	23.9	22.6	21.6	20.5	19.6	18.8	18.0	289.8	191.3	98.5
Highland Canal Direct Flow (Spady Shares)	19.9	25.7	38.8	49.7	59.1	27.7	7.2	0.0	0.0	0.0	0.0	0.0	227.9	227.9	0.0
Highland Ditch Transit Loss	10.0	10.0	10.0	10.0	10.0	10.0	10.0	0.0	0.0	0.0	0.0	0.0	70.0	70.0	0.0
Fort Lyon Canal Aug Stations & Recharge	957.9	1,247.9	1,595.8	1,402.5	1,141.0	697.8	459.3	261.4	0.0	0.0	0.0	236.8	8,000.4	7,502.3	498.2
Fort Bent-LAWMA Aug Station	86.5	117.1	143.8	165.9	148.5	99.2	65.8	0.0	0.0	0.0	0.0	0.0	826.8	826.8	0.0
Lamar shares at Aug Station(s) abv Buffalo	1,022.9	1,240.3	1,615.9	1,673.7	1,402.5	1,082.9	847.0	0.0	0.0	0.0	0.0	0.0	8,885.2	8,885.2	0.0
Manvel Article II at Lamar Aug Station(s)	0.0	0.0	0.0	0.0	0.0	100.0	100.0	0.0	0.0	0.0	0.0	0.0	200.0	200.0	0.0
Sub-Total	2,130.4	2,671.8	3,433.0	3,328.7	2,786.3	2,041.4	1,512.0	283.0	20.5	19.6	18.8	254.8	18,500.1	17,903.5	596.7
Stateline Replacement Sources													0.0	0.0	0.0
Lamar shares at Aug Station(s) blw Buffalo	233.9	283.6	369.5	382.7	320.7	247.6	193.7	0.0	0.0	0.0	0.0	0.0	2,031.6	2,031.6	0.0
X-Y Ditch Direct Flow	317.8	454.0	506.2	563.4	662.3	520.9	379.1	0.0	0.0	0.0	0.0	0.0	3,403.5	3,403.5	0.0
Manvel Ditch Direct Flow	50.0	50.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	150.0	150.0	0.0
Stubbs Ditch Direct Flow	36.0	36.0	36.0	36.0	36.0	36.0	36.0	0.0	0.0	0.0	0.0	0.0	252.0	252.0	0.0
Sisson Ditch Direct Flow	36.0	36.0	36.0	36.0	36.0	36.0	36.0	0.0	0.0	0.0	0.0	0.0	252.0	252.0	0.0
Offset Accnt Release-Transit Loss	0.0	0.0	0.0	150.0	150.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	300.0	300.0	0.0
Stateline Credit	348.0	38.0	0.0	0.0	0.0	0.0	0.0	231.7	212.3	195.3	180.2	166.8	1,372.3	386.0	986.2
Sub-Total	1,021.7	897.6	997.7	1,168.1	1,205.0	840.5	644.7	231.7	212.3	195.3	180.2	166.8	7,761.4	6,775.2	986.2
Consumable Article II Inflow													0.0	0.0	0.0
Offset Account Delivery - Highland	402.2	446.1	670.1	857.1	1,021.0	473.7	115.7	0.0	0.0	0.0	0.0	0.0	3,985.9	3,985.9	0.0
Offset Account Delivery - Keesee I & II	365.7	569.8	553.1	703.8	678.7	637.1	517.8	0.0	0.0	0.0	0.0	0.0	4,026.0	4,026.0	0.0
Total Replacement Sources	3,919.9	4,585.4	5,653.8	6,057.7	5,690.9	3,992.7	2,790.2	514.6	232.9	214.9	199.0	421.6	34,273.5	32,690.6	1,582.9

TABLE 9
POST PLAN 2019 REPLACEMENT REQUIREMENTS
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

(values in ac-ft)

River Reach	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Total	Apr 21 - Oct 21 Total	Nov 21 - Mar 22 Total
REPLACEMENT REQUIREMENTS - 2021															
Las Animas to John Martin Dam 1)	18.8	17.7	16.6	15.7	14.8	14.0	13.2	12.5	11.9	11.3	10.7	10.2	167.4	110.7	56.6
John Martin Dam to Lamar Canal 2)	143.7	131.7	120.8	111.1	102.3	94.4	87.3	17.5	16.5	15.5	14.7	13.8	869.3	791.4	77.9
Lamar Canal to Buffalo Canal 3)	149.9	140.0	130.9	122.5	114.8	107.7	101.2	29.3	27.5	25.9	24.4	23.0	997.3	867.1	130.2
Buffalo Canal to Stateline 4)	191.8	177.9	165.5	154.4	144.2	135.1	126.7	50.7	47.8	45.1	42.6	40.3	1,322.3	1,095.6	226.7
Instate Replacement Requirement	312.5	289.3	268.3	249.3	231.9	216.1	201.7	12.5	11.9	11.3	10.7	10.2	1,825.8	1,769.2	56.6
Stateline Replacement Requirement	191.8	177.9	165.5	154.4	144.2	135.1	126.7	97.5	91.8	86.6	81.7	77.2	1,530.4	1,095.6	434.8
Total Replacement Requirement	504.3	467.2	433.8	403.7	376.2	351.2	328.5	110.0	103.7	97.8	92.4	87.4	3,356.2	2,864.8	491.4
REPLACEMENT SOURCES - 2021															
Instate Replacement Sources															
Fry-Ark Project Water Return Flows	33.2	30.8	28.7	26.9	25.2	23.9	22.6	13.3	12.8	12.4	12.0	11.7	253.6	191.3	62.2
Highland Canal Direct Flow (Spady Shares)	19.9	25.7	38.8	49.7	59.1	27.7	7.2	0.0	0.0	0.0	0.0	0.0	227.9	227.9	0.0
Highland Ditch Transit Loss	10.0	10.0	10.0	10.0	10.0	10.0	10.0	0.0	0.0	0.0	0.0	0.0	70.0	70.0	0.0
Fort Lyon Canal Aug Stations & Recharge	957.9	1,247.9	1,595.8	1,402.5	1,141.0	697.8	459.3	261.4	0.0	0.0	0.0	236.8	8,000.4	7,502.3	498.2
Fort Bent-LAWMA Aug Station	86.5	117.1	143.8	165.9	148.5	99.2	65.8	0.0	0.0	0.0	0.0	0.0	826.8	826.8	0.0
Lamar shares at Aug Station(s) abv Buffalo	1,022.9	1,240.3	1,615.9	1,673.7	1,402.5	1,082.9	847.0	0.0	0.0	0.0	0.0	0.0	8,885.2	8,885.2	0.0
Manvel Article II at Lamar Aug Station(s)	0.0	0.0	0.0	0.0	0.0	100.0	100.0	0.0	0.0	0.0	0.0	0.0	200.0	200.0	0.0
Sub-Total	2,130.4	2,671.8	3,433.0	3,328.7	2,786.3	2,041.4	1,512.0	274.7	12.8	12.4	12.0	248.5	18,463.9	17,903.5	560.4
Stateline Replacement Sources													0.0	0.0	0.0
Lamar shares at Aug Station(s) blw Buffalo	233.9	283.6	369.5	382.7	320.7	247.6	193.7	0.0	0.0	0.0	0.0	0.0	2,031.6	2,031.6	0.0
X-Y Ditch Direct Flow	317.8	454.0	506.2	563.4	662.3	520.9	379.1	0.0	0.0	0.0	0.0	0.0	3,403.5	3,403.5	0.0
Manvel Ditch Direct Flow	50.0	50.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	150.0	150.0	0.0
Stubbs Ditch Direct Flow	36.0	36.0	36.0	36.0	36.0	36.0	36.0	0.0	0.0	0.0	0.0	0.0	252.0	252.0	0.0
Sisson Ditch Direct Flow	36.0	36.0	36.0	36.0	36.0	36.0	36.0	0.0	0.0	0.0	0.0	0.0	252.0	252.0	0.0
Offset Accnt Release-Transit Loss	0.0	0.0	0.0	150.0	150.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	300.0	300.0	0.0
Stateline Credit	0.0	0.0	0.0	0.0	0.0	0.0	0.0	97.5	91.8	86.6	81.7	77.2	434.8	0.0	434.8
Sub-Total	673.7	859.6	997.7	1,168.1	1,205.0	840.5	644.7	97.5	91.8	86.6	81.7	77.2	6,823.9	6,389.2	434.8
Offset Account Delivery - Highland	402.2	446.1	670.1	857.1	1,021.0	473.7	115.7	0.0	0.0	0.0	0.0	0.0	3,985.9	3,985.9	0.0
Offset Account Delivery - Keesee I & II	365.7	569.8	553.1	703.8	678.7	637.1	517.8	0.0	0.0	0.0	0.0	0.0	4,026.0	4,026.0	0.0
Total Replacement Sources	3,571.9	4,547.3	5,653.8	6,057.7	5,690.9	3,992.7	2,790.2	372.2	104.7	99.0	93.7	325.6	33,299.7	32,304.5	995.2

TABLE 9
POST PLAN 2019 REPLACEMENT REQUIREMENTS
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION
(values in ac-ft)

REPLACEMENT REQUIREMENTS - 2022															
River Reach	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	**Total**	**Apr 22 - Oct 22 Total**	**Nov 22 - Mar 23 Total**
Las Animas to John Martin Dam 1)	9.7	9.3	8.9	8.5	8.1	7.8	7.4	7.1	6.8	6.6	6.3	6.1	92.6	59.7	32.9
John Martin Dam to Lamar Canal 2)	55.8	52.1	48.7	45.6	42.7	40.1	37.7	9.1	8.6	8.2	7.8	7.4	363.8	322.9	41.0
Lamar Canal to Buffalo Canal 3)	70.6	66.7	63.0	59.6	56.4	53.4	50.6	14.8	14.0	13.3	12.7	12.0	487.1	420.3	66.9
Buffalo Canal to Stateline 4)	89.6	84.9	80.6	76.5	72.7	69.2	65.8	26.7	25.5	24.3	23.1	22.1	660.9	539.2	121.7
Instate Replacement Requirement	136.2	128.1	120.6	113.6	107.2	101.3	95.8	7.1	6.8	6.6	6.3	6.1	835.8	802.8	32.9
Stateline Replacement Requirement	89.6	84.9	80.6	76.5	72.7	69.2	65.8	50.6	48.1	45.7	43.6	41.6	768.7	539.2	229.5
Total Replacement Requirement	225.7	213.1	201.3	190.1	179.9	170.5	161.5	57.7	54.9	52.3	49.9	47.6	1,604.5	1,342.0	262.4
REPLACEMENT SOURCES - 2022															
Instate Replacement Sources															
Fry-Ark Project Water Return Flows	33.2	30.8	28.7	26.9	25.2	23.9	22.6	9.3	9.1	8.8	8.6	8.4	235.5	191.3	44.2
Highland Canal Direct Flow (Spady Shares)	19.9	25.7	38.8	49.7	59.1	27.7	7.2	0.0	0.0	0.0	0.0	0.0	227.9	227.9	0.0
Highland Ditch Transit Loss	10.0	10.0	10.0	10.0	10.0	10.0	10.0	0.0	0.0	0.0	0.0	0.0	70.0	70.0	0.0
Fort Lyon Canal Aug Stations & Recharge	957.9	1,247.9	1,595.8	1,402.5	1,141.0	697.8	459.3	261.4	0.0	0.0	0.0	236.8	8,000.4	7,502.3	498.2
Fort Bent-LAWMA Aug Station	86.5	117.1	143.8	165.9	148.5	99.2	65.8	0.0	0.0	0.0	0.0	0.0	826.8	826.8	0.0
Lamar shares at Aug Station(s) abv Buffalo	1,022.9	1,240.3	1,615.9	1,673.7	1,402.5	1,082.9	847.0	0.0	0.0	0.0	0.0	0.0	8,885.2	8,885.2	0.0
Manvel Article II at Lamar Aug Station(s)	0.0	0.0	0.0	0.0	0.0	100.0	100.0	0.0	0.0	0.0	0.0	0.0	200.0	200.0	0.0
Sub-Total	2,130.4	2,671.8	3,433.0	3,328.7	2,786.3	2,041.4	1,512.0	270.7	9.1	8.8	8.6	245.2	18,445.9	17,903.5	542.4
Stateline Replacement Sources													0.0	0.0	0.0
Lamar shares at Aug Station(s) blw Buffalo	233.9	283.6	369.5	382.7	320.7	247.6	193.7	0.0	0.0	0.0	0.0	0.0	2,031.6	2,031.6	0.0
X-Y Ditch Direct Flow	317.8	454.0	506.2	563.4	662.3	520.9	379.1	0.0	0.0	0.0	0.0	0.0	3,403.5	3,403.5	0.0
Manvel Ditch Direct Flow	50.0	50.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	150.0	150.0	0.0
Stubbs Ditch Direct Flow	36.0	36.0	36.0	36.0	36.0	36.0	36.0	0.0	0.0	0.0	0.0	0.0	252.0	252.0	0.0
Sisson Ditch Direct Flow	36.0	36.0	36.0	36.0	36.0	36.0	36.0	0.0	0.0	0.0	0.0	0.0	252.0	252.0	0.0
Offset Accnt Release-Transit Loss	0.0	0.0	0.0	150.0	150.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	300.0	300.0	0.0
Stateline Credit	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.6	48.1	45.7	43.6	41.6	229.5	0.0	229.5
Sub-Total	673.7	859.6	997.7	1,168.1	1,205.0	840.5	644.7	50.6	48.1	45.7	43.6	41.6	6,618.7	6,389.2	229.5
Offset Account Delivery - Highland	402.2	446.1	670.1	857.1	1,021.0	473.7	115.7	0.0	0.0	0.0	0.0	0.0	3,985.9	3,985.9	0.0
Offset Account Delivery - Keesee I & II	365.7	569.8	553.1	703.8	678.7	637.1	517.8	0.0	0.0	0.0	0.0	0.0	4,026.0	4,026.0	0.0
Total Replacement Sources	3,571.9	4,547.3	5,653.8	6,057.7	5,690.9	3,992.7	2,790.2	321.3	57.2	54.6	52.2	286.7	33,076.4	32,304.5	771.9

TABLE 9
POST PLAN 2019 REPLACEMENT REQUIREMENTS
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION
(values in ac-ft)

River Reach	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Total	Apr 23 - Oct 23 Total	Nov 23 - Mar 24 Total
REPLACEMENT REQUIREMENTS - 2023															
Las Animas to John Martin Dam 1)	5.8	5.6	5.4	5.2	5.0	4.8	4.7	4.5	4.3	4.2	4.0	3.9	57.6	36.6	21.0
John Martin Dam to Lamar Canal 2)	26.2	24.7	23.4	22.2	21.0	20.0	19.0	5.1	4.9	4.7	4.5	4.3	179.9	156.4	23.5
Lamar Canal to Buffalo Canal 3)	37.0	35.2	33.5	31.9	30.4	29.0	27.7	8.2	7.9	7.5	7.2	6.9	262.4	224.7	37.7
Buffalo Canal to Stateline 4)	49.7	47.6	45.6	43.5	41.6	39.9	38.2	15.6	14.9	14.3	13.7	13.1	377.6	306.0	71.6
Instate Replacement Requirement	69.0	65.6	62.3	59.3	56.4	53.8	51.3	4.5	4.3	4.2	4.0	3.9	438.7	417.7	21.0
Stateline Replacement Requirement	49.7	47.6	45.6	43.5	41.6	39.9	38.2	28.9	27.7	26.5	25.4	24.3	438.8	306.0	132.8
Total Replacement Requirement	118.7	113.1	107.9	102.8	98.0	93.7	89.5	33.4	32.0	30.7	29.4	28.2	877.5	723.8	153.7
REPLACEMENT SOURCES - 2023															
Instate Replacement Sources															
Fry-Ark Project Water Return Flows	33.2	30.8	28.7	26.9	25.2	23.9	22.6	6.7	6.5	6.4	6.3	6.1	223.3	191.3	32.0
Highland Canal Direct Flow (Spady Shares)	19.9	25.7	38.8	49.7	59.1	27.7	7.2	0.0	0.0	0.0	0.0	0.0	227.9	227.9	0.0
Highland Ditch Transit Loss	10.0	10.0	10.0	10.0	10.0	10.0	10.0	0.0	0.0	0.0	0.0	0.0	70.0	70.0	0.0
Fort Lyon Canal Aug Stations & Recharge	957.9	1,247.9	1,595.8	1,402.5	1,141.0	697.8	459.3	261.4	0.0	0.0	0.0	236.8	8,000.4	7,502.3	498.2
Fort Bent-LAWMA Aug Station	86.5	117.1	143.8	165.9	148.5	99.2	65.8	0.0	0.0	0.0	0.0	0.0	826.8	826.8	0.0
Lamar shares at Aug Station(s) abv Buffalo	1,022.9	1,240.3	1,615.9	1,673.7	1,402.5	1,082.9	847.0	0.0	0.0	0.0	0.0	0.0	8,885.2	8,885.2	0.0
Manvel Article II at Lamar Aug Station(s)	0.0	0.0	0.0	0.0	0.0	100.0	100.0	0.0	0.0	0.0	0.0	0.0	200.0	200.0	0.0
Sub-Total	2,130.4	2,671.8	3,433.0	3,328.7	2,786.3	2,041.4	1,512.0	268.1	6.5	6.4	6.3	242.9	18,433.7	17,903.5	530.2
Stateline Replacement Sources													0.0	0.0	0.0
Lamar shares at Aug Station(s) blw Buffalo	233.9	283.6	369.5	382.7	320.7	247.6	193.7	0.0	0.0	0.0	0.0	0.0	2,031.6	2,031.6	0.0
X-Y Ditch Direct Flow	317.8	454.0	506.2	563.4	662.3	520.9	379.1	0.0	0.0	0.0	0.0	0.0	3,403.5	3,403.5	0.0
Manvel Ditch Direct Flow	50.0	50.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	150.0	150.0	0.0
Stubbs Ditch Direct Flow	36.0	36.0	36.0	36.0	36.0	36.0	36.0	0.0	0.0	0.0	0.0	0.0	252.0	252.0	0.0
Sisson Ditch Direct Flow	36.0	36.0	36.0	36.0	36.0	36.0	36.0	0.0	0.0	0.0	0.0	0.0	252.0	252.0	0.0
Offset Accnt Release-Transit Loss	0.0	0.0	0.0	150.0	150.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	300.0	300.0	0.0
Stateline Credit	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.9	27.7	26.5	25.4	24.3	132.8	0.0	132.8
Sub-Total	673.7	859.6	997.7	1,168.1	1,205.0	840.5	644.7	28.9	27.7	26.5	25.4	24.3	6,521.9	6,389.2	132.8
Offset Account Delivery - Highland	402.2	446.1	670.1	857.1	1,021.0	473.7	115.7	0.0	0.0	0.0	0.0	0.0	3,985.9	3,985.9	0.0
Offset Account Delivery - Keesee I & II	365.7	569.8	553.1	703.8	678.7	637.1	517.8	0.0	0.0	0.0	0.0	0.0	4,026.0	4,026.0	0.0
Total Replacement Sources	3,571.9	4,547.3	5,653.8	6,057.7	5,690.9	3,992.7	2,790.2	297.1	34.2	32.9	31.6	267.1	32,967.5	32,304.5	662.9

TABLE 9
POST PLAN 2019 REPLACEMENT REQUIREMENTS
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION
(values in ac-ft)

River Reach	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Total	Apr 24 - Oct 24 Total	Nov 24 - Mar 25 Total
REPLACEMENT REQUIREMENTS - 2024															
Las Animas to John Martin Dam 1)	3.8	3.6	3.5	3.4	3.3	3.2	3.1	3.0	2.9	2.8	2.7	2.6	37.9	23.9	14.0
John Martin Dam to Lamar Canal 2)	14.1	13.5	12.9	12.3	11.8	11.3	10.9	3.1	3.0	2.9	2.8	2.7	101.4	86.9	14.5
Lamar Canal to Buffalo Canal 3)	21.0	20.0	19.2	18.4	17.6	16.9	16.2	4.9	4.7	4.5	4.3	4.1	151.8	129.2	22.5
Buffalo Canal to Stateline 4)	29.4	28.2	27.0	25.9	24.9	23.9	22.9	9.3	9.0	8.7	8.3	7.9	225.4	182.2	43.2
Instate Replacement Requirement	38.9	37.2	35.6	34.1	32.7	31.4	30.2	3.0	2.9	2.8	2.7	2.6	254.1	240.1	14.0
Stateline Replacement Requirement	29.4	28.2	27.0	25.9	24.9	23.9	22.9	17.3	16.7	16.1	15.4	14.7	262.4	182.2	80.2
Total Replacement Requirement	68.3	65.3	62.6	60.0	57.6	55.4	53.0	20.3	19.6	18.9	18.1	17.4	516.5	422.2	94.3
REPLACEMENT SOURCES - 2024															
Instate Replacement Sources															
Fry-Ark Project Water Return Flows	33.2	30.8	28.7	26.9	25.2	23.9	22.6	5.0	4.9	4.8	4.7	4.6	215.3	191.3	23.9
Highland Canal Direct Flow (Spady Shares)	19.9	25.7	38.8	49.7	59.1	27.7	7.2	0.0	0.0	0.0	0.0	0.0	227.9	227.9	0.0
Highland Ditch Transit Loss	10.0	10.0	10.0	10.0	10.0	10.0	10.0	0.0	0.0	0.0	0.0	0.0	70.0	70.0	0.0
Fort Lyon Canal Aug Stations & Recharge	957.9	1,247.9	1,595.8	1,402.5	1,141.0	697.8	459.3	261.4	0.0	0.0	0.0	236.8	8,000.4	7,502.3	498.2
Fort Bent-LAWMA Aug Station	86.5	117.1	143.8	165.9	148.5	99.2	65.8	0.0	0.0	0.0	0.0	0.0	826.8	826.8	0.0
Lamar shares at Aug Station(s) abv Buffalo	1,022.9	1,240.3	1,615.9	1,673.7	1,402.5	1,082.9	847.0	0.0	0.0	0.0	0.0	0.0	8,885.2	8,885.2	0.0
Manvel Article II at Lamar Aug Station(s)	0.0	0.0	0.0	0.0	0.0	100.0	100.0	0.0	0.0	0.0	0.0	0.0	200.0	200.0	0.0
Sub-Total	2,130.4	2,671.8	3,433.0	3,328.7	2,786.3	2,041.4	1,512.0	266.4	4.9	4.8	4.7	241.4	18,425.6	17,903.5	522.1
Stateline Replacement Sources													0.0	0.0	0.0
Lamar shares at Aug Station(s) blw Buffalo	233.9	283.6	369.5	382.7	320.7	247.6	193.7	0.0	0.0	0.0	0.0	0.0	2,031.6	2,031.6	0.0
X-Y Ditch Direct Flow	317.8	454.0	506.2	563.4	662.3	520.9	379.1	0.0	0.0	0.0	0.0	0.0	3,403.5	3,403.5	0.0
Manvel Ditch Direct Flow	50.0	50.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	150.0	150.0	0.0
Stubbs Ditch Direct Flow	36.0	36.0	36.0	36.0	36.0	36.0	36.0	0.0	0.0	0.0	0.0	0.0	252.0	252.0	0.0
Sisson Ditch Direct Flow	36.0	36.0	36.0	36.0	36.0	36.0	36.0	0.0	0.0	0.0	0.0	0.0	252.0	252.0	0.0
Offset Accnt Release-Transit Loss	0.0	0.0	0.0	150.0	150.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	300.0	300.0	0.0
Stateline Credit	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.3	16.7	16.1	15.4	14.7	80.2	0.0	80.2
Sub-Total	673.7	859.6	997.7	1,168.1	1,205.0	840.5	644.7	17.3	16.7	16.1	15.4	14.7	6,469.4	6,389.2	80.2
Offset Account Delivery - Highland	402.2	446.1	670.1	857.1	1,021.0	473.7	115.7	0.0	0.0	0.0	0.0	0.0	3,985.9	3,985.9	0.0
Offset Account Delivery - Keesee I & II	365.7	569.8	553.1	703.8	678.7	637.1	517.8	0.0	0.0	0.0	0.0	0.0	4,026.0	4,026.0	0.0
Total Replacement Sources	3,571.9	4,547.3	5,653.8	6,057.7	5,690.9	3,992.7	2,790.2	283.8	21.6	20.8	20.1	256.1	32,906.9	32,304.5	602.4

Notes

The above calculations assume a call on the river upstream of the Buffalo Canal Headgate April through October and average yields of LAWMA replacement sources.

1) Rch 7 + Rch 8 + Rch 9 + Rch 10 from Post Plan Table 4.

2) Apr-Oct = Rch 11 + Rch 12 + Rch 13 from Post Plan Table 4
   Nov-Mar =(Rch 11 + Rch 12 + Rch 13 from Post Plan Table 3) x .349

3) Apr-Oct = (Rch 14 + Rch 15 + Rch 16 from Post Plan Table 4) + (214 + 215 +216 from Post Plan Table 6)
   Nov-Mar = (Rch 14 + Rch 15 + Rch 16 from Post Plan Table 3) x .349

4) Apr- Oct = (Rch 17 + Rch 18 + SL from Post Plan Table 3) x .819
   Nov -Mar = (Rch 17 + Rch 18 + SL from Post Plan Table 3) x .349

Table 10
Replacement Analysis to Determine Availability of Highland Water for Permanent Pool Deliveries

Year	2019	Date	2/26/2019

Depletions

Source	In-State	Stateline	Total	Offset Account Storage	Ten Year Accntng Adjustment/	Total Depletions
Rule 14	(10,032)	(11,566)	(21,598)			
Aug Plan / SWSP	(3,048)	(7,248)	(10,296)			
Total	(13,080)	(18,814)	(31,894)	0	1,695	(30,199)

Input

Other Offset (Purchased
0

Replacements

Source	In-State			Stateline					Total Replacements
	Direct Flow	Art. II - River	Total	Direct Flow	Art. II - River	Offset Account		Total	
						Input	Credit		
Fry-Ark	1,354		1,354						1,354
Fort Lyon - Direct Flow & Recharge	1,128		1,128						1,128
Fort Lyon - Offset						3,464	2,328	2,328	2,328
Highland	70		70			4,214	2,832	2,832	2,902
Keesee	1,411		1,411			1,411	948	948	2,359
Keesee to Offset						2,104	1,414	1,414	1,414
Fort Bent	1,068		1,068						1,068
Lamar	9,103		9,103	2,065				2,065	11,168
West Farm Gravel Pit Release		750	750						750
XY				3,502		2,000	1,344	4,846	4,846
Manvel		500	500	750				750	1,250
Sisson-Stubbs				504		1,500	1,008	1,512	1,512
Transit Loss				300				300	300
Other Art. II									
Other Offset (Purchased)									
SubTotal	14,133	1,250	15,383	7,121	0	14,693	9,874	16,995	32,378
Offset Account Total on March 1st						7,454	4,698	4,698	4,698
Total	14,133	1,250	15,383	7,121		22,147	14,572	21,694	37,077
							Depl/Repl Balance		6,877

Note: Yellow = Input

Balance	In-State	Stateline	Total
Depletion	(13,080)	(18,814)	(31,894)
Replacement	15,383	23,388	38,771
Over/(Under)	2,303	4,574	6,877

Annual Target Amount for New Offset Deliveries by November 15th	8,386	>>>>>>>>>>>>
Annual Target Amount	**7,886**	
July 1st Delivery Amount	5,258	

Total Ft Lyon Credit =	4,592	
Offset Account Credit at Stateline Delivery Eff		67%

Minimum Delivery Amount - KS Delivery =<2,000	**546**	**NA**
Minimum Delivery Amount - March 1 Offset Ck	**2,546**	
Delivery Requirement	**7,886**	

Evaporation estimate against water currently in DS Consumable			
	Evaporation Adjustment March	141	
	Evaporation Adjustment April	138	
	Evaporation Adjustment May	183	
	total evaporation adjustment	462	6%

Check availability of Highland for Permanent Pool

Total Available for Offset Account	14,693
Highland available for permanent pool	4,214
Available after Highland to PP	10,479

TABLE 11
PREVIOUSLY IRRIGATED LAND TO BE DRIED UP DURING THE 2019 PLAN YEAR
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION
(all values in acres)

Parcel	Acres	Figure Showing Location	Comments
Highland Canal			
23521602	29.1	1	Potentially irrigated by wells owned by M. Spady per 15CW3014
23521603	19.8	1	Potentially irrigated by wells owned by M. Spady per 15CW3014
23521607	9.8	1	Potentially irrigated by wells owned by M. Spady per 15CW3014
23521608	31.7	1	Potentially irrigated by wells owned by M. Spady per 15CW3014
23521610	18.4	1	Potentially irrigated by wells owned by M. Spady per 15CW3014
23521611	29.8	1	Potentially irrigated by wells owned by M. Spady per 15CW3014
23521713	66.5	1	
23521809	48.1	1	
23522001	26.9	1	
23522102	101.4	1	
23522103	11.9	1	
23522104	19.1	1	
23522105	13.2	1	
23522107	28.5	1	
23522108	6.4	1	
23522109	1.2	1	
23522110	3.6	1	
23522111	17.0	1	
23522112	11.0	1	
23522113	16.1	1	
23522801	41.3	1	
23522802	22.6	1	
23522803	35.0	1	
23522804	22.4	1	
23522805	9.5	1	
23522806	9.3	1	
23522807	20.2	1	
23522808	15.8	1	
23522809	40.8	1	
23522901	10.1	1	
23522902	6.1	1	
23522903	10.4	1	
23522904	67.8	1	
23522905	30.3	1	
23522906	19.7	1	
23522907	12.0	1	
23523101	39.7	1	
23523102	56.7	1	
23523103	34.9	1	
23523104	23.8	1	
23523106	23.5	1	
23523201	26.0	1	
23523202	24.7	1	
23523203	3.9	1	
23523204	25.5	1	
23523205	39.3	1	
23523206	30.9	1	
23523207	39.4	1	

TABLE 11
PREVIOUSLY IRRIGATED LAND TO BE DRIED UP DURING THE 2019 PLAN YEAR
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

(all values in acres)

Parcel	Acres	Figure Showing Location	Comments
23523208	3.5	1	
23523209	25.5	1	
23523210	25.1	1	
23523213	25.7	1	
23523214	30.4	1	
23523215	38.3	1	
23523216	53.2	1	
23523217	27.1	1	
23523218	20.7	1	
23523219	38.3	1	
23523301	35.0	1	
23523302	25.7	1	
23523303	51.0	1	
23523304	35.5	1	
23523305	24.8	1	
23523306	14.3	1	
23523308	65.7	1	
23523309	31.9	1	
23523310	44.1	1	
23523311	28.6	1	
23523312	26.3	1	
23523314	4.0	1	
23523315	57.1	1	
24520501	27.1	1	
24520502	30.8	1	
24520503	11.7	1	
24520504	24.2	1	
24520505	19.0	1	
24520506	27.5	1	
24520507	31.4	1	
24520508	23.2	1	
24520509	22.8	1	
24520601	27.5	1	
24520602	28.7	1	
24520603	14.5	1	
24520604	17.6	1	
24520605	30.6	1	
24520607	40.3	1	
24520608	11.4	1	
24520609	42.5	1	
24520610	70.1	1	
24520612	146.9	1	
24520613	63.4	1	
24520703	33.0	1	
24520704	37.4	1	
24520705	50.4	1	
24520706	19.5	1	
24520707	8.7	1	
Total for Highland Canal	2,843.1		

TABLE 11
PREVIOUSLY IRRIGATED LAND TO BE DRIED UP DURING THE 2019 PLAN YEAR
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

(all values in acres)

Parcel	Acres	Figure Showing Location	Comments
Keesee Ditch			
22483302	25.4	2	Portion of Parcel Potentially Re-Irrigated by Well
22483303	3.9	2	Portion of Parcel Potentially Re-Irrigated by Well
22483305	23.7	2	Portion of Parcel Potentially Re-Irrigated by Well
22483403	137.4	2	Potentially Re-Irrigated by Well.
22483404	13.9	2	
22483405	18.3	2	Portion of Parcel Potentially Re-Irrigated by Well
22483406	24.3	2	Portion of Parcel Potentially Re-Irrigated by Well
22483408	38.6	2	Portion of Parcel Potentially Re-Irrigated by Well
22483409	42.1	2	Portion of Parcel Potentially Re-Irrigated by Well
22483503	18.8	2	Portion of Parcel Potentially Re-Irrigated by Well
22483504	128.4	2	Potentially Re-Irrigated by Well.
22483505	16.8	2	Portion of Parcel Potentially Re-Irrigated by Well
22483506	102.9	2	Portion of Parcel Potentially Re-Irrigated by Well
22483511	12.3	2	Portion of Parcel Potentially Re-Irrigated by Well
22483602	14.5	2	
22483603	65.2	2	
23480101	29.3	2	Portion of Parcel Potentially Re-Irrigated by Well
23480106	11.5	2	Portion of Parcel Potentially Re-Irrigated by Well
23480201	5.2	2	Portion of Parcel Potentially Re-Irrigated by Well
23480202	35.5	2	Portion of Parcel Potentially Re-Irrigated by Well
23480203	28.1	2	
23480204	11.6	2	
23480301	53.9	2	Portion of Parcel Potentially Re-Irrigated by Well
23480302	56.1	2	Portion of Parcel Potentially Re-Irrigated by Well
23480303	19.5	2	
23480304	19.1	2	
23480305	23.9	2	Portion of Parcel Potentially Re-Irrigated by Well
23480306	28.7	2	Portion of Parcel Potentially Re-Irrigated by Well
23480307	5.6	2	Portion of Parcel Potentially Re-Irrigated by Well
23480401	10.1	2	Portion of Parcel Potentially Re-Irrigated by Well
23480402	7.9	2	
23480403	134.3	2	Potentially Re-Irrigated by Well.
23480404	69.9	2	Portion of Parcel Potentially Re-Irrigated by Well
23480405	22.9	2	Portion of Parcel Potentially Re-Irrigated by Well
23480406	15.4	2	
23480407	18.7	2	Portion of Parcel Potentially Re-Irrigated by Well
23480409	35.4	2	
23480410	56.7	2	
23480412	22.5	2	Portion of Parcel Potentially Re-Irrigated by Well
23480501	128.6	2	Potentially Re-Irrigated by Well.
23480502	27.7	2	Portion of Parcel Potentially Re-Irrigated by Well
23480503	47.8	2	Portion of Parcel Potentially Re-Irrigated by Well
23480504	29.6	2	
23480505	9.3	2	Portion of Parcel Potentially Re-Irrigated by Well
23480506	147.8	2	Potentially Re-Irrigated by Well.
23480507	37.3	2	
23480508	23.1	2	

TABLE 11
PREVIOUSLY IRRIGATED LAND TO BE DRIED UP DURING THE 2019 PLAN YEAR
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

(all values in acres)

Parcel	Acres	Figure Showing Location	Comments
23480509	49.6	2	
23480513	3.1	2	Portion of Parcel Potentially Re-Irrigated by Well
23480601	10.7	2	
23480602	17.1	2	
23480603	7.9	2	
Total for Keesee Ditch	1,947.6		
Fort Bent Ditch			
22463209	14.2	3	
22463210	5.2	3	
22463604	12.3	3	
22463606	39.9	3	
22463607	27.6	3	
22463608	45.9	3	
22463612	10.7	3	
22473614	32.2	3	
22473624	15.8	3	
22473625	6.1	3	
22483601	39.3	2	Portion of Parcel Potentially Re-Irrigated by Well
22483604	15.8	2	
23450501	39.0	4	
23450502	51.5	4	
23450503	13.6	4	
23450504	79.1	4	
23450602	49.2	4	
23450606	70.3	4	
23460101	17.1	3	
23460104	15.4	3	
23460105	13.4	3	
23460106	46.7	3	
23460402	11.7	3	
23460403	2.2	3	
23460511	8.6	3	
23460512	2.0	3	
23470301	36.4	3	
23470310	53.3	3	
23470624	14.2	2	
23480205	45.1	2	
23480206	44.1	2	
Total for Fort Bent Ditch	877.8		
Lamar Canal			
22443101	7.6	4	
22443102	15.2	4	
22443103	16.3	4	
22443105	46.7	4	
22443109	11.7	4	
22443111	56.7	4	Potentially Re-Irrigated by Well.
22443201	76.4	4	Potentially Re-Irrigated by Well.

TABLE 11
PREVIOUSLY IRRIGATED LAND TO BE DRIED UP DURING THE 2019 PLAN YEAR
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

(all values in acres)

Parcel	Acres	Figure Showing Location	Comments
22443203	16.1	4	
22443204	10.2	4	
22443205	22.5	4	
22443206	23.9	4	
22443211	122.1	4	Potentially Re-Irrigated by Well.
22443214	5.8	4	
22443215	8.3	4	
22443216	23.0	4	Potentially Re-Irrigated by Well.
22443217	16.1	4	
22443218	7.1	4	
22452701	66.3	4	
22452702	45.5	4	
22452703	37.8	4	
22452704	20.6	4	
22452801	83.9	4	Portion of Parcel Potentially Re-Irrigated by Well
22452802	39.2	4	Portion of Parcel Potentially Re-Irrigated by Well
22452803	28.9	4	Portion of Parcel Potentially Re-Irrigated by Well
22452804	36.4	4	Portion of Parcel Potentially Re-Irrigated by Well
22452805	46.5	4	Portion of Parcel Potentially Re-Irrigated by Well
22452806	48.5	4	Portion of Parcel Potentially Re-Irrigated by Well
22452807	47.1	4	Portion of Parcel Potentially Re-Irrigated by Well
22453103	47.6	4	
22453104	14.0	4	
22453105	18.0	4	
22453201	32.8	4	Portion of Parcel Potentially Re-Irrigated by Well
22453202	50.4	4	
22453203	9.0	4	Portion of Parcel Potentially Re-Irrigated by Well
22453204	72.1	4	Portion of Parcel Potentially Re-Irrigated by Well
22453205	37.1	4	Portion of Parcel Potentially Re-Irrigated by Well
22453206	47.5	4	
22453207	54.5	4	
22453208	24.2	4	
22453209	46.1	4	
22453210	44.2	4	
22453211	58.5	4	
22453301	69.4	4	
22453304	39.9	4	Portion of Parcel Potentially Re-Irrigated by Well
22453305	64.5	4	Portion of Parcel Potentially Re-Irrigated by Well
22453306	31.5	4	Portion of Parcel Potentially Re-Irrigated by Well
22453307	75.3	4	Portion of Parcel Potentially Re-Irrigated by Well
22453308	47.6	4	Portion of Parcel Potentially Re-Irrigated by Well
22453309	69.8	4	
22453401	64.3	4	
22453402	50.3	4	
22453403	4.5	4	
22453404	7.2	4	
22453405	18.4	4	
22453406	23.5	4	
22453407	28.3	4	

TABLE 11
PREVIOUSLY IRRIGATED LAND TO BE DRIED UP DURING THE 2019 PLAN YEAR
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

(all values in acres)

Parcel	Acres	Figure Showing Location	Comments
22453411	18.8	4	
22453412	37.4	4	
22453413	19.5	4	
22453415	11.6	4	
22453416	14.0	4	
22453417	21.2	4	
22453418	22.8	4	
22453602	38.5	4	
22453605	8.5	4	
22453608	8.1	4	
22453613	12.6	4	
22453614	33.9	4	
22453615	6.8	4	
22453621	51.4	4	
22462504	18.5	3	
22462515	6.7	3	
22462605	11.3	3	
22462608	18.8	3	
22462609	13.4	3	
22462616	7.9	3	
22462617	12.9	3	
22462707	10.1	3	
22462711	13.8	3	
22462712	7.6	3	
22462804	5.3	3	
22462805	46.2	3	
22462808	27.5	3	
22462809	21.6	3	
22462902	149.9	3	Potentially Re-Irrigated by Well.
22462903	5.1	3	
22462904	8.4	3	
22463211	10.2	3	
22463212	5.5	3	
22463301	97.1	3	Potentially Re-Irrigated by Well.
22463302	28.7	3	Potentially Re-Irrigated by Well.
22463304	36.5	3	
22463305	45.6	3	
22463306	9.5	3	
22463307	26.9	3	
22463310	35.8	3	
22463316	32.9	3	
22463318	5.2	3	
22463319	7.7	3	
22463322	11.0	3	
22463325	5.7	3	
22463402	11.1	3	
22463405	6.4	3	
22463413	60.2	3	
22463415	16.5	3	

TABLE 11
PREVIOUSLY IRRIGATED LAND TO BE DRIED UP DURING THE 2019 PLAN YEAR
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

(all values in acres)

Parcel	Acres	Figure Showing Location	Comments
22463416	8.0	3	
22463417	8.9	3	
22463419	6.2	3	
22463501	7.4	3	
22463502	26.4	3	
22463601	7.1	3	
22463602	38.4	3	
22463603	49.8	3	
22463605	24.0	3	
22463610	8.6	3	
23440103	20.1	5	
23440105	9.1	5	
23440106	9.7	5	
23440108	7.9	5	
23440110	5.2	5	
23440111	23.2	5	
23440113	8.3	5	
23440119	9.0	5	
23440203	18.2	5	
23440204	15.1	5	
23440206	17.8	5	
23440207	31.8	5	
23440208	13.0	5	
23440209	41.4	5	
23440211	7.7	5	
23440212	11.3	5	
23440213	16.4	5	
23440214	21.8	5	
23440215	28.2	5	
23440216	35.4	5	
23440301	9.4	5	
23440302	8.4	5	
23440303	7.6	5	
23440304	8.6	5	
23440307	8.6	5	
23440309	8.1	5	
23440313	6.3	5	
23440314	6.9	5	
23440315	5.2	5	
23440318	18.8	5	
23440320	7.7	5	
23440321	11.5	5	
23440323	5.7	5	
23440324	14.8	5	
23440325	7.1	5	
23440401	10.2	4	
23440408	8.4	4	
23440412	9.7	4	
23440414	18.2	4	

TABLE 11
PREVIOUSLY IRRIGATED LAND TO BE DRIED UP DURING THE 2019 PLAN YEAR
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

(all values in acres)

Parcel	Acres	Figure Showing Location	Comments
23440417	11.8	4	
23440420	11.1	4	
23440423	5.3	4	
23440502	7.3	4	
23440503	8.2	4	
23440504	7.9	4	
23440512	13.4	4	
23441003	8.9	5	
23441004	8.4	5	
23441005	6.9	5	
23441007	21.9	5	
23441014	5.9	5	
23441015	26.1	5	
23441018	24.1	5	
23441101	20.1	5	
23441102	41.1	5	
23441103	47.3	5	
23441104	17.2	5	
23441105	17.6	5	
23441107	29.4	5	
23441109	15.6	5	
23441112	8.1	5	
23441113	12.8	5	
23441114	10.9	5	
23441118	6.0	5	
23450301	35.4	4	
23450401	39.1	4	
23450402	45.6	4	
23450405	99.9	4	
Total for Lamar Canal	4,610.1		
Manvel Canal			
22453410	83.1	4	
23440409	93.4	4	
23440505	23.2	4	
23440506	116.7	4	
23441204	13.7	5	
23450105	29.2	4	
23450106	32.8	4	
Total for Manvel Canal	392.0		
X Y Canal			
22433101	32.4	5	Potentially Re-Irrigated by Well.
22433102	30.0	5	Potentially Re-Irrigated by Well.
22433104	16.5	5	Potentially Re-Irrigated by Well.
22433105	20.0	5	Potentially Re-Irrigated by Well.
22443604	118.5	5	Potentially Re-Irrigated by Well.
22443606	39.0	5	Potentially Re-Irrigated by Well.
23430504	34.4	5	

TABLE 11
PREVIOUSLY IRRIGATED LAND TO BE DRIED UP DURING THE 2019 PLAN YEAR
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

(all values in acres)

Parcel	Acres	Figure Showing Location	Comments
23430505	53.6	5	Potentially Re-Irrigated by Well.
23430506	87.2	5	Potentially Re-Irrigated by Well.
23430507	41.4	5	Potentially Re-Irrigated by Well.
23430508	33.7	5	
23430509	51.9	5	Potentially Re-Irrigated by Well.
23430510	40.9	5	Potentially Re-Irrigated by Well.
23430511	85.0	5	
23430512	14.5	5	Potentially Re-Irrigated by Well.
23430601	54.9	5	Potentially Re-Irrigated by Well.
23430602	47.3	5	Potentially Re-Irrigated by Well.
23430603	38.4	5	
23430604	36.4	5	
23430605	43.7	5	
23430606	59.4	5	
23430607	53.7	5	
23430608	85.4	5	
23430609	65.4	5	Potentially Re-Irrigated by Well.
23430610	38.4	5	Potentially Re-Irrigated by Well.
23430612	40.2	5	Potentially Re-Irrigated by Well.
23430701	17.2	5	
23430702	14.2	5	
23430703	25.5	5	
23430704	27.0	5	
23430705	52.2	5	Potentially Re-Irrigated by Well.
23430706	15.3	5	
23430707	27.9	5	
23430708	38.9	5	
23430709	17.7	5	
23430710	18.4	5	Potentially Re-Irrigated by Well.
23430711	15.5	5	Potentially Re-Irrigated by Well.
23430712	45.6	5	
23430715	6.0	5	
23430801	58.6	5	Potentially Re-Irrigated by Well.
23430802	60.8	5	Potentially Re-Irrigated by Well.
23430803	45.9	5	Potentially Re-Irrigated by Well.
23430804	9.9	5	
23430805	36.6	5	
23430806	35.6	5	
23430807	34.0	5	
23430808	43.6	5	
23430809	28.6	5	
23430810	56.3	5	
23430811	41.2	5	
23430901	132.8	5	
23430902	36.9	5	
23430903	36.4	5	
23430904	37.3	5	
23430905	44.3	5	
23430906	75.5	5	

TABLE 11
PREVIOUSLY IRRIGATED LAND TO BE DRIED UP DURING THE 2019 PLAN YEAR
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

(all values in acres)

Parcel	Acres	Figure Showing Location	Comments
23430907	63.5	5	
23430908	74.7	5	
23430909	19.0	5	
23430910	47.8	5	
23431009	68.1	5	
23431010	102.7	5	
23431404	51.9	5	
23431501	33.2	5	
23431502	39.5	5	
23431503	47.5	5	
23431504	39.2	5	
23431505	43.0	5	
23431506	49.7	5	
23431507	73.6	5	
23431601	34.8	5	
23431602	86.9	5	
23431603	38.2	5	
23431604	26.4	5	
23431605	88.3	5	Potentially Re-Irrigated by Well.
23431607	7.5	5	
23431608	11.7	5	
23431702	16.6	5	
23432201	29.3	5	
23432202	31.0	5	
23440102	76.4	5	Potentially Re-Irrigated by Well.
23440104	14.8	5	Potentially Re-Irrigated by Well.
Total for the X-Y Canal	3,613.0		
Stubbs Ditch			
23421901	77.2	6	
23432401	119.9	6	
23421902	46.5	6	
Total for Stubbs Ditch	243.5		
Sisson Ditch			
23422001	118.9	6	Potentially Re-Irrigated by Well.
23422002	118.8	6	Potentially Re-Irrigated by Well.
Total for Sisson Ditch	237.7		
Fort Lyon Canal (Phase 1)			
22481101	48.0	11	
22481102	99.0	11	
22481103	184.3	11	
22481104	103.5	11	
22481105	27.2	11	
22481905	44.0	11	
22482603	49.8	11	
22482703	61.8	11	
22482704	13.4	11	

TABLE 11
PREVIOUSLY IRRIGATED LAND TO BE DRIED UP DURING THE 2019 PLAN YEAR
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

(all values in acres)

Parcel	Acres	Figure Showing Location	Comments
22482706	103.0	11	
22482707	24.1	11	
22482708	19.4	11	
22482709	8.3	11	
22482801	10.9	11	
22482805	5.5	11	
22482807	10.4	11	
22482808	14.9	11	
22482809	16.1	11	
22482811	9.6	11	
22482812	12.5	11	
22482814	23.4	11	
22482815	15.4	11	
22482816	5.8	11	
22482817	30.5	11	
22483202	33.3	11	
22483203	37.0	11	
22483204	42.6	11	
22483205	36.8	11	
22483207	32.2	11	
22483306	16.2	11	
22483401	16.5	11	
22491201	40.7	11	
22491202	40.5	11	
22491203	65.4	11	
22491204	24.2	11	
22491208	5.3	11	
22491209	58.3	11	
22493002	2.4	10	
22493104	14.2	10	
22493106	12.8	10	
22493107	16.3	10	
22493108	18.2	10	
22493109	18.8	10	
22493110	6.6	10	
22493111	5.1	10	
22493112	2.8	10	
22493114	47.5	10	
22493115	15.1	10	
22493116	7.8	10	
22493117	25.0	10	
22493118	5.2	10	
22493119	6.0	10	
22493120	6.4	10	
22503601	63.3	10	
22503602	14.2	10	
22503603	31.4	10	
22503604	11.1	10	
22503608	19.7	10	Part of parcel covered by 7.6 acre proposed recharge site

TABLE 11
PREVIOUSLY IRRIGATED LAND TO BE DRIED UP DURING THE 2019 PLAN YEAR
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

(all values in acres)

Parcel	Acres	Figure Showing Location	Comments
22503609	20.1	10	
22503610	13.2	10	
22503611	6.9	10	
22511401	48.0	9	
22511407	41.1	9	
22511408	12.9	9	
22511409	17.7	9	
22511410	27.4	9	
22511704	20.3	9	
22511705	9.0	9	
22511707	13.0	9	
22511708	43.0	9	
22511709	24.3	9	
22511712	5.0	9	
22511713	26.8	9	
22511714	36.7	9	
22511718	6.6	9	
22511720	3.2	9	
22511721	1.2	9	
22512009	37.6	9	
22512016	17.5	9	
22512306	19.7	9	
22512310	52.1	9	
22512311	20.5	9	
22512501	10.5	9	
22512502	35.4	9	
22512601	28.8	9	
22512602	26.2	9	
22512603	23.8	9	
22512606	9.1	9	
22512607	41.2	9	
22512608	32.0	9	
22512609	35.6	9	
22512610	36.6	9	
22512611	40.3	9	
22512613	14.3	9	
22512614	24.7	9	
22512615	31.6	9	
22512616	7.6	9	
22512617	13.8	9	
22512618	11.9	9	
22512619	42.1	9	
22512707	42.7	9	
22512708	30.3	9	
22512715	18.9	9	
22512805	28.4	9	
22512806	36.1	9	
22513107	18.2	9	
22513108	13.7	9	

TABLE 11
PREVIOUSLY IRRIGATED LAND TO BE DRIED UP DURING THE 2019 PLAN YEAR
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

(all values in acres)

Parcel	Acres	Figure Showing Location	Comments
22513109	17.8	9	
22513110	52.0	9	
22513111	52.1	9	
22513114	1.7	9	
22513115	3.2	9	
22513118	16.9	9	
22513125	16.3	9	
22513126	26.8	9	
22513401	3.6	9	
22513402	11.7	9	
22513501	31.8	9	
22513502	34.0	9	
22522903	32.7	8	
22522904	18.1	8	
22522905	36.7	8	
22522906	18.2	8	
22532301	16.5	8	
22532305	18.2	8	
22532306	33.8	8	
22532307	33.0	8	
22532308	1.7	8	
22532309	0.7	8	
22532601	19.9	8	
22532602	0.0	8	
22532603	40.8	8	
22532604	14.6	8	
22481002	153.5	11	
22481903	34.2	11	
22481904	17.1	11	
22491805	50.1	10	
22491806	20.7	10	
22491807	27.3	10	
22491808	23.5	10	
22491810	22.7	10	
22491904	15.7	10	
22491907	10.6	10	
22491908	14.7	10	
22491909	42.4	10	
22491910	19.6	10	
22491911	9.0	10	
22491912	66.7	10	
22491915	19.2	10	
22491916	19.5	10	
22491920	5.4	10	
22491921	23.2	10	
22491922	19.1	10	
22491923	17.2	10	
22491924	16.3	10	
22491925	6.0	10	

TABLE 11
PREVIOUSLY IRRIGATED LAND TO BE DRIED UP DURING THE 2019 PLAN YEAR
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

(all values in acres)

Parcel	Acres	Figure Showing Location	Comments
22492505	32.9	11	Part of parcel covered by 5.6 acre proposed recharge site
22492506	19.8	11	
22492507	12.8	11	
22492508	14.1	11	
22492512	31.2	11	Part of parcel covered by 5.6 acre proposed recharge site
22492513	45.0	11	
22493001	3.0	10	
22493101	17.7	10	
22493102	16.1	10	
22493103	12.7	10	
22493105	17.8	10	
22493113	5.5	10	
22493121	7.3	10	
22502406	44.2	10	
22502407	16.1	10	
22502408	31.4	10	
22502416	23.5	10	
23530602	15.1	7	
23530603	15.6	7	
23530610	16.3	7	
23530611	15.0	7	
23530614	1.9	7	
23541401	21.6	7	
23541402	19.1	7	Part of parcel covered by 6.5 acre proposed recharge site
23541408	7.5	7	
23541410	12.5	7	Part of parcel covered by 6.5 acre proposed recharge site
23541411	14.4	7	
23541413	24.1	7	
23541424	11.5	7	
23542901	21.0	7	
23543005	18.0	7	
23543006	31.5	7	
23543007	10.2	7	
23543011	10.2	7	
23543013	7.5	7	
Total for Fort Lyon Canal (Phase 1)	4,747.9		
Fort Lyon Canal (Phase 2)			
22470301	29.3	13	
22470309	27.3	13	
22470310	38.9	13	
22470311	25.3	13	
22471001	38.4	13	
22471003	16.7	13	
22471004	23.5	13	
22471005	35.8	13	Part of parcel covered by 11.4 acre proposed recharge site
22471006	33.6	13	Part of parcel covered by 11.4 acre proposed recharge site
22471007	13.9	13	
22471012	30.9	13	

TABLE 11
PREVIOUSLY IRRIGATED LAND TO BE DRIED UP DURING THE 2019 PLAN YEAR
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

(all values in acres)

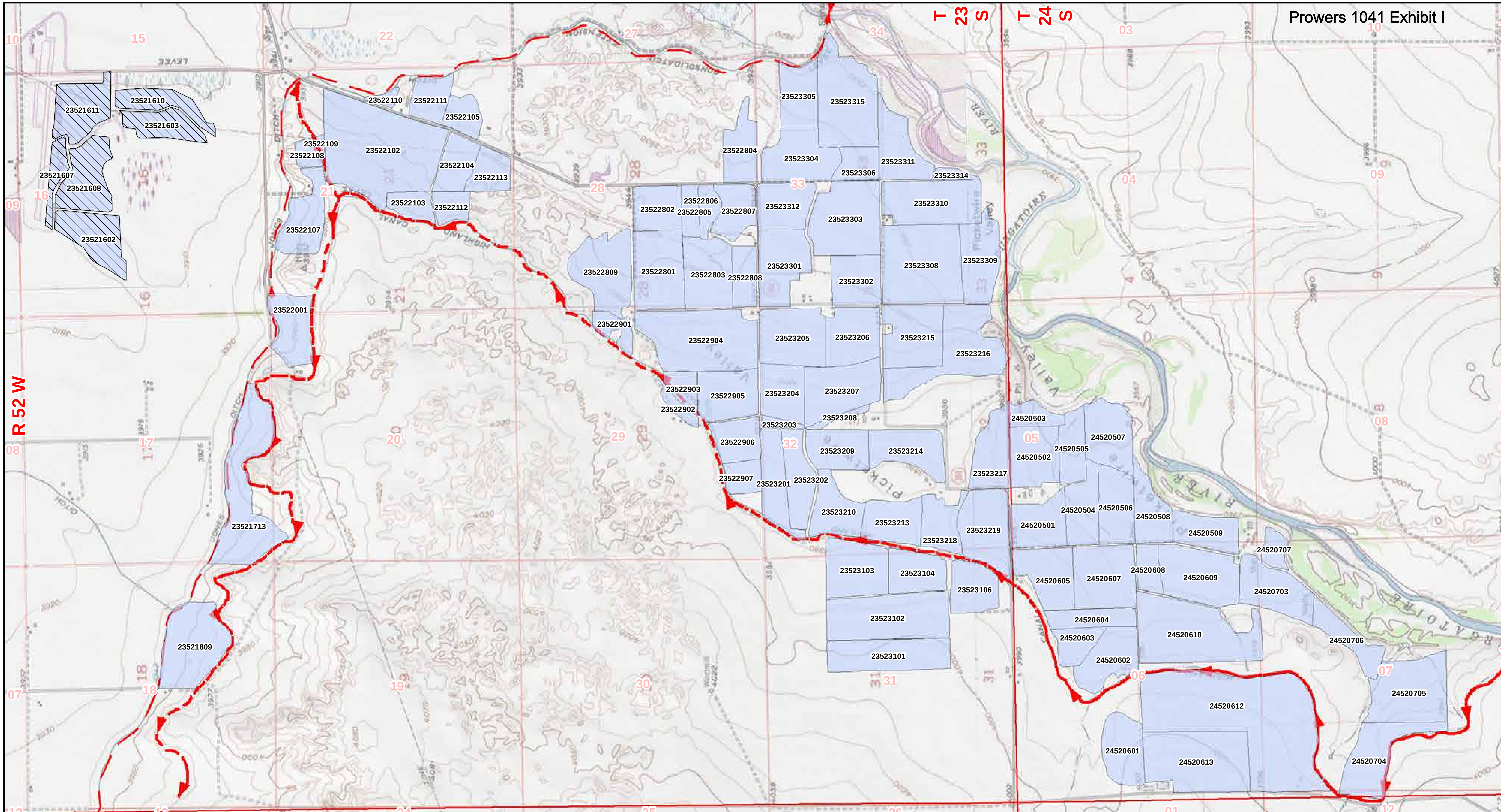
Parcel	Acres	Figure Showing Location	Comments
22471013	21.3	13	
22471014	15.9	13	
22471015	24.3	13	
22471016	12.1	13	
22471017	2.4	13	
22471020	12.6	13	Part of parcel covered by 11.4 acre proposed recharge site
22471023	19.4	13	
22471024	23.0	13	
22471025	22.2	13	
22471027	19.7	13	
22471028	12.5	13	
Total for Fort Lyon Canal (Phase 2)	499.0		
Fort Lyon Canal (Phase 3)			
21473301	14.1	13	
21473302	102.5	13	
21473308	6.6	13	
21473309	27.9	13	
21473311	100.7	13	
21473312	25.5	13	
21481101	125.3	12	
21481103	57.8	12	Part of parcel covered by 10.2 acre proposed recharge site
21481104	215.4	12	
21481105	35.4	12	Part of parcel covered by 11.0 acre proposed recharge site
21481106	10.1	12	
21482603	97.7	12	
21482604	50.9	12	
21482605	0.4	12	
22461601	21.8	13	
22461602	16.7	13	
22461612	36.7	13	
22461615	40.1	13	
22461616	19.3	13	
22461620	33.0	13	
22461621	8.4	13	
22461703	33.3	13	
22461704	14.0	13	
22461705	12.3	13	
22461706	42.9	13	
22461710	17.9	13	
22461712	32.1	13	
22461713	25.2	13	
22461714	19.2	13	
22461716	25.2	13	
22461717	32.3	13	
22461718	22.4	13	
22461719	54.6	13	
22461722	68.7	13	
22461723	2.1	13	

TABLE 11
PREVIOUSLY IRRIGATED LAND TO BE DRIED UP DURING THE 2019 PLAN YEAR
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

(all values in acres)

Parcel	Acres	Figure Showing Location	Comments
22461724	12.2	13	
22461725	5.4	13	
22480101	94.1	12	
Total for Fort Lyon Canal (Phase 3)	1,560.3		
Total Acres	21,572.2		

Prowers 1041 Exhibit I



Service Layer Credits: Copyright:© 2013 National Geographic Society, i-cubed

Legend

Potentially Re-Irrigated by Wells per Case No. 15CW3014

Highland Dry-Up

0 1,000 2,000 4,000

Scale in Feet

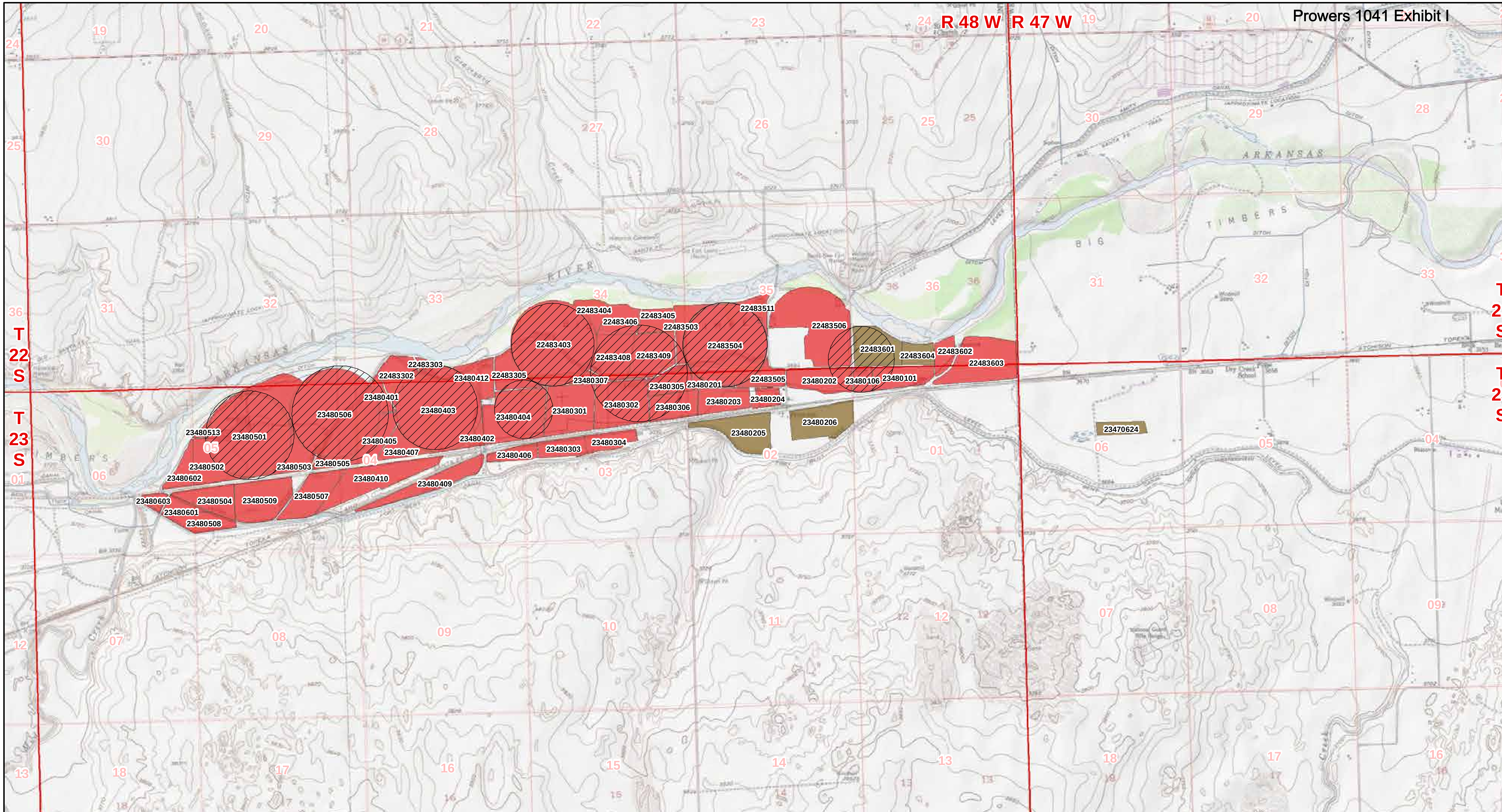
Hendrix Wai Engineering, Inc.

Job No.	L101
File:	Dryup Figure 1 Rule 14 .mxd
Date:	01/17/2019
Prepared For:	LAWMA

Figure 1

LAND PARCELS FORMERLY IRRIGATED WITH SURFACE WATER RIGHTS

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION



Legend

- Potentially Re-Irrigated by Wells in Case No. 02CW181
- Fort Bent Ditch Dry-Up
- Keesee Ditch Dry-Up

Service Layer Credits: Copyright:© 2013 National Geographic Society, i-cubed

0 1,500 3,000 6,000

Scale in Feet

N W E S

Hendrix Wai Engineering, Inc.

Job No. L101

File: Dryup Figure 2 Rule 14.mxd

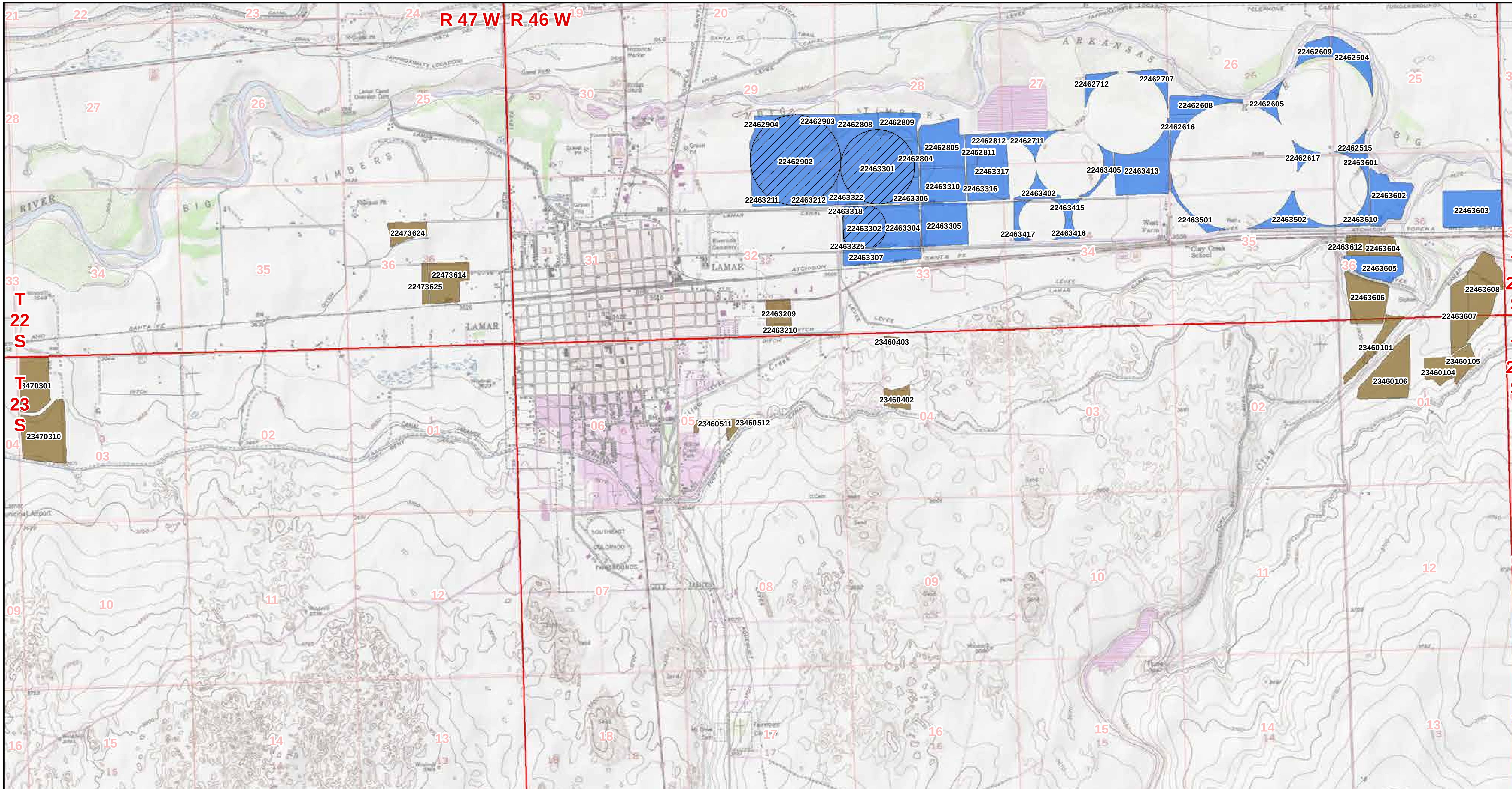
Date: 01/17/2019

Prepared For: LAWMA

Figure 2

LAND PARCELS FORMERLY IRRIGATED WITH SURFACE WATER RIGHTS

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION



Legend

- Lamar Canal Dry-Up
- Fort Bent Ditch Dry-Up
- Potentially Re-Irrigated by Wells in Case No. 12CW37

0 1,500 3,000 6,000

Scale in Feet

N W E S

Hendrix Wai Engineering, Inc.

Job No. L101

File: Dryup Figure 3 Rule 14.mxd

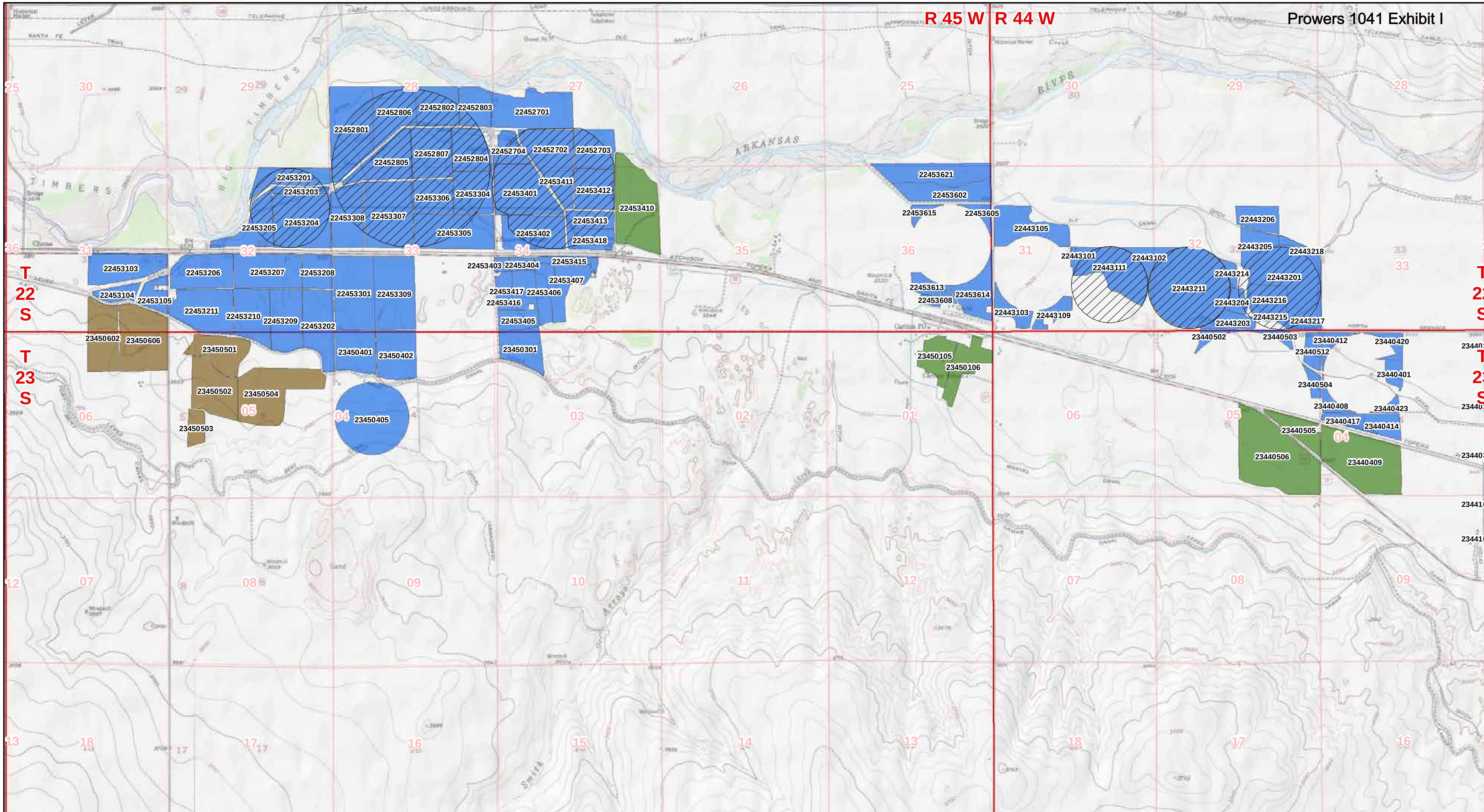
Date: 01/17/2019

Prepared For: LAWMA

Figure 3

LAND PARCELS FORMERLY IRRIGATED WITH SURFACE WATER RIGHTS

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION



Service Layer Credits: Copyright:© 2013 National Geographic Society, i-cubed

Legend

- Potentially Re-Irrigated by Wells in Case Nos. 02CW181 & 14CW3004
- Fort Bent Ditch Dry-Up
- Lamar Canal Dry-Up
- Manvel Canal Dry-Up

0 1,500 3,000 6,000
Scale in Feet

N W E S

Job No.: L101
File: Dryup Figure 4 Rule 14.mxd
Date: 01/17/2019
Prepared For: LAWMA

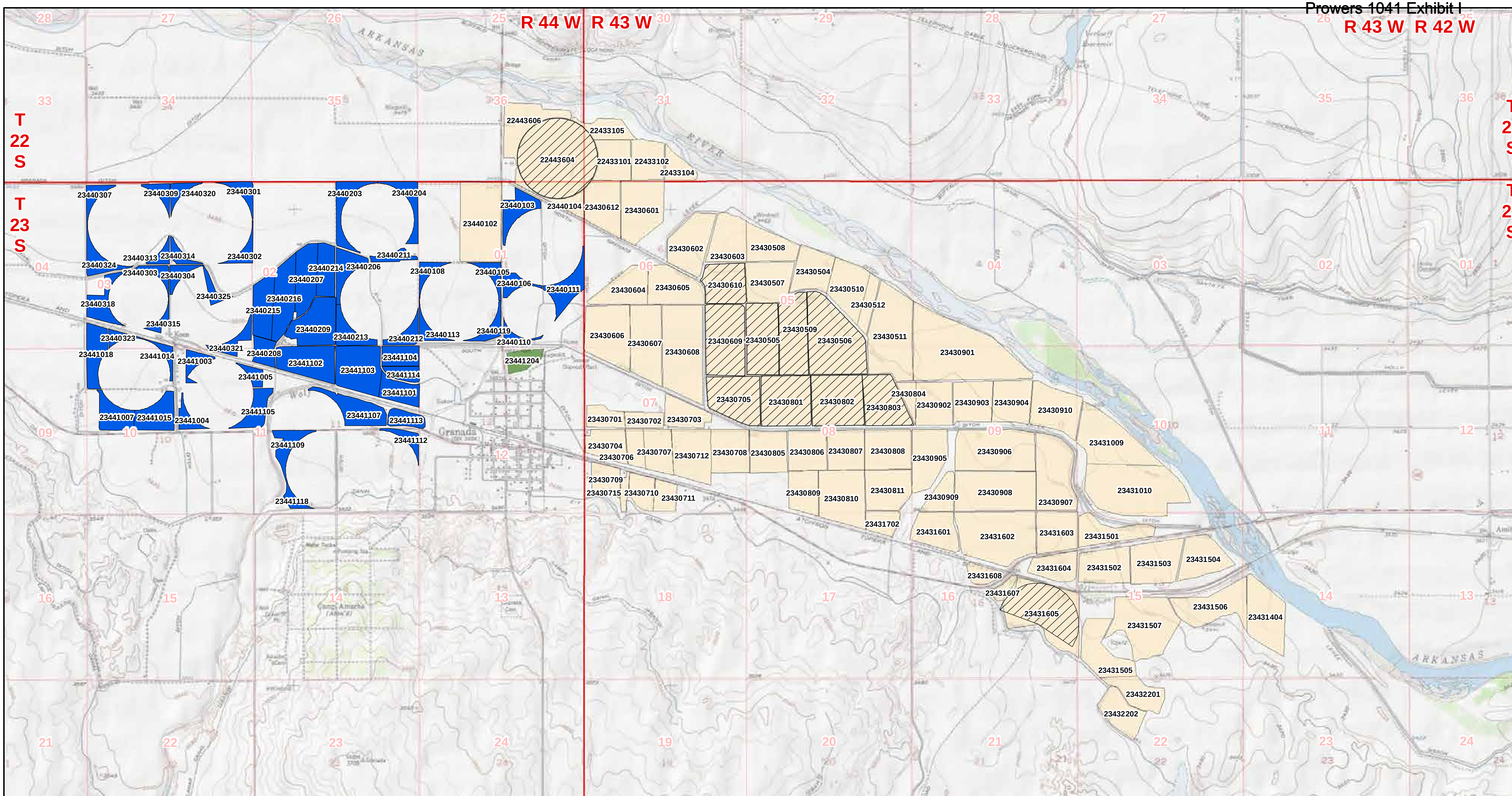
Hendrix Wai Engineering, Inc.

Figure 4

LAND PARCELS FORMERLY IRRIGATED WITH SURFACE WATER RIGHTS

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Prowers 1041 Exhibit I



Legend

Service Layer Credits: Copyright:© 2013 National Geographic Society, i-cubed

Re-Irrigated by Wells in Case Nos. 02CW181 & 14CW3004

Lamar Canal Dry-Up

Manvel Canal Dry-Up

XY Canal Dry-Up

0 1,500 3,000 6,000

Scale in Feet

N W E S

Hendrix Wai Engineering, Inc.

Job No.: L101

File: Dryup Figure 5 Rule 14.mxd

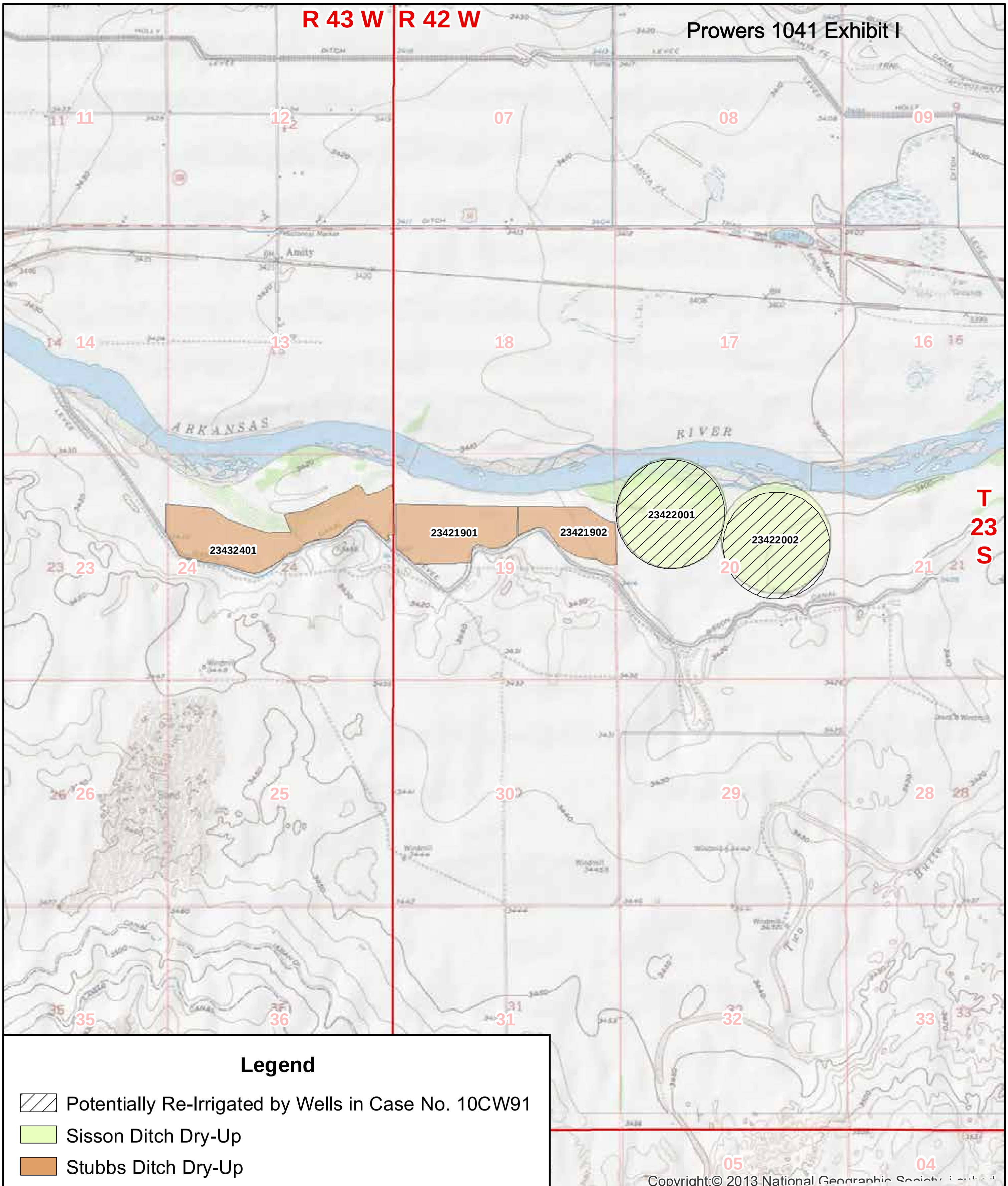
Date: 01/17/2019

Prepared For: LAWMA

Figure 5

LAND PARCELS FORMERLY IRRIGATED WITH SURFACE WATER RIGHTS

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION



Legend

- Potentially Re-Irrigated by Wells in Case No. 10CW91
- Sisson Ditch Dry-Up
- Stubbs Ditch Dry-Up

0 1,500 3,000 6,000

Scale in Feet

N W E S

Hendrix Wai Engineering, Inc.

Job No.
L101

File:
Dryup Figure 6 Rule 14.mxd

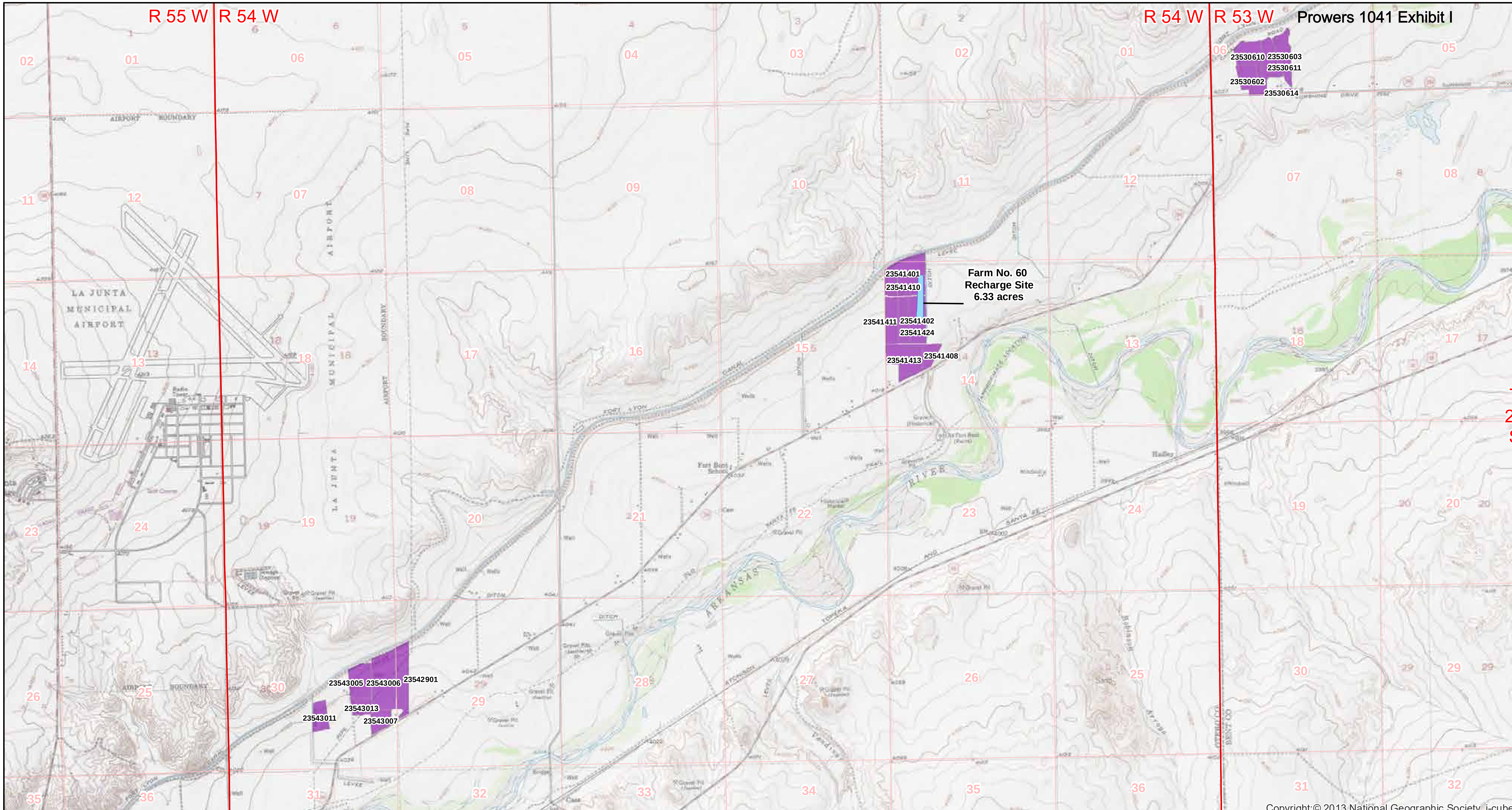
Date:
01/17/2019

Prepared For:
LAWMA

Figure 6

LAND PARCELS FORMERLY IRRIGATED WITH SURFACE WATER RIGHTS

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION



Legend

- Recharge Sites
- Ft Lyon Canal Dry-Up

0 1,500 3,000 6,000

Scale in Feet

N W E S

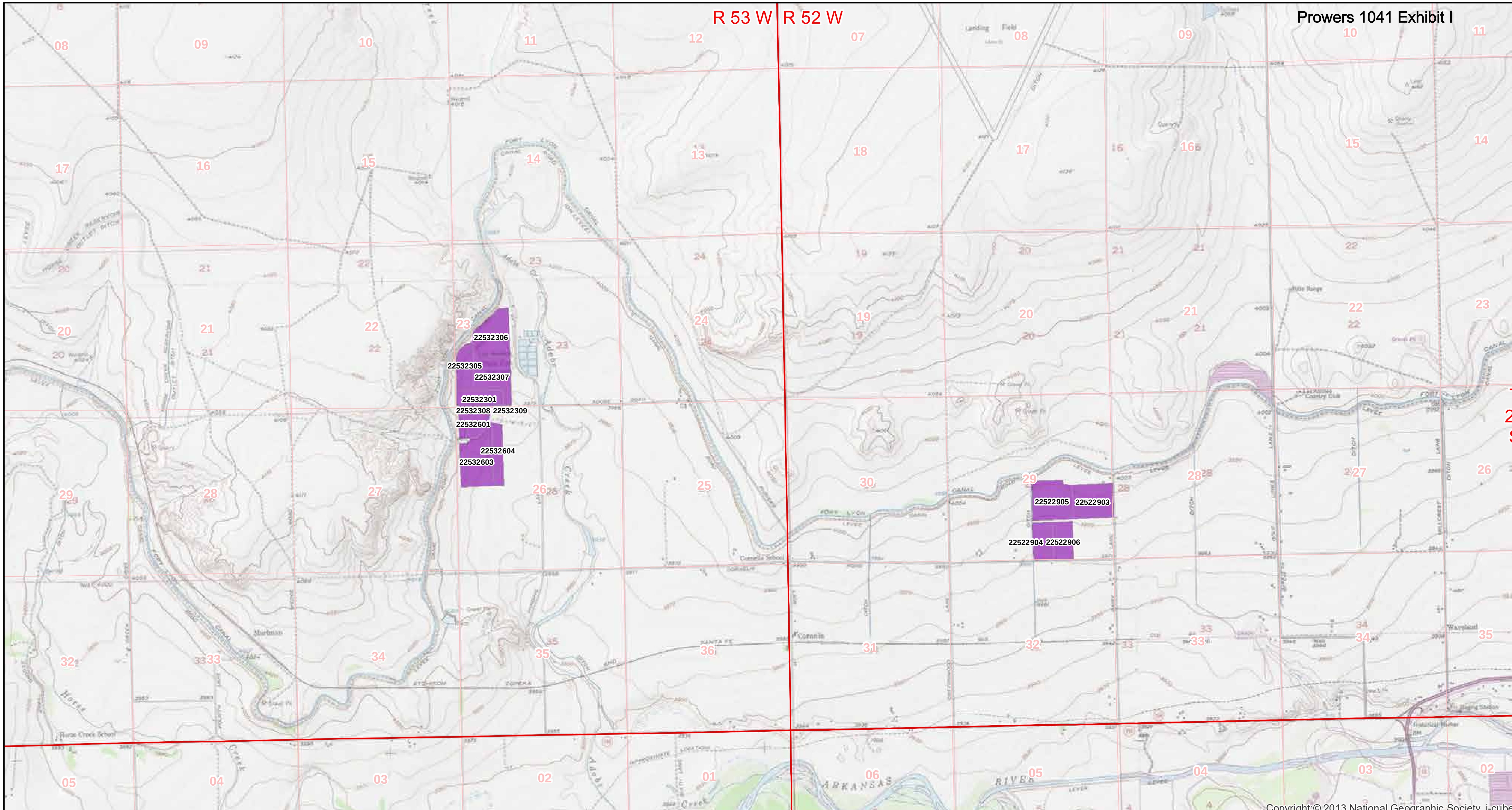
Hendrix Wai Engineering, Inc.

Job No.	L101
File:	Dryup Figure 7 Rule 14 .mxd
Date:	01/17/19
Prepared For:	LAWMA

Figure 7

LAND PARCELS FORMERLY IRRIGATED WITH SURFACE WATER RIGHTS

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION



Legend

Ft Lyon Canal Dry-Up

0 1,500 3,000 6,000

Scale in Feet

N W E S

Hendrix Wai Engineering, Inc.

Job No.
L101

File:
Dryup Figure 8 Rule 14 .mxd

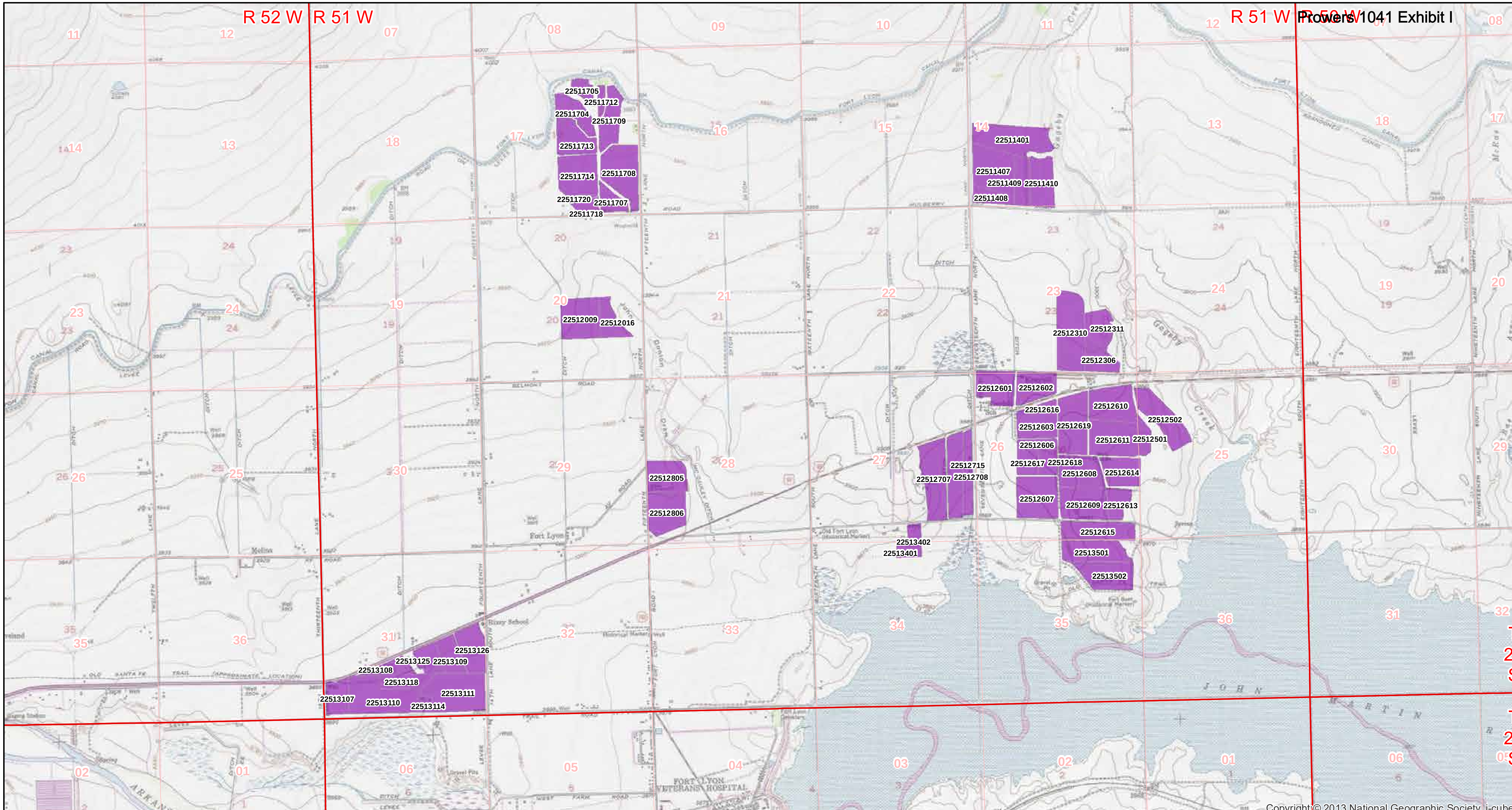
Date:
01/17/19

Prepared For:
LAWMA

Figure 8

LAND PARCELS FORMERLY IRRIGATED WITH SURFACE WATER RIGHTS

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION



Legend

Ft Lyon Canal Dry-Up

0 1,500 3,000 6,000

Scale in Feet

N W E S

Hendrix Wai Engineering, Inc.

Job No.: L101

File: Dryup Figure 9 Rule 14 .mxd

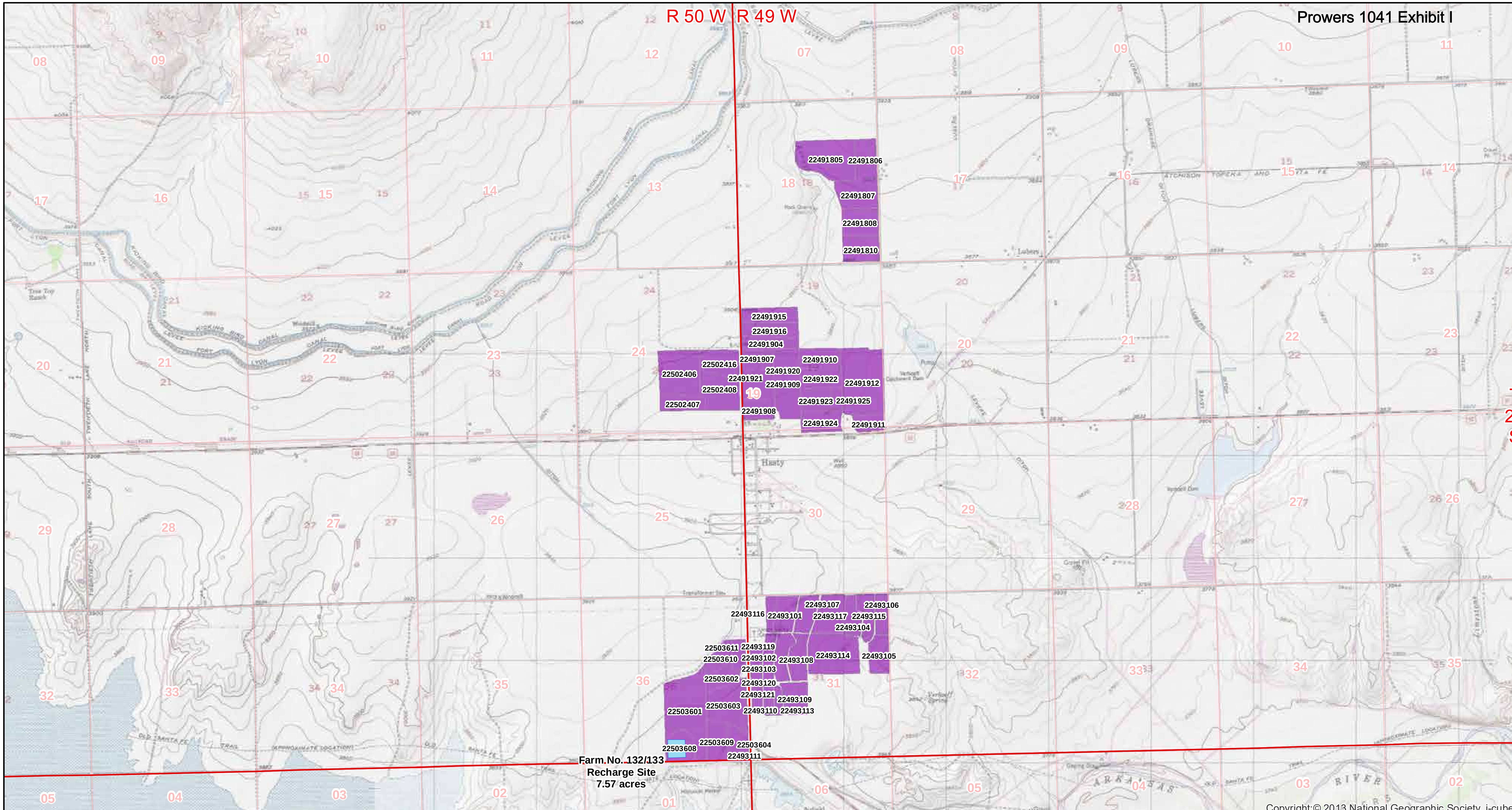
Date: 01/08/2019

Prepared For: LAWMA

Figure 9

LAND PARCELS FORMERLY IRRIGATED WITH SURFACE WATER RIGHTS

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION



Legend

- Recharge Sites
- Ft Lyon Canal Dry-Up

0 1,500 3,000 6,000

Scale in Feet

N W E S

Hendrix Wai Engineering, Inc.

Job No. L101

File: Dryup Figure 10 Rule 14 .mxd

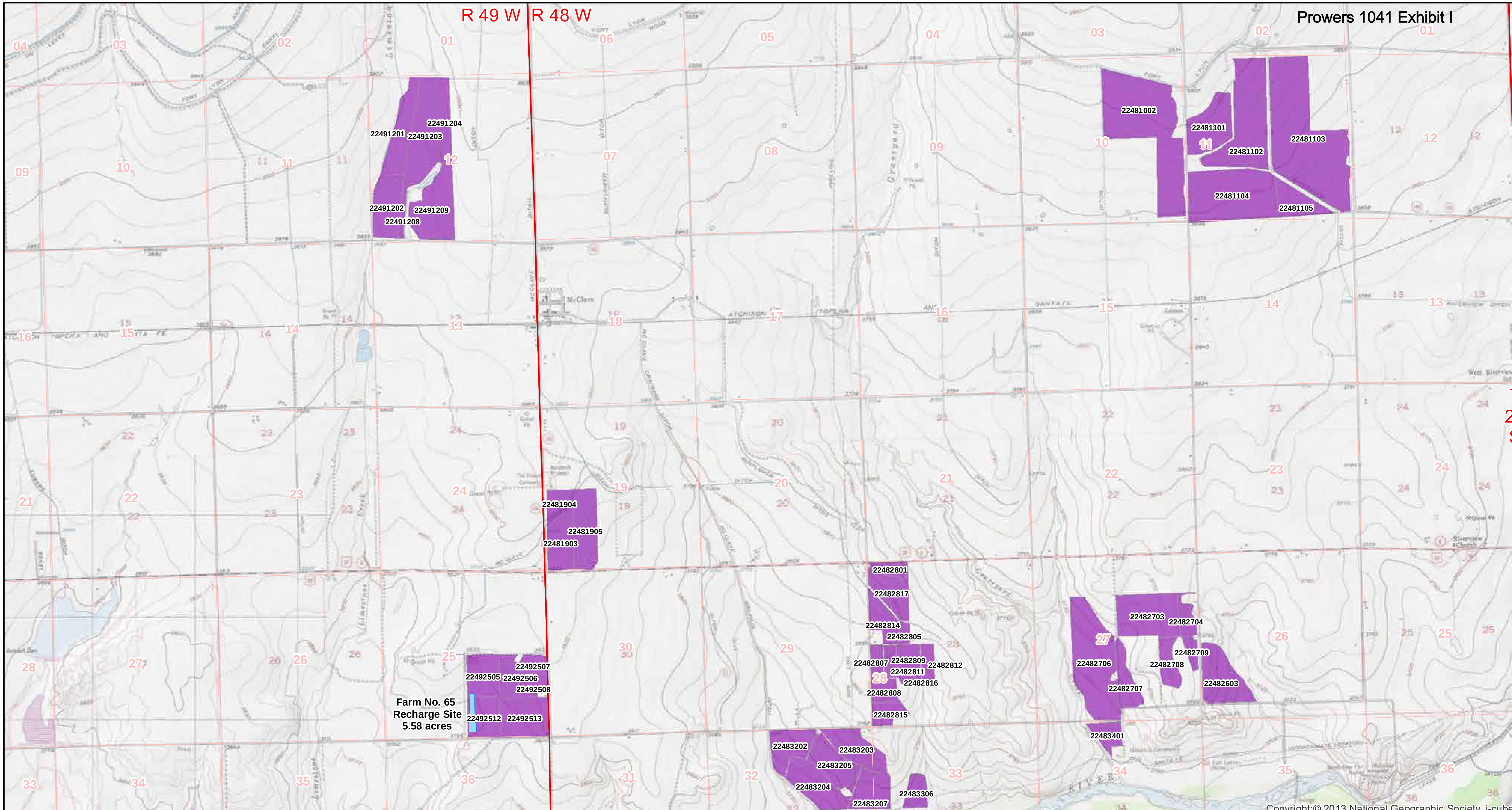
Date: 01/04/18

Prepared For: LAWMA

Figure 10

LAND PARCELS FORMERLY IRRIGATED WITH SURFACE WATER RIGHTS

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION



Legend

- Ft Lyon Canal Dry-Up
- Recharge Sites

0 1,500 3,000 6,000

Scale in Feet

N W E S

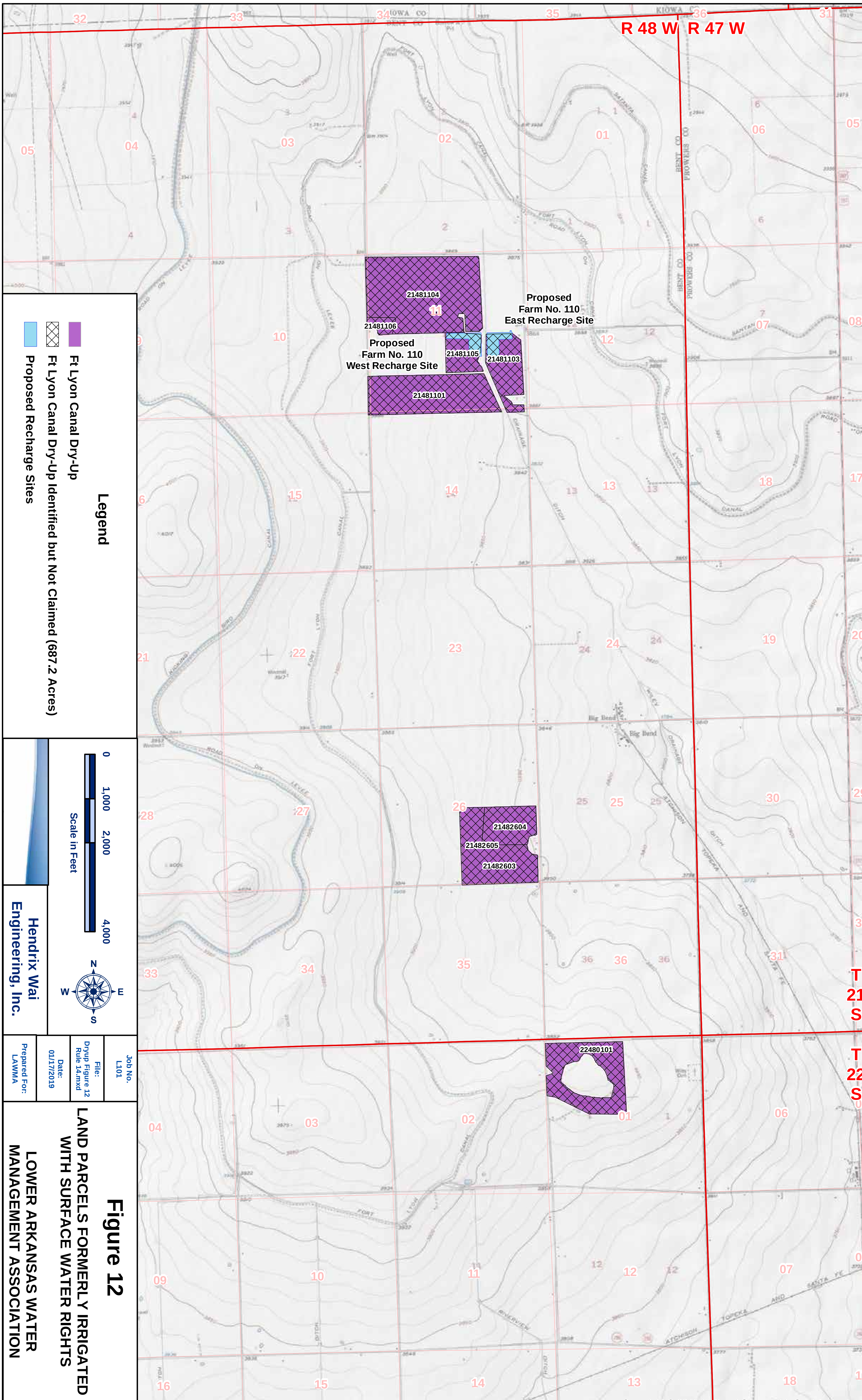
Hendrix Wai Engineering, Inc.

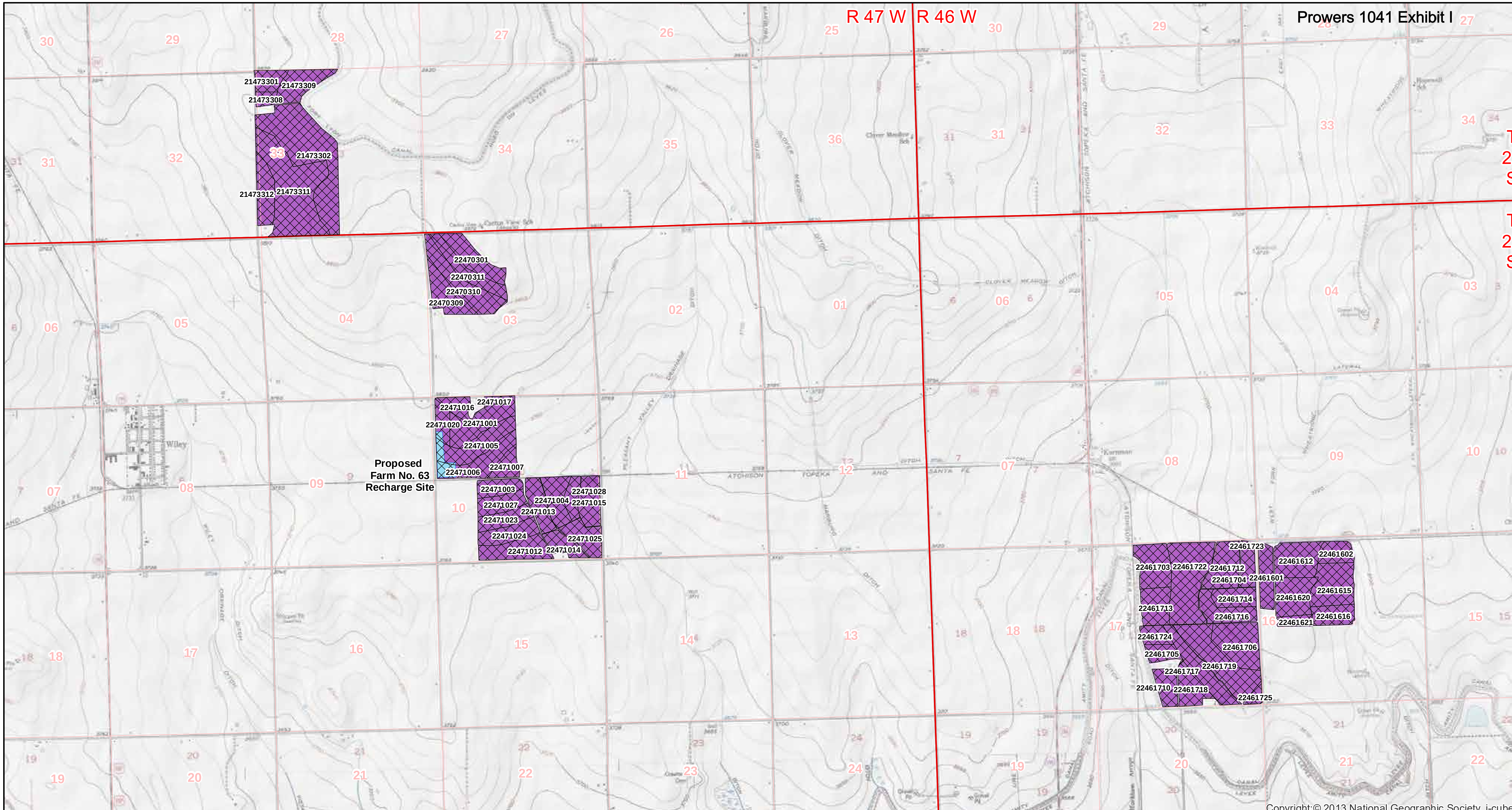
Job No.	L101
File:	Dryup Figure 11 Rule 14 .mxd
Date:	01/17/19
Prepared For:	LAWMA

Figure 11

LAND PARCELS FORMERLY IRRIGATED WITH SURFACE WATER RIGHTS

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION


R 48 W
R 47 W
T 21 S
T 22 S
Proposed Farm No. 110 East Recharge Site
Proposed Farm No. 110 West Recharge Site
21481104
21481106
21481105
21481103
21481101
21482604
21482605
21482603
22480101
Legend
Ft Lyon Canal Dry-Up
Ft Lyon Canal Dry-Up Identified but Not Claimed (687.2 Acres)
Proposed Recharge Sites
0
1,000
2,000
4,000
Scale in Feet
N
E
S
W
Hendrix Wai Engineering, Inc.
Job No. L101
File: Dryup Figure 12 Rule 14.mxd
Date: 01/17/2019
Prepared For: LAWMA
Figure 12
LAND PARCELS FORMERLY IRRIGATED WITH SURFACE WATER RIGHTS
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION
Copyright:© 2013 National Geographic Society, i-cubed



Legend

Ft Lyon Canal Dry-Up Identified but Not Claimed (1,372.2 Acres)

Proposed Recharge Sites

Ft Lyon Canal Dry-Up

0 1,500 3,000 6,000

Scale in Feet

N W E S

Job No. L101

File: Dryup Figure 13 Rule 14 .mxd

Date: 01/17/2019

Prepared For: LAWMA

Hendrix Wai Engineering, Inc.

Figure 13

LAND PARCELS FORMERLY IRRIGATED WITH SURFACE WATER RIGHTS

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Prowers
1041 Ex I

Hendrix Wai Engineering, Inc.
Water Resources, Water Rights and GIS/Computer Modeling

P.O. Box 4487
Parker, CO 80134

Telephone: (720) 930-4360
E-Mail: Randy@Hendrix-Wai.com

February 28, 2019

Bill W. Tyner
Colorado Division of Water Resources
310 E. Abriendo, Suite B
Pueblo, Colorado 81004

Subject: 2019 Augmentation Plan Projection for the Lower Arkansas Water Management Association

---

Dear Bill:

Pursuant to Paragraph 47.E. of the Decree entered in Case No. 02CW181 (the "Decree"), this letter provides your office the Lower Arkansas Water Management Association's ("LAWMA") Annual Plan Projection ("Projection") for the operation of LAWMA's plan for augmentation decreed in Case No. 02CW181 for the period April 1, 2019 through March 31, 2020. The Projection contains the following information:

(1) a tabulation of the structures included in the plan for augmentation;

(2) a description of the replacement water allocated to replace depletions from the structures from use in previous years;

(3) projected pumping for each alluvial well for the annual period based on the amount of replacement water allocated to said alluvial well divided by the appropriate consumptive use factor described in Exhibit R to the Decree;

(4) projected pumping for each bedrock well for the annual period and the future maximum annual stream depletion caused by pumping of the well over the term it is in the plan for augmentation;

(5) surface area for each gravel pit based on the most recent information available;

(6) projected diversions for each surface diversion structure for the annual period based on the amount of replacement water allocated to said surface diversion structure divided by the appropriate consumptive use factor described in Exhibit R to the Decree;

(7) projected depletions by the structures for the annual period taking into account depletions by the structures from use in previous years; and

(8) projected replacement requirements by H-I Model river reach based on actual pumping and diversions and consumable augmentation supplies for the annual period.

Augmented Structures Included in the Plan for Augmentation

Table A shows the number of the various augmented structures by type and use as well as how many of the structures are augmented by other augmentation plans in addition to LAWMA's augmentation plan. This table does not specifically identify the other augmentation plans. **Table B** shows the 5 additional structures that were added to the augmentation plan in 2019 pursuant to the decrees entered in Case Nos. 17CW3035 and 16CW3018. **Table C** identifies the two wells within the augmentation plan that have pre-Compact allocations. **Table 1** shows all of the structures that are included in the plan for augmentation.

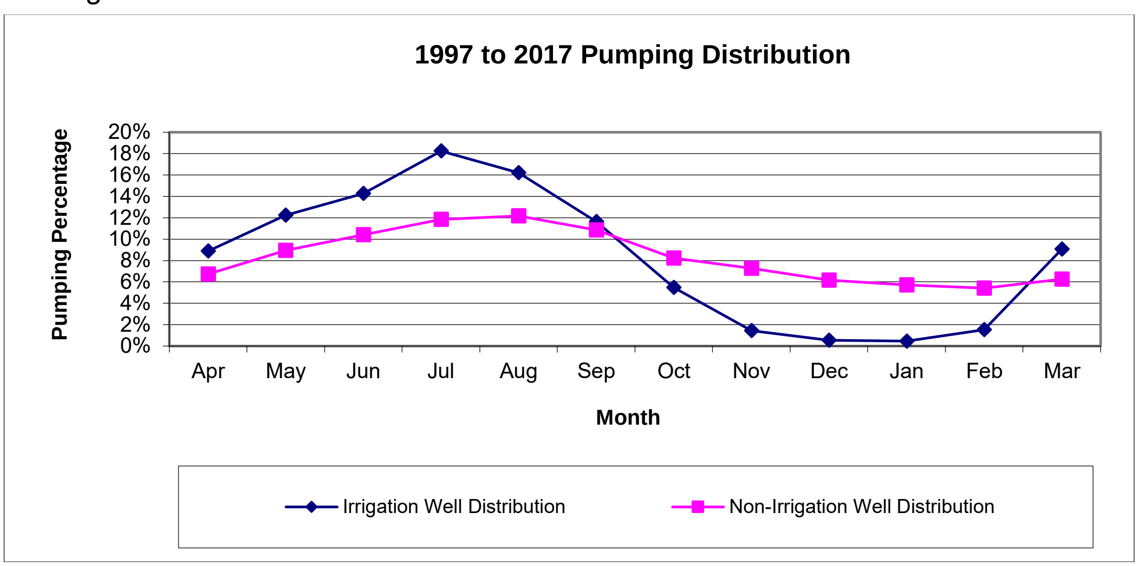
Projected Pumping, Projected Maximum Annual Stream Depletions for Bedrock Wells, and Allowable Surface Area for Gravel Pits

Table 2 shows the projected monthly and annual total pumping for April 2019 through March 2020 for the alluvial wells shown in **Table 1**.

Table 3 shows the projected monthly and annual total pumping for April 2019 through March 2020 and the maximum annual stream depletions for the bedrock wells shown in **Table 1**.

Table 4 shows the surface area for the gravel pits shown in **Table 1**.

Table 5 shows the projected monthly and annual diversions for April 2019 through March 2020 under this plan for the structures shown in **Table 1**. An allocation of 100% was made to a LAWMA common share for purposes of developing the monthly pumping projection. LAWMA has identified the wells as either irrigation or non-irrigation wells since 1997, the first full year of Rule 14 plan operation, and has developed a monthly distribution of the annual projected pumping based on the 1997 to 2017 pumping by month of the irrigation and non-irrigation wells. The following chart shows that distribution:



LAWMA determines the annual projected pumping for the alluvial wells listed in **Table 2** by dividing the number of LAWMA shares dedicated to each well by the presumptive depletion factor for that well, and then multiplying by the annual allocation to a LAWMA common share or by 100% for a LAWMA preferred share. LAWMA determines projected pumping for the bedrock wells listed in Table 3 based on the last twelve months of pumping by each well. LAWMA determines the projected surface areas of the gravel pits or ponds listed in Table 4 based on the 2017 aerial photography obtained as part of the National Agricultural Imagery Program (NAIP) as made available by the United States Department of Agriculture.

If a structure does not have a projected diversion amount, then the structure may not divert any water under the Decree during the period of April 2019 through March 2020 unless the owner moves LAWMA shares to the structure from other LAWMA structures or purchases fully consumable water converted to an equivalent LAWMA share. The fully consumable water would be delivered to the river as an augmentation source. In either case, we will update this projection to show the new projected monthly and annual diversions for the structure. Some of the structures for which no projected diversions are shown in **Table 5** may be being augmented by another plan or may not have been constructed as of February 28, 2019.

Estimated Depletions

Stream depletions were projected from the wellhead depletions or diversions in accordance with the methodology described in Decree Exhibit S in Case No. 02CW181, Decree Exhibit B in Case No. 08CW018, Decree Exhibit B in Case No. 10CW091, Decree Exhibit B in Case No. 12CW37, Decree Exhibit B in Case No. 13CW3004, Decree Exhibit C in Case No. 13CW3065, Decree Exhibit B in Case No. 14CW3004, Decree Exhibit C in Case No. 15CW3014, Decree Exhibit D in Case No. 17CW3000, Decree Exhibit D in Case No. 17CW3001, Decree Exhibit C in Case No. 17CW3035, and the Decree in Case No. 16CW3018. Depletions from pumping that occurred prior to 2019 were included in the calculation of stream depletions, with the following exceptions for the main stem irrigation wells. For the main stem irrigation wells that were previously included in LAWMA's Rule 14 plans from 1996 to 2006, pumping prior to a structure's inclusion into the augmentation plan and any lagged depletions will continue to be augmented within LAWMA's Rule 14 plan. For the main stem irrigation wells that were previously included in LAWMA's Rule 14 plans from 2007 to the present but are now included in the 02CW181 plan for augmentation, pumping prior to a structure's inclusion into the augmentation plan and any lagged depletions were included in the stream depletion analysis for this augmentation plan. **Table 6** shows the annual stream depletions and the stream depletions by river reach for the structures in this augmentation plan.

Replacement Supplies

LAWMA's projected stream replacement requirements and replacement sources for April 2019 through March 2020 are shown in **Table 7**. **Table 7** includes the replacement requirements for the following:

1. Replacement requirements for the structures identified in **Table 1**. These replacement requirements are shown in **Table 7** since the replacement sources associated with these structures are also shown in **Table 7**.

2. Rule 14 replacement requirements shown in LAWMA's 2019 Rule 14 plan **Tables 7a** and **7b** dated February 28, 2019.

3. The 500 acre-feet storage charge owed to the Offset Account. It is anticipated that LAWMA will be reimbursed for a portion of this storage charge if the other well associations deliver water to the Offset Account. However, for the purposes of demonstrating the adequacy of the LAWMA augmentation plan in **Table 7**, the entire 500 acre-feet storage charge is shown as a LAWMA replacement obligation.

4. Replacement requirements for substitute water supply plans that use LAWMA shares as the source of augmentation and replacement supply.

The Arkansas Basin snow pack has a snow water equivalent of 122% of the 1981-to-2010 median as of February 27, 2019, as described by the NRCS "SNOTEL Colorado Snowpack Update Map." The National Weather Service (NWS) River Forecast Center is also predicting an above average water supply at the Arkansas River at Las Animas river gage and an above average water supply at the Purgatoire River near Las Animas river gage. The NWS forecast incorporates three components: 1) baseflow or the amount of water coming from groundwater, 2) runoff or the amount of water coming from surface runoff, and 3) routed flow or the amount of water coming from an upstream point. Baseflow is never a constant value as it can increase after rainfall events and decrease until the next rainfall event. Runoff generally comes from rainfall events and snowmelt. Upstream flow routing is based on flow coming from an upstream river gage.

Based on the methodology used by the NWS, the current NWS forecast, and the current snow pack, it is reasonable to project that the amount of replacement credits available under the majority of LAWMA's Arkansas and Purgatoire River water rights will be 100% of the long-term average. A 100% of average projection is further justified by the relatively large amount of water currently in storage in the Lamar Canal's and Fort Bent Ditch's Article II accounts, which will boost the amount of water available to LAWMA's Lamar Canal and Fort Bent Ditch shares. The following describes in more detail the replacement sources shown in **Table 7**:

1. Consumptive use credits from the use of the Highland Canal water rights changed in Case No. 02CW181 (02CW181 Highland Canal Water Rights). In accordance with the requirements of Paragraph 31.C.i.(2). of the decree entered in Case No. 02CW181 (02CW181 Decree), during the second year after the end of the Compliance Period (as defined in Paragraph 31.A. of the 02CW181 Decree and as extended pursuant to that same Paragraph), LAWMA shall limit the amount of the 02CW181 Highland Canal Water Rights

for which LAWMA may take consumptive use stream credits by multiplying the diversion rate for each 02CW181 Highland Canal Water Right by the greater of (a) the percentage of the 02CW181 Highland Canal dry-up lands that are in compliance with Paragraph 31.A. of the 02CW181 Decree; or (b) 60%. LAWMA's annual status report required by Paragraph 30.C. of the 02CW181 Decree prepared by LAWMA's expert consultant in 2018 (Annual Report) determined that 41.3% of the 02CW181 Highland Canal dry-up lands are in compliance with Paragraph 31.A. of the 02CW181 Decree. Accordingly, for this plan year, LAWMA must limit the amount of the 02CW181 Highland Canal Water Rights for which LAWMA may take consumptive use stream credits to 60% of the amount of each of the 02CW181 Highland Canal Water Rights. The 02CW181 Highland Canal Water Rights are expected to yield 3,986 acre-feet of consumable water to the river during the 2019 Plan Year. 60% of 3,986 acre-feet is 2,392 acre-feet. Pursuant to paragraph 31.D of the 02CW181 Decree, the expected 1,594 acre-feet of fully consumable water derived from the 02CW181 Highland Canal Water Rights for which LAWMA must forgo taking credit under paragraph 31.C may be leased to LAWMA's members, with the funds collected from such leases to be used by LAWMA to establish and maintain ground cover on the 02CW181 dry-up land. The consumable water derived from the 02CW181 Highland Canal Water Rights may be stored in the Offset Account in John Martin Reservoir or left in the river to meet in-state replacement obligations.

2. Consumptive use credits from use of the Highland Canal water rights changed in Case No. 10CW85. These water rights are expected to yield 228 acre-feet of consumable water to the river. The consumptive use water may be stored in the Offset Account in John Martin Reservoir or left in the river to meet in-state replacement obligations.

3. Consumptive use credits from the use of one-half of the Keesee Ditch direct flow water rights changed in Case No. 02CW181 (02CW181 Keesee Direct Flow Water Rights). In accordance with the requirements of Paragraph 31.C.ii.(2). of the 02CW181 Decree, during the second year after the end of the Compliance Period (as defined in Paragraph 31.A. of the 02CW181 Decree and as extended pursuant to that same Paragraph), LAWMA shall limit the amount of the 02CW181 Keesee Direct Flow Water Rights for which LAWMA may take consumptive use stream credits by multiplying the diversion rate for each 02CW181 Keesee Direct Flow Water Right by the greater of (a) the percentage of the 02CW181 Keesee Ditch dry-up lands that are in compliance with Paragraph 31.A. of the 02CW181 Decree; or (b) 60%. LAWMA's Annual Report determined that 72.5% of the 02CW181 Keesee Ditch dry-up lands are in compliance with Paragraph 31.A. of the 02CW181 Decree. Accordingly, for this plan year, LAWMA must limit the amount of the 02CW181 Keesee Direct Flow Water Rights for which LAWMA may take consumptive use stream credits to 72.5% of the amount of each of the 02CW181 Keesee Direct Flow Water Rights. The 02CW181 Keesee Direct Flow Water Rights are expected to yield 1,411 acre-feet of consumable water to the river. 72.5% of 1,411 acre-feet is 1,023 acre-feet. Pursuant to paragraph 31.D of the 02CW181

Decree, the expected 388 acre-feet of fully consumable water derived from the 02CW181 Keesee Direct Flow Water Rights for which LAWMA must forgo taking credit under paragraph 31.C may be leased to LAWMA's members, with the funds collected from such leases to be used by LAWMA to establish and maintain ground cover on the 02CW181 dry-up land.

4. Consumptive use credits from the use of the remaining one-half of the Keesee Ditch direct flow water rights changed in Case No. 05CW052. These sources are expected to yield 1,411 acre-feet of consumable water. The consumable water may be stored in the Offset Account in John Martin Reservoir or left in the river to replace in-state replacement obligations.

5. Consumptive use credits from Fort Bent Ditch shares changed in Case No. 02CW181 (02CW181 Fort Bent Shares). All water available to LAWMA under the 02CW181 Fort Bent Shares will be delivered to the river at the LAWMA Fort Bent Augmentation Station. In accordance with the requirements of Paragraph 31.C.iv.(2). of the 02CW181 Decree, during the second year after the end of the Compliance Period (as defined in Paragraph 31.A. of the 02CW181 Decree and as extended pursuant to that same Paragraph), LAWMA shall limit the amount water available to the 02CW181 Fort Bent Shares for which LAWMA may take consumptive use stream credits by multiplying the amount of water available to the 02CW181 Fort Bent Shares by the greater of (a) the percentage of the 02CW181 Fort Bent Ditch dry-up lands that are in compliance with Paragraph 31.A. of the 02CW181 Decree; or (b) 60%. LAMWA's Annual Report determined that 84.0% of the 02CW181 Fort Bent Ditch dry-up lands are in compliance with Paragraph 31.A. of the 02CW181 Decree. Accordingly, for this plan year, LAWMA must limit the amount of water available to the 02CW181 Fort Bent Shares for which LAWMA may take consumptive use stream credits to 84.0% of the amount of water available to the 02CW181 Fort Bent Shares.

   LAWMA owns 462 02CW181 Fort Bent Shares that are expected to yield 500 acre-feet of consumable water to the river. The City of Lamar (City) owns 923 02CW181 Fort Bent Shares and allows LAWMA to use the City's 02CW181 Fort Bent Shares that the City does not use, which are expected to yield 293 acre-feet of consumable water. Accordingly, the total expected yield of the 02CW181 Fort Bent Shares that LAWMA is entitled to use is 793 acre-feet. 84.0% of 793 acre-feet is 666 acre-feet. Pursuant to paragraph 31.D of the 02CW181 Decree, the expected 127 acre-feet of fully consumable water derived from the portion of the 02CW181 Fort Bent Shares for which LAWMA must forgo taking credit under paragraph 31.C may be leased to LAWMA's members, with the funds collected from such leases to be used by LAWMA to establish and maintain ground cover on the 02CW181 dry-up land.

6. Consumptive use credits from 144 Fort Bent Ditch shares changed in Case No. 10CW85. These 144 shares are expected to yield 99 acre-feet of consumable water to the river. These shares will also be turned out at the LAWMA Fort Bent Augmentation Station.

7. Consumptive use credits from 8,247 Lamar Canal shares changed in Case No. 02CW181 (02CW181 Lamar Canal Shares). Water derived from the 02CW181 Lamar Canal Shares will be delivered to the river through the DOW Center Farm Augmentation Station, the West Farm Augmentation Station, the Granada East Augmentation Station, or the Granada West Augmentation Station. In accordance with the requirements of Paragraph 31.C.v.(2). of the 02CW181 Decree, during the second year after the end of the Compliance Period (as defined in Paragraph 31.A. of the 02CW181 Decree and as extended pursuant to that same Paragraph), LAWMA shall limit the amount water available to the 02CW181 Lamar Canal Shares for which LAWMA may take consumptive use stream credits by multiplying the amount of water available to the 02CW181 Lamar Canal Shares by the greater of (a) the percentage of the 02CW181 Lamar Canal dry-up lands that are in compliance with Paragraph 31.A. of the 02CW181 Decree; or (b) 60%. LAWMA's Annual Report determined that 95.8% of the 02CW181 Lamar Canal dry-up lands are in compliance with Paragraph 31.A. of the 02CW181 Decree. Accordingly, for this plan year, LAWMA must limit the amount of water available to the 02CW181 Lamar Canal for which LAWMA may take consumptive use stream credits to 95.8% of the amount of water available to the 02CW181 Lamar Canal Shares. The 02CW181 Lamar Canal shares are expected to yield 8,220 acre-feet of consumable water to the river. 95.8% of 8,220 acre-feet is 7,875 acre-feet. Pursuant to paragraph 31.D of the 02CW181 Decree, the expected 345 acre-feet of fully-consumable water derived from the 02CW181 Lamar Canal Shares for which LAWMA must forgo taking credit under paragraph 31.C may be leased to LAWMA's members, with the funds collected from such leases to be used by LAWMA to establish and maintain ground cover on the 02CW181 dry-up land.

8. Consumptive use credits from 897 Lamar Canal shares changed in Case No. 15CW3067 (15CW3067 Lamar Canal Shares). The LAWMA's 15CW3067 Lamar Canal Shares are expected to yield 882 acre-feet of consumable water to the river. This water will be delivered through one or all of the following augmentation stations: West Farm Augmentation Station, DOW Center Farm Augmentation Station, or any excess credits to the West Farm Gravel Pit for later release.

9. Consumptive use credits from 783.5 Granada Irrigation Company (GIC) shares changed in Case No. 15CW3067 (15CW3067 GIC Shares). The GIC shares are delivered through the Lamar Canal system and each GIC share equates to 3.498 Lamar Canal shares (1 GIC x 10,600 Lamar Canal shares / 3,030 GIC shares). The 15CW3067 GIC Shares are expected to yield 2,065 acre-feet of consumable water to the river. This water will be delivered through

one or both of the following augmentation stations: Granada East Augmentation Station or the Granada West Augmentation Station.

10. LAWMA has fully consumable water stored in the West Farm Gravel Pit. Currently there is 1,150 acre-feet of stored water that LAWMA purchased from Colorado Springs Utilities (CS-U) in 2018. LAWMA can release that water below the Lamar Canal river headgate for delivery to downstream in-State water rights or the Stateline. Under the decree in Case No. 15CW3067, LAWMA may store the consumptive use portion of the Lamar Canal shares changed in that case in the West Farm Gravel Pit. LAWMA may also acquire fully consumable water from entities such as CS-U and store that water in the gravel pit as well. It is anticipated that LAWMA will add consumable water to the gravel pit from the 897 Lamar Canal shares changed in Case No. 15CW3067 that are in excess of river replacement obligations.

11. Consumptive use credits associated with the Manvel Article II water that is estimated to yield 500 acre-feet of consumable water to the river. All of this water will be delivered through the West Farm Augmentation Station, the DOW Center Farm Augmentation Station, the Granada East Augmentation Station, or the Granada West Augmentation Station depending on which reach of the river replacement water is needed in.

12. Consumptive use credits from the 54 cfs Manvel Canal direct flow water right changed in Case No. 02CW181. This water right is expected to yield 750 acre-feet of consumable water to the river.

13. Consumptive use credits derived from the portion of the X-Y Canal direct flow water right changed in Case No. 02CW181 (67 cfs of the total water right of 69 cfs) (02CW181 X-Y Direct Flow Water Right). In accordance with the requirements of Paragraph 31.C.iii.(2). of the 02CW181 Decree, during the second year after the end of the Compliance Period (as defined in Paragraph 31.A. of the 02CW181 Decree and as extended pursuant to that same Paragraph), LAWMA shall limit the amount of the 02CW181 X-Y Direct Flow Water Right for which LAWMA may take consumptive use stream credits by multiplying 67 cfs by the greater of (a) the percentage of the 02CW181 X-Y Canal dry-up lands that are in compliance with Paragraph 31.A. of the 02CW181 Decree; or (b) 60%. LAWMA's Annual Report determined that 98.1% of the 02CW181 X-Y Canal dry-up lands are in compliance with Paragraph 31.A. of the 02CW181 Decree. Accordingly, for this plan year, LAWMA must limit the amount of the 02CW181 X-Y Direct Flow Water Right for which LAWMA may take consumptive use stream credits to 98.1% of 67 cfs. The 02CW181 X-Y Water Right is expected to yield 3,404 acre-feet of consumable water to the river. 98.1% of 3,404 acre-feet is 3,339 acre-feet. Pursuant to paragraph 31.D of the Decree, the expected 65 acre-feet of fully-consumable water derived from the 02CW181 X-Y Direct Flow Water Right for which LAWMA must forgo

taking credit under paragraph 31.C may be leased to LAWMA's members, with the funds collected from such leases to be used by LAWMA to establish and maintain ground cover on the 02CW181 dry-up land.

14. Consumptive use credits derived from 2.0 cfs of the X-Y Canal direct flow water right changed in Case No. 15CW3067 (15CW3067 X-Y Water Right). The 15CW3067 X-Y Water Right is expected to yield 99 acre-feet of consumable water to the river.

15. Consumptive use credits from the 7.2 cfs Stubbs Ditch direct flow water right changed in Case No. 02CW181. This water right is expected to yield 252 acre-feet of consumable water to the river consistent with the Sisson-Stubbs Settlement Agreement between Colorado and Kansas signed on September 23, 2005.

16. Consumptive use credits from the 18 cfs Sisson Ditch direct flow water right changed in Case No. 10CW85. This water right is expected to yield 252 acre-feet of consumable water to the river consistent with the Sisson-Stubbs Settlement Agreement between Colorado and Kansas signed on September 23, 2005.

The following sources are described in Paragraph 40 of LAWMA's 02CW181 Decree as part of LAWMA's overall augmentation water portfolio and will be used as replacement supplies in the Augmentation Plan and / or LAWMA's Rule 14 Plan. These sources are also shown in Table 7.

1. An allocation of 1,354 acre-feet of Fryingpan-Arkansas Project return flow water is projected to be made by Southeastern Colorado Water Conservancy District (SECWCD) and the Fort Lyon Pilot Project. This is an estimate of the allocation based on the preliminary projection provided by the Division 2 Engineer's office. In the event any excess Fryingpan-Arkansas Project return flow water becomes available to LAWMA, LAWMA will purchase this water. This includes LAWMA's portion of the Fort Lyon project return flows carried over from 2018. The Fort Lyon Canal Company's engineer has informed LAWMA that the carried over project water will be delivered through the canal in 2019.

2. Article II water currently in storage in John Martin Reservoir in LAWMA's Keesee, X-Y Graham, Manvel, and the Sisson - Stubbs accounts. This water will be released to the river or transferred to other Article II accounts for in-state replacement obligations or transferred to the Offset Account for replacement of Stateline depletions as needed. As of February 27, 2019, LAWMA currently has 19,699 acre-feet of consumable water stored in John Martin Reservoir. These sources are thus expected to yield 19,699 acre-feet of consumable water during the 2019 plan year.

3. LAWMA's ownership in Colorado's portion of the conservation storage in John Martin Reservoir, which is 11.0% of Colorado's portion and consists of 5.10% from the ownership of the X-Y and Graham, 2.40% from ownership of the Manvel, 2.30% from ownership of the Keesee, 0.34% from ownership of the Stubbs, and 0.86% from ownership of the Sisson. This should yield LAWMA at least 1,200 acre-feet of consumable water. As of February 19, 2019, LAWMA's share of the consumable portion of the water in conservation storage that will begin to be delivered into Article II accounts on April 1 was 904 acre-feet. It is estimated that this share will grow by an additional 300 acre-feet due to inflows to conservation storage during the month of March.

As of February 27, 2019, LAWMA's consumable water in storage in John Martin Reservoir or available as a credit at the Stateline is as follows:

Account Name	Consumable Storage/Stateline Credit (ac-ft)
Offset (doesn't include storage charge water)	7,454
XY-Graham Article II	9,267
Manvel Article II	4,428
Keesee Article II	3,572
Stubbs Article II	287
Sisson Article II	2,145
Credit at Stateline (as of Feb. 1, 2019)	9,303
LAWMA's Portion of Conservation Storage	1,027
Total	37,483

The 9,303 acre-feet of credit at the Stateline is estimated from the Division Engineer's monthly accounting and does not reflect actual H-I Model results of Stateline credit through December 2018. Those results were unavailable for the preparation of this plan but will include the removal from the 10-year Compact accounting of 12,527 acre-feet of Stateline credit in 2008 and the addition or subtraction of any deliveries or depletions by LAWMA's direct flow sources to the Stateline in 2018.

4. Credit for the unconsumed portion of the transit loss associated with releases of LAWMA's consumable water from the Offset Account. These credits are estimated to yield 300 acre-feet of consumable water to the river based on past years' total amounts of unconsumed transit losses.

5. Credit for the unconsumed portion of the transit loss from consumptive use water that may be purchased by LAWMA during this plan year and delivered to the Offset Account. The yield will be determined based on the amount of water purchased by LAWMA and a copy of the contract(s) will be provided. In late January and early February, LAWMA acquired fully consumable water from CS-U that has been delivered to the Offset Account. LAWMA

delivered the initial 500 acre-feet to the Kansas Charge account to establish the Offset Account for 2019 and the remainder is being delivered to the Downstream Consumable Account for delivery to Kansas for use in 2019. LAWMA has an agreement with CS-U for delivery of up to 4,500 acre-feet before March 31, 2019. The amount delivered to the Downstream Consumable account as of February 27, 2019 is 1,171 acre-feet. To make the initial delivery to establish the Offset Account for 2020, LAWMA has projected a delivery of 250 acre-feet a month to the Offset Account for August and September 2019.

6. Credit for the unconsumed portion of the transit loss from deliveries to the Offset Account of replacement water from all of LAWMA's Highland Canal water rights changed in Case No. 02CW181 and in Case No. 10CW85. These credits are expected to yield 70 acre-feet of consumable water to the river.

The following sources are not described in LAWMA's 02CW181, 05CW052, and 10CW085 decrees but are a part of LAWMA's overall augmentation water portfolio. These sources will be used as replacement supplies only in LAWMA's Rule 14 Plan until they have been changed for use in the Augmentation Plan through a water court decree or an administratively approved substitute water supply plan. These sources are also shown in **Table 7**.

1. Consumptive use credits from 162.5 Fort Bent Ditch shares for shares for which a water court application (Case No. 17CW3068) was filed by LAWMA on December 19, 2017 for a change of use. LAWMA proposes to use the same terms and conditions on a per-share basis for calculations of consumptive use credits and historical return flow obligations for these shares as those used for the Fort Bent Ditch Shares that were changed in Case Nos. 02CW181 and 10CW85. Assuming the same terms and conditions are imposed on these shares as are imposed on LAWMA's Fort Bent Ditch shares changed in Case Nos. 02CW181 and 10CW85, these shares are expected to yield 176 acre-feet of consumable water to the river. This water will be delivered through the LAWMA augmentation station on the Fort Bent Ditch. LAWMA will use these Fort Bent Ditch shares only in its Rule 14 Plan until a decree is entered in Case No. 17CW3068.

2. Consumptive use credits from 6,080 Fort Lyon Canal shares for which LAWMA will file a future water court application for a change of use. As part of its application for its 2017 Rule 14 plan, LAWMA provided a historical consumptive use analysis of the 6,080 Fort Lyon Canal shares LAWMA acquired in 2017 and 1,429 additional Fort Lyon Canal shares LAWMA will acquire in 2019 from Arkansas River Farms. LAWMA will continue to rely on this previously submitted analysis for the 2019 plan year. During the 2019 plan year, LAWMA will utilize 4,520 of the 6,080 Fort Lyon Canal shares LAWMA acquired in 2017 through 8 augmentation stations along the Fort Lyon Canal. LAWMA expects those shares will yield 4,773 acre-feet of consumable water to the river. During the 2018 plan year LAWMA began utilizing 1,150 of the 6,080 Fort Lyon Canal shares LAWMA acquired in 2017 via 3 recharge facilities along

the Fort Lyon Canal, and LAWMA will continue to utilize those shares through those recharge facilities during the 2019 plan year. LAWMA expects those shares will yield 1,253 acre-feet of consumable water lagged back to the river over time. Approximately 58% (727 acre-feet) of this consumable water will accrue to the river during the 2019 plan year and the balance will accrue during post plan years. Lagged accretions from operations of the recharge facilities in the past are expected to yield an additional 146 acre-feet during the 2019 plan year. LAWMA is also anticipating the use of 410 of the 6,080 Fort Lyon shares at a new recharge facility that will yield 439 acre-feet of consumable water lagged back to the river. Approximately 58% (255 acre-feet) of this consumable water will accrue to the river during the 2019 plan year.

Finally, LAWMA anticipates it will close on the additional 1,429 Fort Lyon Canal shares during the 2019 plan year. These 1,429 shares will be delivered to the Wiley or May Valley drains through an additional, already constructed, augmentation station and recharge facilities below John Martin Dam. LAWMA expects the yield of these 1,429 shares to be 1,382 acre-feet, but LAWMA will not project the yield of these shares as available for replacement purposes until LAWMA submits an amendment to its 2019 Rule 14 plan after closing on the shares. When the Amity Canal's water rights on the Wiley and May Valley drains are not in priority, water available to these shares will be shepherded past the Amity Canal to the Arkansas River pursuant to an agreement between LAWMA, Arkansas River Farms, and Amity, a copy of which is included with this application. When the Amity Canal's water rights on the May Valley and Wiley drains are in priority, water available to the shares will be delivered to the Amity Canal via the May Valley and Wiley drains and the Division Engineer for Water Division No. 2 will consider such delivery as delivery to the Arkansas River.

During the 2019 plan year, the three sets of Fort Lyon Canal shares described above (7,509 shares in total) are expected to yield 7,200 acre-feet of fully consumable water. In the historical consumptive use analysis submitted with the 2017 Rule 14 plan application, LAWMA proposed monthly consumptive use factors associated with each Fort Lyon Canal augmentation station and recharge site based on the individual historical consumptive use analyses for the farms associated with each augmentation station or recharge site, and also proposed a 10-year farm headgate delivery volumetric limit, an annual maximum volumetric limit, and monthly maximum volumetric limits for all 7,509 shares. LAWMA will continue to rely on those consumptive use factors and volumetric limits during the 2019 plan year.

17. Excess consumptive use credits from the City of Lamar's operations. These credits are estimated to yield approximately 100 acre-feet. LAWMA is currently working on an agreement with the City of Lamar to acquire the excess consumptive use credits. Once an agreement for the 2019 plan year has been reached it will be submitted to the Division Engineer's office. This consumable water is derived from the City of Lamar's operation of its

plan for augmentation decreed in Case No. 05CW107-A, and includes water derived from 02CW181 Fort Bent Shares delivered by the City to its Clay Creek Recharge facility that is distinct from any water derived from the 02CW181 Fort Bent Shares delivered through the LAWMA Fort Bent Ditch Augmentation Station. LAWMA is currently working on an agreement with the City to acquire the excess consumptive use credits. Once an agreement has been reached it will be submitted to the Division Engineer's office. This consumable water is derived from the City's operation of its plan for augmentation decreed in Case No. 05CW107-A and includes 02CW181 Fort Bent Shares delivered by the City to its Clay Creek Recharge facility but does not include 02CW181 Fort Bent Shares delivered through the LAWMA Fort Bent Ditch Augmentation Station.

Any excess consumptive use credits derived from LAWMA's replacement water sources at the Stateline will be accumulated in the accounting and used to replace future Stateline depletions attributable to LAWMA's members' operations. Stateline credits derived from LAWMA's direct delivery to the Stateline, but not from Offset Account deliveries, will be carried forward more than one month consistent with the 10-year Compact accounting principles. Stateline credits derived from LAWMA's Offset Account deliveries to the Stateline will be carried forward indefinitely and used until all of the credits are exhausted, consistent with the Offset Account Crediting Agreement. In-state depletions or credits will only be carried forward one month for Rule 14 plan operations per the Division Engineer's policy. The concept for this accounting of carrying forward Stateline and in-state credits is shown in **Table 7**. It should be noted that while in-state credits are carried forward one month in **Table 7**, carried-forward credits are not needed for replacement of in-state depletions in the next month and therefore flow downstream to the Stateline.

Accounting

LAWMA will include monthly accounting for the structures within this plan within its monthly Rule 14 plan accounting. This accounting will be similar to accounting provided during the 2018 plan year with the addition of worksheets for the Highland and Keesee water rights that are currently maintained by the Division Engineer's Office and the additional Fort Lyon Canal shares delivered through a new augmentation station and installed recharge sites.

If you have any questions, please give me a call.

Hendrix Wai Engineering Inc.

Randy Hendrix

Randy L. Hendrix

Enclosure
cc: Donald F. Higbee w/enc.
Richard J. Mehren, Esq. w/enc.

TABLE A
SUMMARY OF LAWMA STRUCTURES COVERED UNDER LAWMA'S AUGMENTATION PLAN DECREED IN CASE NO. 02CW181

Type of Structure and Use	Total Number of Structures	Number of Active Structures	Number Augmented by Other Plans	Amount of Pumping Requested in Current Plan (ac-ft)
(1)	(2)	(3)	(4)	(5)
Alluvial Wells				
Irrigation	83	73	22	11,213
Turf Irrigation	9	7	0	226
Cattle Feedlot	8	6	0	425
Municipal	37	37	37	0
Other	18	16	0	603
Sub Total	155	139	59	12,468
Bedrock Wells				
Turf Irrigation	6	6	0	241
Truck Wash	3	2	0	25
Cattle Feedlot	9	9	0	313
Swine Facilities	31	29	0	713
Municipal	2	2	1	4
Other	2	2	0	7
Sub Total	53	50	1	1,303
Gravel Pits	11	9	0	780
Ponds (Evaporation)	14	12	0	387
Other Structures	13	12	0	326
Total of All Structures	246	222	60	15,264

TABLE B
Structures Added to the 02CW181 Augmentation Plan
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

SEO ID No. (1)	Suffix (2)	Name (3)	Permit No. (4)		Case No. (5)	Q40 (6)	Q160 (7)	Sec (8)	Ts (9)	Rng (10)	Distance_NS (11)	Distance_EW (12)	County (13)	Source (14)	Note (15)
6706881		Seaboard Foods, LLC.	81004	F	17CW3035	NE	NE	27	24 S	47 W	136 N	132 E	Prowers	Dakota Aquifer	1
6706882		Seaboard Foods, LLC.	81003	F	17CW3035	NW	NE	27	24 S	47 W	85 N	1743 E	Prowers	Dakota Aquifer	1
6706883		Seaboard Foods, LLC.	81002	F	17CW3035	SE	SE	22	24 S	47 W	343 S	136 E	Prowers	Dakota Aquifer	1
6706885		Granada Feeders, LLC.			17CW3035	SW	SW	22	23 S	44 W	1165 S	1110 W	Prowers	Cheyenne Aquifer	1
		Ullom Farm			16CW3018			19	22S	47W			Prowers		2

Notes:
1) Structures were added per Case No. 17CW3035 decree dated August 30,2018.
2) Structures were added per Case No. 16CW3018 decree dated October 19,2018.

TABLE C
PRE-COMPACT PUMPING and WELL HEAD DEPLETION
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

(all values in ac-ft)

SEO ID NO.	OWNER	H-I MODEL USER GROUP	ABOVE / BELOW BUFFALO CANAL	PRESUMPTIVE STREAM DEPLETION FACTOR	PRE-COMPACT PUMPING ALLOWANCE	PRE-COMPACT DEPLETION ALLOWANCE
1	2	3	4	5	6	7
6705109	Rock Tran, LLC	15	Above	0.850	58.5	49.7
6705513	Elk Mountain Cattle Co.	21	Below	0.680	111.1	75.5
				Grand Total	169.6	125.2
				Above Buffalo Canal	58.5	49.7
				Below Buffalo Canal	111.1	75.5
			User Groups	15	58.5	49.7
				21	111.1	75.5

TABLE 1
Structures in 02CW181 Augmentation Plan
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

SEO ID No. (1)	Suffix (2)	Name (3)	Permit No. (4)		Case No. (5)	Dep. Factor (6)	Q40 (7)	Q160 (8)	Sec (9)	Ts (10)	Rng (11)	Distance_NS (12)	Distance_EW (13)	County (14)	Source (15)
Alluvial Wells															
1705059	A	Spady Brothers	14061	R	W-3346	0.680	SW	NW	16	23 S	52 W	2241 N	1220 W	Bent	Arkansas River Valley Fill Aquifer
1705061	A	Spady Brothers	14063	R	W-3346	0.680	SW	SW	16	23 S	52 W	1247 S	13 W	Bent	Arkansas River Valley Fill Aquifer
1705062	A	Spady Brothers	9233	F	W-3346	0.680	NW	SW	15	23 S	52 W	2275 S	180 W	Bent	Arkansas River Valley Fill Aquifer
1705708	B	Huerfano River Management	53681	F	- - -	1.000	NE	NE	29	23 S	54W	1210 N	790 E	Otero	Arkansas River Valley Fill Aquifer
1706249	A	Las Animas Golf Course	49081	F	- - -	0.850	NE	SE	3	23 S	52 W	2200 S	500 E	Bent	Arkansas River Valley Fill Aquifer
6705029	A	Prowers Enterprises, LLC	10071	R	W 2695	0.850	NW	SE	35	22 S	48 W	1500 S	2680 W	Bent	Arkansas River Valley Fill Aquifer
6705030	A	City of Lamar	3655	R	W-418	1.000	NW	SE	32	24 S	46 W			Prowers	Clay Creek Alluvium
6705035	A	Prowers Enterprises, LLC	20015	R	418	0.850	SW	SW	36	22 S	48 W	40 S	40 W	Bent	Arkansas River Valley Fill Aquifer
6705037	A	Prowers Enterprises, LLC	2906	F	W 2695	0.850	SE	SE	33	22 S	48 W	1250 S	800 E	Bent	Arkansas River Valley Fill Aquifer
6705039	A	Prowers Enterprises, LLC	4502	F	W 2695	0.850	NE	SE	6	23 S	48 W	2200 S	1050 E	Bent	Arkansas River Valley Fill Aquifer
6705041	A	Prowers Enterprises, LLC	29682	F	83CW 73	0.850	SE	NE	6	23 S	48 W	2700 S	700 E	Bent	Arkansas River Valley Fill Aquifer
6705043	A	Prowers Enterprises, LLC	29680	F	83CW 73	0.850	SE	NE	5	23 S	48 W	1375 N	1230 E	Bent	Arkansas River Valley Fill Aquifer
6705044	A	Prowers Enterprises, LLC	10073	R	W 2695	0.850	SE	NE	5	23 S	48 W	1350 N	1250 E	Bent	Arkansas River Valley Fill Aquifer
6705045	A	Prowers Enterprises, LLC	29681	F	83CW 73	0.850	SE	NE	5	23 S	48 W	1550 N	1220 E	Bent	Arkansas River Valley Fill Aquifer
6705046	A	Prowers Enterprises, LLC	10072	R	W 2695	0.850	SE	NE	5	23 S	48 W	1600 N	1220 E	Bent	Arkansas River Valley Fill Aquifer
6705076	A	CDOC-VA Well No. 397	11766	R	81CW200	0.850	SW	NE	4	23S	51W	1803 N	1627 E	Bent	Arkansas River Valley Fill Aquifer
6705077	A	CDOC-VA Well No. 396	11765	R	81CW200	0.850	SW	NE	4	23S	51W	1637 N	1545 E	Bent	Arkansas River Valley Fill Aquifer
6705078	A	CDOC-VA Well No. 22	11767	R	81CW200	0.680	NW	NW	4	23S	51W	65 N	1313 W	Bent	Arkansas River Valley Fill Aquifer
6705079	A	CDOC-VA Well No. 381	11764	R	81CW200	0.680	NW	NW	4	23S	51W	78 N	290 W	Bent	Arkansas River Valley Fill Aquifer
6705080	A	CDOC-VA Well No. 249	22972	F	81CW200	0.680	SE	NW	4	23S	51W	2620 N	2048 W	Bent	Arkansas River Valley Fill Aquifer
6705103	A	Larry Winger, LLC	20014	R	CA 418	0.850	NW	SW	31	22S	47W	1450 S	60 W	Prowers	Arkansas River Valley Fill Aquifer
6705104	A	Donald C. and Peggy E. Brown	20014	T	CA 418	0.850	NW	SW	31	22S	47W	1400 S	960 W	Prowers	Arkansas River Valley Fill Aquifer
6705105	A	Larry Winger, LLC	20014	S	CA 418	0.680	NW	SW	31	22S	47W	2500 S	75 W	Prowers	Arkansas River Valley Fill Aquifer
6705106	A	Larry Winger, LLC	2744	F	W-3444	0.680	SW	NW	31	22S	47W	3000 S	350 W	Prowers	Arkansas River Valley Fill Aquifer
6705107	B	Colorado Beef	42942	F	- - -	1.000	NE	NW	31	22 S	47 W	300 N	1800 W	Prowers	Arkansas River Valley Fill Aquifer
6705108	A	Colorado Beef	42941	F	- - -	1.000	SE	SW	30	22 S	47 W	5100 N	1800 W	Prowers	Arkansas River Valley Fill Aquifer
6705109	A	Rock Tran, LLC	20088	R	W-3149	0.682	SW	SW	32	22S	47W	150 S	650 W	Prowers	Arkansas River Valley Fill Aquifer
6705224	A	Wiley School	48076	F	- - -	0.850	NW	NW	8	22 S	47 W	590 N	620 W	Prowers	Arkansas River Valley Fill Aquifer
6705244	A	City of Lamar	20018	Y	W-4015	1.000	NW	SW	3	23 S	46 W	1725 S	600 W	Prowers	Clay Creek Alluvium
6705245	A	City of Lamar	20018	X	W-4015	1.000	SW	SW	3	23 S	46 W	1000 S	1250 W	Prowers	Clay Creek Alluvium
6705246	A	City of Lamar	20018	W	W-4015	1.000	NE	NW	10	23 S	46 W	350 N	1425 W	Prowers	Clay Creek Alluvium
6705247	A	City of Lamar	20018	V	W-4015	1.000	NW	NW	10	23 S	46 W	1310 N	1150 W	Prowers	Clay Creek Alluvium
6705248	A	City of Lamar	20018	U	W-4015	1.000	SW	NW	10	23 S	46 W	2125 N	975 W	Prowers	Clay Creek Alluvium
6705249	A	City of Lamar	20018	T	W-4015	1.000	NE	SW	10	23 S	46 W	2400 S	2450 W	Prowers	Clay Creek Alluvium
6705250	A	City of Lamar	20018	S	W-4015	1.000	SE	SW	10	23 S	46 W	1310 S	2525 W	Prowers	Clay Creek Alluvium
6705251	A	City of Lamar	20018	R	W-4015	1.000	SE	SW	10	23 S	46 W	450 S	2575 W	Prowers	Clay Creek Alluvium
6705252	A	City of Lamar	19937	V	W-4015	1.000	NE	NW	15	23 S	46 W	525 N	1800 W	Prowers	Clay Creek Alluvium
6705253	A	City of Lamar	19937	U	W-4015	1.000	SW	NW	15	23 S	46 W	1825 N	715 W	Prowers	Clay Creek Alluvium
6705254	A	City of Lamar	19937	S	W-4015	1.000	NW	SW	15	23 S	46 W	2640 S	1000 W	Prowers	Clay Creek Alluvium
6705255	A	City of Lamar	19937	R	W-4015	1.000	SW	SW	15	23 S	46 W	1319 S	650 W	Prowers	Clay Creek Alluvium
6705256	A	City of Lamar	18309	V	W-4015	1.000	SW	SW	15	23 S	46 W	550 S	400 W	Prowers	Clay Creek Alluvium
6705257	A	City of Lamar	18309	W	W-4015	1.000	SW	NW	22	23 S	46 W	2000 N	1285 W	Prowers	Clay Creek Alluvium
6705258	A	City of Lamar	18309	U	W-4015	1.000	NE	NW	22	23 S	46 W	600 N	1850 W	Prowers	Clay Creek Alluvium
6705259	A	City of Lamar	18309	X	W-4015	1.000	NW	NW	22	23 S	46 W	600 N	500 W	Prowers	Clay Creek Alluvium
6705260	A	City of Lamar	18309	S	W-4015	1.000	SW	NW	22	23 S	46 W	2700 S	675 W	Prowers	Clay Creek Alluvium
6705261	A	City of Lamar	18309	T	W-4015	1.000	SE	SW	22	23 S	46 W	300 S	2100 W	Prowers	Clay Creek Alluvium
6705262	A	City of Lamar	4003	F	W-706	1.000	NE	SE	8	24 S	46 W	1730 S	200 E	Prowers	Clay Creek Alluvium
6705263	A	City of Lamar	18309	R	W-4015	1.000	NE	NW	27	23 S	46 W	570 N	2200 W	Prowers	Clay Creek Alluvium
6705264	A	City of Lamar	3808	F	W-1051	1.000	SE	SE	33	23 S	46 W	1300 S	625 E	Prowers	Clay Creek Alluvium
6705265	A	City of Lamar	3809	F	W-1051	1.000	SW	NE	33	23 S	46 W	1900 N	1550 E	Prowers	Clay Creek Alluvium
6705266	A	City of Lamar	3747	F	W-1051	1.000	SW	NW	9	24 S	46 W	2600 N	75 W	Prowers	Clay Creek Alluvium
6705267	A	City of Lamar	3390	F	W-706	1.000	NE	SE	8	24 S	46 W	2550 S	500 E	Prowers	Clay Creek Alluvium
6705268	A	City of Lamar	3391	F	W-706	1.000	NE	SE	8	24 S	46 W	2050 S	800 E	Prowers	Clay Creek Alluvium
6705269	A	City of Lamar	10750	F	W-1051	1.000	NW	SE	21	24 S	46 W	2175 S	1950 E	Prowers	Clay Creek Alluvium
6705270	A	City of Lamar	10748	F	W-1051	1.000	NE	NE	28	24 S	46 W	580 N	200 E	Prowers	Clay Creek Alluvium
6705271	A	City of Lamar	10749	F	W-1051	1.000	NW	NE	33	24 S	46 W	1000 N	2550 E	Prowers	Clay Creek Alluvium

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6705277	A	Lamar Light and Power	3405	RF	02CW089	1.000	SW	SW	29	22 S	46 W	1200 S	300 W	Prowers	Arkansas River Valley Fill Aquifer
6705292	A	City of Lamar	Unreg.		- - -	0.850	SE	NW	32	22 S	46 W	2000 N	1350 W	Prowers	Arkansas River Valley Fill Aquifer
6705293	A	City of Lamar	Unreg.		- - -	0.850	SE	NW	32	22 S	46 W	2050 N	1350 W	Prowers	Arkansas River Valley Fill Aquifer
6705299	A	Colorado State Parks (Lake Hasty)	45243	F	- - -	0.650	SW	SE	5	23 S	49 W	1105 S	2515 E	Bent	Arkansas River Valley Fill Aquifer
6705300	A	U.S. Corps of Engineers (Lake Hasty)	45242	F	- - -	0.650	NE	NE	8	23 S	49 W	655 N	1230 E	Bent	Arkansas River Valley Fill Aquifer
6705350	A	GP Resources, LLC	79628	F	W-1822 / 12CW37	1.000	NW	NE	32	22S	46W	1140N	1390E	Prowers	Arkansas River Valley Fill Aquifer
6705355	A	GP Resources, LLC	79631	F	W-1822 / 12CW37	1.000	NE	NE	32	22S	46W	1150N	50E	Prowers	Arkansas River Valley Fill Aquifer
6705355	B	GP Resources, LLC	79631	F	W-1822 / 12CW37	1.000	NE	NE	32	22S	46W	1150N	50E	Prowers	Arkansas River Valley Fill Aquifer
6705372	A	City of Lamar	15270	R	- - -	0.850	NW	NW	31	22 S	46 W	1000 N	1275 W	Prowers	Arkansas River Valley Fill Aquifer
6705373	A	GP Resources, LLC	79629	F	W-1822 / 12CW37	1.000	NE	NW	33	22S	46W	1140N	2650W	Prowers	Arkansas River Valley Fill Aquifer
6705373	B	GP Resources, LLC	79629	F	W-1822 / 12CW37	1.000	NE	NW	33	22S	46W	1140N	2650W	Prowers	Arkansas River Valley Fill Aquifer
6705374	A	GP Resources, LLC	79630	F	W-1822 / 12CW37	1.000	NE	NW	34	22S	46W	1110N	1840W	Prowers	Arkansas River Valley Fill Aquifer
6705388	A	City of Lamar	21767	F	W-1609	1.000	NW	NW	20	23 S	46 W	800 N	350 W	Prowers	Clay Creek Alluvium
6705389	A	Roth and Sons, John	6436	R	W 1822	0.680	SE	NW	32	22 S	45 W	2550 N	2200 W	Prowers	Arkansas River Valley Fill Aquifer
6705390	A	Roth and Sons, John	4160	F	W 1822	0.680	NE	NW	33	22 S	45 W	605 N	1355 W	Prowers	Arkansas River Valley Fill Aquifer
6705398	A	City of Lamar	18309	Y	W-4015	1.000	NE	NW	27	23 S	46 W	200 N	1975 W	Prowers	Clay Creek Alluvium
6705423	A	City of Lamar	3746	F	W-1051	1.000	NW	NE	33	23 S	46 W			Prowers	Clay Creek Alluvium
6705424	A	City of Lamar	19151	R	- - -	1.000	NW	NW	22	23 S	46 W			Prowers	Clay Creek Alluvium
6705432	A	Prowers County Grazing, Inc.	57924	F	- - -	1.000	SW	NE	9	21 S	45 W	1525 N	2495 E	Prowers	Big Sandy Creek Alluvium
6705475	A	Jones, Carl	5288	F	W1317	0.680	SE	SW	7	23 S	43 W	1100 S	1950 W	Prowers	Arkansas River Valley Fill Aquifer
6705477	G	GP Irrigated Farms LLC	12876	RR	W3236	0.850	NW	NW	1	23S	44W	150 N	200 W	Prowers	Arkansas River Valley Fill Aquifer
6705481	A	GP Resources, LLC	79634	F	W-1459 / 12CW37	1.000	SW	SE	1	23S	44W	630S	2570E	Prowers	Arkansas River Valley Fill Aquifer
6705491	A	GP Resources, LLC	79632	F	W-3236 / 12CW37	1.000	SW	NE	10	23S	44W	2550N	2390E	Prowers	Arkansas River Valley Fill Aquifer
6705495	A	Granada Feeders, LLC	55777	F	00CW129	1.000	NE	NW	22	23 S	44 W	20 N	1875 W	Prowers	Arkansas River Valley Fill Aquifer
6705513	A	Elk Mountain Cattle Co.	18252	R	W 2060	0.680	SW	SE	36	22 S	44 W	320 S	2600 E	Prowers	Arkansas River Valley Fill Aquifer
6705514	A	Elk Mountain Cattle Co.	6795	F	W 2060	0.850	NW	NE	1	23 S	44 W	20 N	2000 E	Prowers	Arkansas River Valley Fill Aquifer
6705515	A	Division of Wildlife (X-Y Ranch)	55482 19219	F R	- - -	0.680	SW	NE	6	23 S	43 W	2600 N	2620 E	Prowers	Arkansas River Valley Fill Aquifer
6705516	A	Division of Wildlife (X-Y Ranch)	5708	FR	- - -	0.680	SE	NW	5	23 S	43 W	2024 N	1814 W	Prowers	Arkansas River Valley Fill Aquifer
6705517	A	Division of Wildlife (X-Y Ranch)	55483 6533	F F	- - -	0.680	NE	SE	5	23 S	43 W	1775 S	510 E	Prowers	Arkansas River Valley Fill Aquifer
6705518	A	Division of Wildlife (X-Y Ranch)	9573	F	- - -	0.680	SE	NE	8	23 S	43 W	1490 N	55 E	Prowers	Arkansas River Valley Fill Aquifer
6705519	A	Division of Wildlife (X-Y Ranch)	6534	FR	- - -	0.680	NW	NW	8	23 S	43 W	928 N	1076 W	Prowers	Arkansas River Valley Fill Aquifer
6705520	A	Division of Wildlife (X-Y Ranch)	55481 19467	F R	- - -	0.680	NE	NE	7	23 S	43 W	1200 N	450 E	Prowers	Arkansas River Valley Fill Aquifer
6705521	A	Division of Wildlife (X-Y Ranch)	5882	R	W 2104	0.680	SW	SW	6	23 S	43 W	1300 S	170 W	Prowers	Arkansas River Valley Fill Aquifer
6705522	A	Division of Wildlife (X-Y Ranch)	5881	R	W 2104	0.680	NW	NW	7	23 S	43 W	1210 N	635 W	Prowers	Arkansas River Valley Fill Aquifer
6705523	A	Division of Wildlife (X-Y Ranch)	5880	R	W 2104	0.680	SW	NW	7	23 S	43 W	1600 N	820 W	Prowers	Arkansas River Valley Fill Aquifer
6705524	A	Division of Wildlife (X-Y Ranch)	19467	U	W 2104	0.680	NW	SW	7	23 S	43 W	2640 S	85 W	Prowers	Arkansas River Valley Fill Aquifer
6705525	A	Division of Wildlife (X-Y Ranch)	5879	R	W 2104	0.680	SE	SE	8	23 S	43 W	700 S	120 E	Prowers	Arkansas River Valley Fill Aquifer
6705526	A	Division of Wildlife (X-Y Ranch)	19467	T	W 2104	0.680	NW	NW	16	23 S	43 W	750 N	1175 W	Prowers	Arkansas River Valley Fill Aquifer
6705527	A	Lower Arkansas Water Management Association	5878	R	W 2104	1.000	SW	NE	16	23 S	43 W	1850 N	1930 E	Prowers	Arkansas River Valley Fill Aquifer
6705528	A	Division of Wildlife (X-Y Ranch)	10158	F	W 2104	0.680	SW	NE	16	23 S	43 W	1350 N	1775 E	Prowers	Arkansas River Valley Fill Aquifer
6705529	A	J-S Farms	19467	V	W-2104	0.850	SW	NE	16	23S	43W	2326 N	2075 E	Prowers	Arkansas River Valley Fill Aquifer
6705530	A	J-S Farms	5877	R	W 2104	0.850	SW	NE	16	23 S	43 W	2600 N	2250 E	Prowers	Arkansas River Valley Fill Aquifer
6705531	A	J-S Farms	19467	S	W-2104	0.850	NW	SE	16	23S	43W	2308 S	2442 E	Prowers	Arkansas River Valley Fill Aquifer
6705532	A	Lower Arkansas Water Management Association	5883	R	W 2104	0.680	NE	SW	15	23 S	43 W	2550 S	2580 W	Prowers	Arkansas River Valley Fill Aquifer
6705539	A	GP Resources, LLC	79635	F	W-3303 / 12CW37	1.000	SW	NW	11	23S	44W	2240N	600W	Prowers	Arkansas River Valley Fill Aquifer

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6705543	G	GP Irrigated Farms LLC	3124	F	W1940	0.850	NW	SE	31	22S	44W	1650 S	2640 E	Prowers	Arkansas River Valley Fill Aquifer
6705543	B	GP Resources, LLC	79633	F	W-1940 / 12CW37	1.000	SE	SW	31	22S	44W	1220S	2530W	Prowers	Arkansas River Valley Fill Aquifer
6705545	G	GP Irrigated Farms LLC	3642	F	W1936	0.850	NW	SE	32	22S	44W	2075 S	2375 E	Prowers	Arkansas River Valley Fill Aquifer
6705546	G	GP Irrigated Farms LLC	15620	R	W1936	0.850	NW	NE	5	23S	44W	300 N	2400 E	Prowers	Arkansas River Valley Fill Aquifer
6705655	A	Roth and Sons, John	2824	R	W 1822	0.680	NW	SW	32	22 S	45 W	2575 S	305 W	Prowers	Arkansas River Valley Fill Aquifer
6705656	A	Roth and Sons, John	6435	R	W 1822	0.680	NW	NW	33	22 S	45 W	620 N	700 W	Prowers	Arkansas River Valley Fill Aquifer
6705657	A	Roth and Sons, John	4229	F	W 1822	0.680	NE	NE	32	22 S	45 W	810 N	35 E	Prowers	Arkansas River Valley Fill Aquifer
6705717	H	GP Irrigated Farms LLC	20562	F	W4795	0.880		NE	35	23S	42W	1320 N	1320 E	Prowers	Arkansas River Valley Fill Aquifer
6705720	H	GP Irrigated Farms LLC	21595	F	W4795	0.880		NW	35	23S	42W	1320 N	1320 W	Prowers	Arkansas River Valley Fill Aquifer
6705722	H	GP Irrigated Farms LLC	20566	F	W4795	0.880		SE	36	23S	42W	1320 S	1320 E	Prowers	Arkansas River Valley Fill Aquifer
6705723	H	GP Irrigated Farms LLC	21593	F	W4795	0.880		NE	36	23S	42W	1320 N	1320 E	Prowers	Arkansas River Valley Fill Aquifer
6705724	H	GP Irrigated Farms LLC	13985	F	W854	0.880	SW	NE	25	23S	42W	1475 N	2260 E	Prowers	Arkansas River Valley Fill Aquifer
6705725	H	GP Irrigated Farms LLC	20457	FR	79CW147	0.880	NE	SW	30	23S	41W	2487 S	1471 W	Prowers	Arkansas River Valley Fill Aquifer
6705726	H	GP Irrigated Farms LLC	15065	F	W1939	0.880	SE	NW	31	23S	41W	1725 N	1430 W	Prowers	Arkansas River Valley Fill Aquifer
6705727	H	GP Irrigated Farms LLC	5985	R	W499	0.880	NW	NW	30	23S	41W	90 N	110 W	Prowers	Arkansas River Valley Fill Aquifer
6705728	H	GP Irrigated Farms LLC	21062	F	79CW147	0.880	NE	NE	31	23S	41W	1310 N	1310 E	Prowers	Arkansas River Valley Fill Aquifer
6705729	H	GP Irrigated Farms LLC	17105	F	W1939	0.880	NE	SW	29	23S	41W	1400 S	1670 W	Prowers	Arkansas River Valley Fill Aquifer
6705731	H	GP Irrigated Farms LLC	8844	F	W1939	0.880	NW	NW	29	23S	41W	950 S	480 W	Prowers	Arkansas River Valley Fill Aquifer
6705733	H	GP Irrigated Farms LLC	6776	F	W1939	0.880	NW	NW	29	23S	41W	550 N	500 W	Prowers	Arkansas River Valley Fill Aquifer
6705736	H	GP Irrigated Farms LLC	20567	F	W4795	0.880		SE	6	23S	41W	1320 S	1320 E	Prowers	Arkansas River Valley Fill Aquifer
6705737	H	GP Irrigated Farms LLC	19422	R	W499	0.880	NW	NE	30	23S	41W	105 N	2215 E	Prowers	Arkansas River Valley Fill Aquifer
6705760	A	City of Lamar	19937	T	W-4015	1.000	NE	NW	22	23 S	46 W			Prowers	Clay Creek Alluvium
6705774	H	GP Irrigated Farms LLC	11063	FR	W2066	0.880	SE	SW	23	23S	42W	1314 S	2104 W	Prowers	Arkansas River Valley Fill Aquifer
6705775	H	GP Irrigated Farms LLC	20129	FR	W4501	0.880	NW	SE	23	23S	42W	1329 S	1479 E	Prowers	Arkansas River Valley Fill Aquifer
6705805	A	Butte Creek & River Reserve, GP	67382	F	- - -	0.850	SW	NE	21	23 S	42 W	1641 N	1896 E	Prowers	Arkansas River Valley Fill Aquifer
6705808	A	Butte Creek & River Reserve, GP	17760	F	W-3353	0.850	NE	SW	20	23 S	42 W	1680 S	2600 W	Prowers	Arkansas River Valley Fill Aquifer
6705809	A	Butte Creek & River Reserve, GP	17759	F	W-3353	0.850	NW	NW	20	23 S	42 W	1220 N	100 W	Prowers	Arkansas River Valley Fill Aquifer
6705866	A	Arambel Ranch	197613		- - -	1.000	NE	SE	17	22 S	42 W	2580 S	870 E	Prowers	Arkansas River Valley Fill Aquifer
6705910	A	City of Lamar	78	RF	W-1609	1.000	NE	NW	22	23 S	46 W			Prowers	Clay Creek Alluvium
6706021	A	Prowers Enterprises, LLC	51981	F	- - -	0.850	NE	SE	6	23 S	48 W	2200 S	1100 E	Bent	Arkansas River Valley Fill Aquifer
6706101	A	Rush Creek Farms	18943	F	14CW3059	0.850	NW	SW	6	18 S	46 W	1780 S	1050 W	Kiowa	Rush Creek Alluvium
6706101	B	Rush Creek Farms	77412	F		1.000	NW	SW	6	18 S	46 W	1780 S	1050 W	Kiowa	Rush Creek Alluvium
6706142	A	National Park Service	13260	RR	W3235	0.850	NW	SW	30	17 S	45 W	1526 S	1161 W	Kiowa	Big Sandy Creek Alluvium
6706153	A	Kirk A. Barlow	24347	F	W-4509 / 01CW58	0.850	SW	NE	36	17S	47W	2600 N	1960 E	Kiowa	Big Sandy Creek Alluvium
6706154	A	Rush Creek Farms	18944	F	14CW3059	0.850	SE	SE	36	17 S	47 W	120 S	400 E	Kiowa	Rush Creek Alluvium
6706154	B	Rush Creek Farms	77413	F		1.000	SE	SE	36	17 S	47 W	120 S	400 E	Kiowa	Rush Creek Alluvium
6706167	A	Kirk A. Barlow	46559	F	W-4509 / 01CW58	0.850	SE	SW	25	17S	47W	950 S	2600 W	Kiowa	Big Sandy Creek Alluvium
6706221	A	Dale Mitchek, LLC	74990	F		1.000	SE	SW	20	14 S	46 W	836 S	2447 W	Cheyenne	Eureka Creek Alluvium
6706288	A	Lawrence A. and Charlene K. Monks	74662	F		1.000	SW	SW	8	10 S	55 W	200 S	300 W	Lincoln	Big Sandy Creek Alluvium
6706329	A	Kirk A. Barlow	47076	F	W-4509 / 01CW58	0.850	NW	NE	36	17S	47W	500 N	1950 E	Kiowa	Big Sandy Creek Alluvium
6706337	A	City of Lamar	47754	F	- - -	0.850	NW	SE	31	22 S	46 W			Prowers	Arkansas River Valley Fill Aquifer
6706338	A	City of Lamar	47755	F	- - -	0.850	SW	SW	31	22 S	46 W			Prowers	Arkansas River Valley Fill Aquifer
6706339	A	City of Lamar	47753	F	- - -	1.000								Prowers	Willow Creek Alluvium
6706376	A	Prowers County Grazing, Inc.	52927	F	- - -	0.850	SE	NW	9	21 S	45 W	1525 N	2600 E	Prowers	Big Sandy Creek Alluvium
6706381	A	Prowers County Grazing, Inc.	57925	F	- - -	0.850	NE	SW	9	21 S	45 W	2500 S	2200 W	Prowers	Big Sandy Creek Alluvium
6706394	A	Kirk A. Barlow	58547	F	W-4509 / 01CW58	0.850	SW	SE	25	17S	47W	500 S	1950 E	Kiowa	Big Sandy Creek Alluvium
6706396	A	VA Cemetery Well	77297	F	- - -	0.850	NW	NE	4	23 S	51 W	34 N	2089 E	Bent	Arkansas River Valley Fill Aquifer
6706397	A	City of Lamar (Shop Well)	61987	F	- - -	1.000	NE	SE	31	22 S	46 W	2100 S	850 E	Prowers	Arkansas River Valley Fill Aquifer
6706406	A	City of Lamar (Well No. 47)	66423	F	05CW107	1.000	SE	SE	10	23 S	46 W	600 S	800 E	Prowers	Clay Creek Alluvium
6706408	A	City of Lamar (Well No. 31 Backup)	66423	F	05CW107	1.000	SE	SE	10	23 S	46 W	600 S	800 E	Prowers	Clay Creek Alluvium
6706452	A	Big Sandy Cattle Company	74810	F	- - -	0.040	NE	NW	18	15S	47W	1268 N	1396 W	Cheyenne	Big Sandy Creek Alluvium
6706453	A	Big Sandy Cattle Company	74811	F	- - -	0.040	NW	NW	18	15S	47W	823 N	947 W	Cheyenne	Big Sandy Creek Alluvium

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- - -		Big Sandy Cattle Company	156617		- - -	0.000	SE	SW	7	15S	47W	153 S	1760 W	Cheyenne	Big Sandy Creek Alluvium
- - -		Bentwood Ranch, LLC	239888		- - -	0.000	NE	NE	25	22 S	45 W	220 N	230 E	Prowers	Arkansas River Valley Fill Aquifer
					Bedrock Wells										
1706216	A	Mountain Prairie, LLC	61678	F	- - -	1.000	SW	NW	2	24 S	52 W	2840 S	180 W	Bent	Cheyenne Aquifer
1706220	A	Mountain Prairie, LLC	61694	F	- - -	1.000	NW	NW	27	24 S	52 W	100 N	650 W	Bent	Dakota/Cheyenne Aquifer
1706360	A	DiRezza Land and Cattle	49656	F	- - -	1.000	SW	NE	33	22 S	53 W	1625 N	1856 E	Bent	68% Dakota / 32% Cheyenne Aquifer
1706415	A	Mountain Prairie, LLC	61675	F	- - -	1.000	NE	NE	2	24 S	52 W	800 N	600 E	Bent	Cheyenne Aquifer
1706416	A	Mountain Prairie, LLC	61653	F	- - -	1.000	NW	NW	2	24 S	52 W	700 N	900 W	Bent	Cheyenne Aquifer
1706417	A	Mountain Prairie, LLC	61666	F	- - -	1.000	SE	NE	2	24 S	52 W	1400 N	700 E	Bent	Cheyenne Aquifer
1706418	A	Mountain Prairie, LLC	61670	F	- - -	1.000	SW	SW	2	24S	52 W	800 S	750 W	Bent	Cheyenne Aquifer
1706419	A	Mountain Prairie, LLC	61674	F	- - -	1.000	NW	NE	11	24 S	52 W	400 N	2300 E	Bent	Cheyenne Aquifer
1706420	A	Mountain Prairie, LLC	61656	F	- - -	1.000	NE	NW	11	24 S	52 W	1100 N	2300 W	Bent	Cheyenne Aquifer
1706421	A	Mountain Prairie, LLC	61664	F	- - -	1.000	SW	SE	11	24 S	52 W	900 S	2300 E	Bent	Cheyenne Aquifer
1706422	A	Mountain Prairie, LLC	56190	F	- - -	1.000	SW	SE	11	24 S	52 W	150 S	2300 E	Bent	Cheyenne Aquifer
1706423	A	Mountain Prairie, LLC	61695	F	- - -	1.000	SE	NE	2	24 S	52 W	2300 N	150 E	Bent	Dakota/Cheyenne Aquifer
1706487	A	Mountain Prairie, LLC	61449	F	- - -	1.000	SE	SE	23	24 S	52 W	100 S	100 E	Bent	Cheyenne Aquifer
1706488	A	Mountain Prairie, LLC	61450	F	- - -	1.000	SE	SE	14	24 S	52 W	100 S	100 E	Bent	Cheyenne Aquifer
6705304	A	Broyles Land & Water LLLP	13245	RR	W2695	0.850	NW	NE	2	23S	48W	788 N	2051 E	Bent	Dakota Aquifer
6706217	A	Bristol-Granada Cemetery District	55009	F	- - -	0.850	SE	NE	23	22 S	44 W	1720 N	180 E	Prowers	Fort Hays Aquifer
6706332	A	R. E. Turpin Trust	131397	A	- - -	1.000	SW	SW	31	21 S	46 W	1188 S	657 W	Prowers	Dakota Aquifer
6706340	A	Pioneer Pork, LLC	47879	F	- - -	1.000	SE	SW	30	27 S	44 W	50 S	1607 W	Prowers	Dakota Aquifer
6706347	A	WhiteStone Farms, LLC (Dry Creek)	50387	F	- - -	1.000	SW	SW	32	23 S	47 W	109 S	1182 W	Prowers	Dakota Aquifer
6706348	A	WhiteStone Farms, LLC (Dry Creek)	50385	F	- - -	1.000	SE	SW	32	23 S	47 W	83 S	2508 W	Prowers	Cheyenne Aquifer
6706349	A	WhiteStone Farms, LLC (Dry Creek)	50386	F	- - -	1.000	SE	SE	32	23 S	47 W	69 S	112 E	Prowers	Cheyenne Aquifer
6706356	A	Colorado Pork, LLC	49699	F	- - -	1.000	NW	NE	27	24 S	47 W	50 N	2610 E	Prowers	Cheyenne Aquifer
6706359	A	WhiteStone Farms, LLC (Rocky Ridge)	50644	FR	- - -	1.000	SE	NE	20	23 S	49 W	1411 N	683 E	Bent	Cheyenne Aquifer
6706360	A	WhiteStone Farms, LLC (Rocky Ridge)	50645	F	- - -	1.000	SW	NE	20	23 S	49 W	1411 N	1323 E	Bent	Cheyenne Aquifer
6706361	A	R. E. Turpin Trust	62575		- - -	1.000	SW	SW	31	21 S	46 W	890 S	237 W	Prowers	Dakota Aquifer
6706367	A	Colorado Pork, LLC	51716	F	- - -	1.000	NW	NE	27	24 S	47 W	100 N	1810 E	Prowers	Cheyenne Aquifer
6706368	A	WhiteStone Farms, LLC (Rocky Ridge)	54278	F	- - -	1.000	SE	NE	20	23 S	49 W	1950 N	2200 E	Bent	Dockum Aquifer
6706380	A	Christensen Farms Midwest LLC	62110	F	- - -	1.000	SE	NE	27	24 S	47 W	1580 N	50 E	Prowers	Dakota Aquifer
6706382	A	Granada Water Association	57125	F	- - -	1.000	SW	SE	2	22 S	45 W	75 S	2400 E	Prowers	Dakota Aquifer
6706384	A	Lamar Community College	58509	F	- - -	0.850	NE	NE	7	23 S	46 W	700 N	695 E	Prowers	Dakota Aquifer
6706398	A	Beef City, Inc	250973		03CW70	1.000	SE	SW	5	22 S	48 W	75 S	2768 E	Bent	Cheyenne Aquifer
6706399	A	Beef City, Inc	245510		- - -	1.000	SE	SE	5	22 S	48 W	20 S	1115 E	Bent	Dakota Aquifer
6706400	A	Beef City, Inc	245871		- - -	1.000	SW	SW	4	22 S	48 W	20 S	50 W	Bent	Dakota Aquifer
6706401	A	Beef City, Inc	246342		- - -	1.000	SW	SW	4	22 S	48 W	50 S	1083 W	Bent	Dakota Aquifer
6706402	A	Beef City, Inc	249776		03CW70	1.000	SE	SW	4	22 S	48 W	50 S	2500 W	Bent	Cheyenne Aquifer
6706403	A	Beef City, Inc	247716		03CW70	1.000	SW	SE	4	22 S	48 W	50 S	3940 W	Bent	Dakota Aquifer
6706404	A	Beef City, Inc	247717		03CW70	1.000	SW	SW	33	21 S	48 W	1307 S	50 W	Bent	Dakota Aquifer
6706407	A	Granada Feeders, LLC	64976	F	03CW60	1.000	NW	NW	22	23 S	44 W	735 N	950 W	Prowers	Cheyenne Aquifer
6706408	A	City of Lamar (Well No. 31 Backup)	74738	F	05CW107	1.000	NW	NW	20	23 S	46 W	325 N	139 W	Prowers	Cheyenne Aquifer
6706409	A	Granada Feeders, LLC	65746	F	03CW60	1.000	NW	SW	22	23 S	44 W	1500 S	300 W	Prowers	Cheyenne Aquifer
6706459	A	Colorado Division of Wildlife	284065		- - -	1.000	NW	SE	36	22 S	46 W	1880 S	1545 E	Prowers	Cheyenne Aquifer
6706460	A	E. Prowers Cemetery District (Hartman)	76909	F	12CW37	1.000	NW	NE	26	22S	43W	245N	2402E	Prowers	Fort Hays Limestone
6706461	A	E. Prowers Cemetery District (Holly)	76908	F	12CW37	1.000	NW	SE	11	23S	42W	1352S	2593W	Prowers	Dakota Sandstone
6706462	A	Holly School District RE-3	76681	F	12CW37	0.850	NE	NE	15	23S	42W	500N	940E	Prowers	Dakota Sandstone
6706469	A	McClave School District RE-2	77991	F	13CW3065	0.850	SE	NE	13	22 S	49 W	1880 N	100 E	Bent	Cheyenne Aquifer
6706881		Seaboard Foods, LLC	81004	F	17CW3035	1.000	NE	NE	27	24 S	47 W	136 N	132 E	Prowers	Dakota Aquifer
6706882		Seaboard Foods, LLC	81003	F	17CW3035	1.000	NW	NE	27	24 S	47 W	85 N	1743 E	Prowers	Dakota Aquifer
6706883		Seaboard Foods, LLC	81002	F	17CW3035	1.000	SE	SE	22	24 S	47 W	343 S	136 E	Prowers	Dakota Aquifer
6706885		Granada Feeders, LLC			17CW3035	1.000	SW	SW	22	23 S	44 W	1165 S	1110 W	Prowers	Cheyenne Aquifer
- - -		Beef City, Inc	245870		- - -	1.000	SE	SW	5	22 S	48 W	75 S	2768 E	Bent	Dakota Aquifer
- - -		Beef City, Inc	246341		- - -	1.000	SE	SW	4	22 S	48 W	50 S	2043 W	Bent	Dakota Aquifer
- - -		Granada Feeders, LLC	248443		03CW60	1.000	NW	NW	22	23 S	44 W	705 N	880 W	Prowers	Dakota Aquifer
- - -		Granada Feeders, LLC	- - -		03CW60	1.000	NW	SW	22	23 S	44 W	1400 S	150 W	Prowers	Dakota Aquifer

TABLE 1
Structures in 02CW181 Augmentation Plan
LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

SEO ID No. (1)	Suffix (2)	Name (3)	Permit No. (4)	Case No. (5)	Dep. Factor (6)	Q40 (7)	Q160 (8)	Sec (9)	Ts (10)	Rng (11)	Distance_NS (12)	Distance_EW (13)	County (14)	Source (15)
		Gravel Pit Related Structures												
1706490		Bent County Ready-Mix (M-95-7)	48758 F	- - -	1.000	NW	NE	8	23 S	52 W			Bent	Arkansas River Valley Fill Aquifer
6705785		Midwestern Farms Resources	54629 F	- - -	1.000	NW	SW	18	23 S	42 W	2575 S	225 E	Prowers	Arkansas River Valley Fill Aquifer
- - -		Midwestern Farms Resources (M-93-59)	53050 F	- - -	1.000	NE	NW	18	23 S	42 W			Prowers	Arkansas River Valley Fill Aquifer
6705953		All Rite Paving & Redi-Mix, Inc.	47192 F	- - -	1.000	SW	NE	30	22 S	46 W	1850 N	1540 E	Prowers	Arkansas River Valley Fill Aquifer
6705999		All Rite Paving & Redi-Mix, Inc. (M-87-79)	47193 F	- - -	1.000	SW	NW	30	22 S	46 W			Prowers	Arkansas River Valley Fill Aquifer
6706357		Prowers County (M-97-16)	49444 F	- - -	1.000	SE	NW	26	22 S	46 W			Prowers	Arkansas River Valley Fill Aquifer
6706362		Carder, Inc. (J-S Farms Pit) (M-96-46)	46899 F	- - -	1.000	SW	NW	29	22 S	46 W			Prowers	Arkansas River Valley Fill Aquifer
6706366		Carder, Inc. (Hard Scrabble Pit) (M-98-46)	51673 F	- - -	1.000	SE	SE	28	22 S	47 W	600 S	500 E	Prowers	Arkansas River Valley Fill Aquifer
6706388		Eastern Colorado Aggregates, LLLP (M-01-41)	56441 F	- - -	1.000	SW	NE	26	22 S	46 W			Prowers	Arkansas River Valley Fill Aquifer
6706389		Ritchie Paving, Inc. (Fletcher Pit) (M-02072)	58964 F	- - -	1.000		NE	24	23 S	42 W			Prowers	Arkansas River Valley Fill Aquifer
6706383		Carder Inc. S-C Farms Pit (M-92-076)	75609 F	94CW037	1.000	NE	NE	31	22 S	44 W	350 N	950 E	Prowers	Arkansas River Valley Fill Aquifer
6706410		Carder Inc. Tamarack Pit (M-01066)	65968 F	- - -	1.000	NW	NW	12	23 S	49 W	800 N	800 W	Bent	Arkansas River Valley Fill Aquifer
- - -		Carder Inc. Butte Creek Pit		- - -	1.000	NW	SE	22	23 S	42 W	2150 S	1900 E	Prowers	Arkansas River Valley Fill Aquifer
		Ponds & Other Structures												
1703508		Division of Wildlife - Dawn Pond		- - -	1.000			35	22 S	53 W			Bent	Adobe Creek
1703925		Division of Wildlife - Las Animas Fish Hatchery		- - -	1.000			23	22 S	53 W			Bent	Adobe Creek
6700544		Gerald Verhoeff Ditch - L. Verhoeff		CA 418	0.680	SE	NE	28	22S	49W	2462 N	624 E	Bent	East Prowers Arroyo
6700579		James Cushny Ditch - L. Verhoeff		11/07/1924 Adj.	0.680	SE	SW	28	22S	49W	2 S	1786 W	Bent	West Fork Prowers Arroyo
6700581		Swallow Seepage Ditch - L. Verhoeff		06/03/1922 Adj.	0.680	SE	NE	29	22S	49W	2603 N	7 E	Bent	West Fork Prowers Arroyo
6700624		August Reyher Seepage Ditch No. 1 - B. Heckman		08/26/1946 Adj.	0.680	NE	SE	14	22S	49W	1950 S	300 E	Bent	August Reyher Drainage Ditch
6700625		August Reyher Seepage Ditch No. 2 - B. Heckman		08/26/1946 Adj.	0.680	NE	SE	14	22S	49W	1950 S	300 E	Bent	August Reyher Drainage Ditch
6700630		Dudley Ditch No. 1 - L. Verhoeff		06/03/1922 Adj.	0.680	NE	NE	21	22S	49W	161 N	967 E	Bent	East Prowers Arroyo
6702060		Halde Sand & Gravel, Inc. - Halde Spring		03CW25	1.000	NW	NW	4	12 S	53 W	350 N	1000 W	Lincoln	Coon Creek
6700580		Lyvere Ditch - L. Verhoeff		06/03/1922 Adj.	0.680	SE	NE	29	22S	49W	2603 N	7 E	Bent	West Fork Prowers Arroyo
6706363		City of Lamar - Lamar N. Gateway Pond No. 1	52184 F	13CW3060	1.000	NE	SE	30	22S	46W	1840 S	950 E	Prowers	Arkansas River Valley Fill Aquifer
6706454		Raymond Dechant - Dechant Pond		- - -	1.000	NW	SW	21	22 S	46 W	2120 S	1240 W	Prowers	Arkansas River Valley Fill Aquifer
6706474		City of Lamar - Lamar N. Gateway Pond No. 2		13CW3060	1.000	NW	SW	29	22S	46W	1900 S	1535 W	Prowers	Arkansas River Valley Fill Aquifer
6707823		Bonnie Place Pond - Reyher Enterprises, Inc.		- - -	1.000	NE	SE	17	22S	48W	1740 S	650 E	Bent	Arkansas River Valley Fill Aquifer
Burt White Heckman		August Reyher Seepage Reservoir		- - -	1.000	NE	SE	14	22S	49W	1950 S	300 E	Bent	August Reyher Drainage Ditch
Cottonwood Creek Pond		Santa Fe Trail River Ranch			1.000	NE	NW	30	22S	44W	1150N	1570W	Prowers	Cottonwood Creek
East Parrish Pond		Santa Fe Trail River Ranch			1.000	SE	NW	29	22S	44W	1800N	2440W	Prowers	Parrish Creek
East Pond		Santa Fe Trail River Ranch			1.000	NW	SE	26	22S	44W	1850S	1550E	Prowers	Neumeister Return
Enstrom-Bristol Properties, LLC		Enstrom Water Fowl Pond		- - -	1.000	SE	SW	26	22S	44W	1000 S	2600 W	Prowers	Arkansas River Valley Fill Aquifer
Enstrom-Bristol Properties, LLC		Enstrom Pump		- - -	1.000	SW	SE	26	22S	44W	300 S	2560 E	Prowers	Arkansas River
Grant's Pond		Bentwood Ranch, LLC		- - -	1.000	SE	NW	25	22 S	45 W	2400 N	2500 W	Prowers	Goodale Slough
Parrish Pond		Santa Fe Trail River Ranch			1.000	SE	NW	29	22S	44W	1500N	1890W	Prowers	Parrish Creek
Reyher Enterprises, Inc.		Underground Drain No. 1		- - -	0.680	SE	SW	8	22S	48W	50 S	2460 W	Bent	Arkansas River Valley Fill Aquifer
Reyher Enterprises, Inc.		Underground Drain No. 2		- - -	0.680	NE	NW	17	22S	48W	1095 N	2625 W	Bent	Arkansas River Valley Fill Aquifer
Reyher Enterprises, Inc.		Underground Drain No. 3		- - -	0.680	NE	SE	17	22S	48W	1835 S	965 E	Bent	Arkansas River Valley Fill Aquifer
Ullom Farm		Colorado Beef		16CW3018	1.000			19	22S	47W			Prowers	Arkansas River Valley Fill Aquifer
Vap Pond		Jeffrey L. Vap		- - -	1.000	NW	NE	6	23S	48 W	750 N	2150 E	Bent	Arkansas River Valley Fill Aquifer

Notes:
* Permit Application receipt number
Structures in listed in Case Nos. 02CW181, 08CW018, 10CW091, 12CW37, 13CW3004, 13CW3065, 14CW3004, 15CW3014, 16CW3018, 17CW3000, 17CW3001, and 17CW3035.

Table 2 - Projected Pumping For Alluvial Wells In Table 1

(sorted by Structure ID)

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Farm Group	Farm Unit	Structure ID	Suffix	Name	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	TOTAL (Apr19 - Feb20)
					2019 Augmentation Plan Year												
3012	3012	1705059	A	Spady Brothers	3.35	4.62	5.38	6.88	6.12	4.39	2.06	0.55	0.00	0.00	0.00	3.42	36.77
3012	3012	1705061	A	Spady Brothers	3.35	4.62	5.38	6.88	6.12	4.39	2.06	0.55	0.00	0.00	0.00	3.42	36.77
3012	3012	1705062	A	Spady Brothers	3.35	4.62	5.38	6.88	6.12	4.39	2.06	0.55	0.00	0.00	0.00	3.42	36.77
299	299	1705708	B	Huerfano River Management	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	12.00
291	291	1706249	A	Las Animas Golf Course	4.46	9.82	14.15	10.19	11.34	11.19	4.73	2.46	0.53	0.75	0.74	1.65	72.01
82	82	6705029	A	Prowers Enterprises, LLC	9.76	13.45	15.66	20.03	17.81	12.78	6.00	1.59	0.00	0.00	0.00	9.97	107.05
16	16	6705030	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
82	82	6705035	A	Prowers Enterprises, LLC	6.87	9.46	11.01	14.09	12.53	8.99	4.22	1.12	0.00	0.00	0.00	7.01	75.30
82	82	6705037	A	Prowers Enterprises, LLC	9.66	13.30	15.49	19.81	17.61	12.64	5.94	1.58	0.00	0.00	0.00	9.86	105.89
82	82	6705039	A	Prowers Enterprises, LLC	6.87	9.46	11.01	14.09	12.53	8.99	4.22	1.12	0.00	0.00	0.00	7.01	75.30
82	82	6705041	A	Prowers Enterprises, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
82	82	6705043	A	Prowers Enterprises, LLC	9.66	13.30	15.49	19.81	17.61	12.64	5.94	1.58	0.00	0.00	0.00	9.86	105.89
82	82	6705044	A	Prowers Enterprises, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
82	82	6705045	A	Prowers Enterprises, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
82	82	6705046	A	Prowers Enterprises, LLC	9.66	13.30	15.49	19.81	17.61	12.64	5.94	1.58	0.00	0.00	0.00	9.86	105.89
336	336.1	6705076	A	CO Dept of Corrections - Ft Lyon	6.65	9.16	10.67	13.65	12.13	8.71	4.09	1.09	0.00	0.00	0.00	6.79	72.94
336	336.1	6705077	A	CO Dept of Corrections - Ft Lyon	6.65	9.16	10.67	13.65	12.13	8.71	4.09	1.09	0.00	0.00	0.00	6.79	72.94
336	336.1	6705078	A	CO Dept of Corrections - Ft Lyon	8.18	11.27	13.12	16.78	14.92	10.71	5.03	1.34	0.00	0.00	0.00	8.35	89.70
336	336.1	6705079	A	CO Dept of Corrections - Ft Lyon	8.05	11.08	12.90	16.51	14.68	10.54	4.95	1.31	0.00	0.00	0.00	8.21	88.23
336	336.1	6705080	A	CO Dept of Corrections - Ft Lyon	5.50	7.57	8.82	11.28	10.03	7.20	3.38	0.90	0.00	0.00	0.00	5.61	60.29
278	278	6705103	A	Larry Winger, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
278	278	6705104	A	Donald C. and Peggy E. Brown	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
278	278	6705105	A	Larry Winger, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
278	278	6705106	A	Larry Winger, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	17.1	6705107	B	Colorado Beef	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	17.1	6705108	A	Colorado Beef	14.66	31.02	35.22	24.42	24.05	30.68	0.00	15.82	9.82	35.06	37.86	33.67	292.28
278	278	6705109	A	Rock Tran, LLC	12.52	17.25	20.08	25.69	22.84	16.39	7.70	2.05	0.00	0.00	0.00	12.78	137.30
216	216	6705224	A	Wiley School	1.46	2.01	2.34	2.99	2.66	1.91	0.90	0.24	0.00	0.00	0.00	1.49	16.00
16	16	6705244	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	16	6705245	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	16	6705246	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	16	6705247	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	16	6705248	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	16	6705249	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	16	6705250	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	16	6705251	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	16	6705252	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	16	6705253	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	16	6705254	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	16	6705255	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	16	6705256	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	16	6705257	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	16	6705258	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	16	6705259	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	16	6705260	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	16	6705261	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	16	6705262	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	16	6705263	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	16	6705264	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	16	6705265	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	16	6705266	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	16	6705267	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 2 - Projected Pumping For Alluvial Wells In Table 1

(sorted by Structure ID)

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Farm Group	Farm Unit	Structure ID	Suffix	Name	2019 Augmentation Plan Year Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	TOTAL (Apr19 - Feb20)
16	*16*	6705268	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
16	*16*	6705269	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
16	*16*	6705270	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
16	*16*	6705271	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
15	*15.1*	6705277	A	Lamar - Utilities Board, City of	0.07	0.09	0.10	0.12	0.12	0.11	0.08	0.07	0.06	0.06	0.05	0.06	**0.99**
16	*16*	6705292	A	City of Lamar	1.93	2.66	3.10	3.96	3.52	2.53	1.19	0.32	0.00	0.00	0.00	1.97	**21.18**
16	*16*	6705293	A	City of Lamar	1.82	2.51	2.93	3.74	3.33	2.39	1.12	0.30	0.00	0.00	0.00	1.86	**20.00**
298	*298*	6705299	A	Colorado State Parks (Lake Hasty)	4.56	6.28	7.31	9.36	8.32	5.97	2.80	0.74	0.00	0.00	0.00	4.65	**49.99**
176	*176*	6705300	A	U.S. Corps of Engineers (Lake Hasty)	2.19	3.01	3.51	4.49	3.99	2.87	1.35	0.36	0.00	0.00	0.00	2.23	**24.00**
312	*312*	6705350	A	GP Resources, LLC	6.86	9.12	10.62	12.09	12.41	11.08	8.39	7.43	6.29	5.82	5.52	6.38	**102.01**
312	*312*	6705355	A	GP Resources, LLC	6.79	9.03	10.51	11.97	12.29	10.97	8.31	7.36	6.23	5.76	5.47	6.31	**101.00**
312	*312*	6705355	B	GP Resources, LLC	0.47	0.63	0.73	0.83	0.85	0.76	0.58	0.51	0.43	0.40	0.38	0.44	**7.01**
16	*16*	6705372	A	City of Lamar	1.93	2.66	3.10	3.96	3.52	2.53	1.19	0.32	0.00	0.00	0.00	1.97	**21.18**
312	*312*	6705373	A	GP Resources, LLC	0.47	0.63	0.73	0.83	0.85	0.76	0.58	0.51	0.43	0.40	0.38	0.44	**7.01**
312	*312*	6705373	B	GP Resources, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
312	*312*	6705374	A	GP Resources, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
16	*16*	6705388	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
186	*186*	6705389	A	Roth and Sons, John	10.80	14.87	17.32	22.15	19.70	14.14	6.64	1.76	0.00	0.00	0.00	11.02	**118.40**
186	*186*	6705390	A	Roth and Sons, John	10.80	14.87	17.32	22.15	19.70	14.14	6.64	1.76	0.00	0.00	0.00	11.02	**118.40**
16	*16*	6705398	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
16	*16*	6705423	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
16	*16*	6705424	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
173	*173*	6705432	A	Prowers County Grazing, Inc.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
208	*208.2*	6705475	A	Jones, Carl	2.68	3.69	4.30	5.50	4.89	3.51	1.65	0.44	0.00	0.00	0.00	2.74	**29.40**
133	*133*	6705477	G	GP Irrigated Farms LLC	7.83	10.79	12.56	16.07	14.29	10.26	4.81	1.28	0.00	0.00	0.00	7.99	**85.88**
312	*312*	6705481	A	GP Resources, LLC	4.97	6.62	7.70	8.77	9.01	8.04	6.09	5.39	4.56	4.22	4.01	4.63	**74.01**
312	*312*	6705491	A	GP Resources, LLC	4.97	6.62	7.70	8.77	9.01	8.04	6.09	5.39	4.56	4.22	4.01	4.63	**74.01**
287	*287*	6705495	A	Granada Feeders, LLC	2.82	3.75	4.37	4.98	5.11	4.56	3.46	3.06	2.59	2.39	2.27	2.63	**41.99**
300	*300*	6705513	A	Elk Mountain Cattle Co.	10.13	13.95	16.24	20.78	18.48	13.26	6.23	1.65	0.00	0.00	0.00	10.34	**111.06**
300	*300*	6705514	A	Elk Mountain Cattle Co.	9.23	12.71	14.80	18.93	16.83	12.08	5.67	1.51	0.00	0.00	0.00	9.42	**101.18**
246	*246.1*	6705515	A	Colorado Division of Wildlife, XY Ranch SWA	22.82	31.44	36.60	46.82	41.63	29.88	14.03	3.73	0.00	0.00	0.00	23.29	**250.24**
246	*246.2*	6705515	B	Colorado Division of Wildlife, XY Ranch SWA (Moist Soil Impoundments)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
246	*246.1*	6705516	A	Colorado Division of Wildlife, XY Ranch SWA	22.69	31.25	36.38	46.55	41.38	29.71	13.95	3.71	0.00	0.00	0.00	23.16	**248.78**
246	*246.1*	6705517	A	Colorado Division of Wildlife, XY Ranch SWA	22.69	31.25	36.38	46.55	41.38	29.71	13.95	3.71	0.00	0.00	0.00	23.16	**248.78**
246	*246.2*	6705517	B	Colorado Division of Wildlife, XY Ranch SWA (Moist Soil Impoundments)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
246	*246.1*	6705518	A	Colorado Division of Wildlife, XY Ranch SWA	22.69	31.25	36.38	46.55	41.38	29.71	13.95	3.71	0.00	0.00	0.00	23.16	**248.78**
246	*246.1*	6705519	A	Colorado Division of Wildlife, XY Ranch SWA	22.69	31.25	36.38	46.55	41.39	29.71	13.95	3.71	0.00	0.00	0.00	23.16	**248.79**
246	*246.1*	6705520	A	Colorado Division of Wildlife, XY Ranch SWA	22.69	31.25	36.38	46.55	41.39	29.71	13.95	3.71	0.00	0.00	0.00	23.16	**248.79**
246	*246.2*	6705520	B	Colorado Division of Wildlife, XY Ranch SWA (Moist Soil Impoundments)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
246	*246.1*	6705521	A	Colorado Division of Wildlife, XY Ranch SWA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
246	*246.1*	6705522	A	Colorado Division of Wildlife, XY Ranch SWA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
246	*246.1*	6705523	A	Colorado Division of Wildlife, XY Ranch SWA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
246	*246.1*	6705524	A	Colorado Division of Wildlife, XY Ranch SWA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
246	*246.1*	6705525	A	Colorado Division of Wildlife, XY Ranch SWA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
246	*246.1*	6705526	A	Colorado Division of Wildlife, XY Ranch SWA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
999	*999*	6705527	A	Lower Arkansas Water Management Association	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
246	*246.1*	6705528	A	Colorado Division of Wildlife, XY Ranch SWA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
49	*49.5*	6705529	A	J-S Farms	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
49	*49.5*	6705530	A	J-S Farms	2.15	2.96	3.44	4.40	3.91	2.81	1.32	0.35	0.00	0.00	0.00	2.19	**23.53**

Table 2 - Projected Pumping For Alluvial Wells In Table 1

(sorted by Structure ID)

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Farm Group	Farm Unit	Structure ID	Suffix	Name	2019 Augmentation Plan Year Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	TOTAL (Apr19 - Feb20)
49	49.5	6705531	A	J-S Farms	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
999	999	6705532	A	Lower Arkansas Water Management Association	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
312	312.3	6705539	A	GP Resources, LLC	4.97	6.62	7.70	8.77	9.01	8.04	6.09	5.39	4.56	4.22	4.01	4.63	74.01
312	312.2	6705543	G	GP Irrigated Farms LLC	16.31	22.46	26.15	33.46	29.75	21.35	10.02	2.66	0.00	0.00	0.00	16.65	178.81
312	312.2	6705543	B	GP Resources, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
312	312.2	6705545	G	GP Irrigated Farms LLC	16.42	22.61	26.33	33.68	29.94	21.49	10.09	2.68	0.00	0.00	0.00	16.76	180.00
312	312.2	6705546	G	GP Irrigated Farms LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
186	186	6705655	A	Roth and Sons, John	10.80	14.87	17.32	22.15	19.70	14.14	6.64	1.76	0.00	0.00	0.00	11.02	118.40
186	186	6705656	A	Roth and Sons, John	10.80	14.87	17.32	22.15	19.70	14.14	6.64	1.76	0.00	0.00	0.00	11.02	118.40
186	186	6705657	A	Roth and Sons, John	10.80	14.87	17.32	22.15	19.70	14.14	6.64	1.76	0.00	0.00	0.00	11.02	118.40
312	312.2	6705717	H	GP Irrigated Farms LLC	29.12	40.11	46.70	59.75	53.12	38.13	17.90	4.76	0.00	0.00	0.00	29.72	319.31
312	312.2	6705720	H	GP Irrigated Farms LLC	29.12	40.11	46.70	59.75	53.12	38.13	17.90	4.76	0.00	0.00	0.00	29.72	319.31
312	312.2	6705722	H	GP Irrigated Farms LLC	29.23	40.26	46.87	59.96	53.31	38.27	17.96	4.77	0.00	0.00	0.00	29.83	320.46
312	312.2	6705723	H	GP Irrigated Farms LLC	29.23	40.26	46.87	59.96	53.31	38.27	17.96	4.77	0.00	0.00	0.00	29.83	320.46
312	312.2	6705724	H	GP Irrigated Farms LLC	29.12	40.11	46.70	59.75	53.12	38.13	17.90	4.76	0.00	0.00	0.00	29.72	319.31
312	312.2	6705725	H	GP Irrigated Farms LLC	29.12	40.11	46.70	59.75	53.12	38.13	17.90	4.76	0.00	0.00	0.00	29.72	319.31
312	312.2	6705726	H	GP Irrigated Farms LLC	29.12	40.11	46.70	59.75	53.12	38.13	17.90	4.76	0.00	0.00	0.00	29.72	319.31
312	312.2	6705727	H	GP Irrigated Farms LLC	29.12	40.11	46.70	59.75	53.12	38.13	17.90	4.76	0.00	0.00	0.00	29.72	319.31
312	312.2	6705728	H	GP Irrigated Farms LLC	29.12	40.11	46.70	59.75	53.12	38.13	17.90	4.76	0.00	0.00	0.00	29.72	319.31
312	312.2	6705729	H	GP Irrigated Farms LLC	29.12	40.11	46.70	59.75	53.12	38.13	17.90	4.76	0.00	0.00	0.00	29.72	319.31
312	312.2	6705731	H	GP Irrigated Farms LLC	29.12	40.11	46.70	59.75	53.12	38.13	17.90	4.76	0.00	0.00	0.00	29.72	319.31
312	312.2	6705733	H	GP Irrigated Farms LLC	29.12	40.11	46.70	59.75	53.12	38.13	17.90	4.76	0.00	0.00	0.00	29.72	319.31
312	312.2	6705736	H	GP Irrigated Farms LLC	29.12	40.11	46.70	59.75	53.12	38.13	17.90	4.76	0.00	0.00	0.00	29.72	319.31
312	312.2	6705737	H	GP Irrigated Farms LLC	29.12	40.11	46.70	59.75	53.12	38.13	17.90	4.76	0.00	0.00	0.00	29.72	319.31
16	16	6705760	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
312	312.2	6705774	H	GP Irrigated Farms LLC	29.23	40.26	46.87	59.96	53.31	38.27	17.96	4.77	0.00	0.00	0.00	29.83	320.46
312	312.2	6705775	H	GP Irrigated Farms LLC	29.23	40.26	46.87	59.96	53.31	38.27	17.96	4.77	0.00	0.00	0.00	29.83	320.46
334.2	334.2	6705805	A	Butte Creek & River Reserve GP	10.73	14.78	17.21	22.01	19.57	14.05	6.59	1.75	0.00	0.00	0.00	10.95	117.64
334.2	334.2	6705808	A	Butte Creek & River Reserve GP	10.73	14.78	17.21	22.01	19.57	14.05	6.59	1.75	0.00	0.00	0.00	10.95	117.64
334.2	334.2	6705809	A	Butte Creek & River Reserve GP	10.73	14.78	17.21	22.01	19.57	14.05	6.59	1.75	0.00	0.00	0.00	10.95	117.64
350	350	6705866	A	Arambel Ranch	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	16	6705910	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
82	82	6706021	A	Prowers Enterprises, LLC	9.66	13.30	15.49	19.81	17.61	12.64	5.94	1.58	0.00	0.00	0.00	9.86	105.89
3527	3527	6706101	A	Rush Creek Farms	24.32	33.50	39.00	49.90	44.36	31.84	14.95	3.97	0.00	0.00	0.00	24.82	266.66
3527	3527	6706101	B	Rush Creek Farms	8.40	11.17	13.01	14.81	15.21	13.58	10.28	9.10	7.71	7.13	6.77	7.81	124.98
361	361	6706142	A	National Park Service	1.98	2.63	3.06	3.48	3.58	3.20	2.42	2.14	1.81	1.68	1.59	1.84	29.41
230.0	230.1	6706153	A	Barlow, Kirk A.	13.4	18.5	21.5	27.5	24.5	17.6	8.2	2.2	0.0	0.0	0.0	13.7	147.1
3527	3527	6706154	A	Rush Creek Farms	24.3	33.5	39.0	49.9	44.4	31.8	15.0	4.0	0.0	0.0	0.0	24.8	266.7
3527	3527	6706154	B	Rush Creek Farms	8.4	11.2	13.0	14.8	15.2	13.6	10.3	9.1	7.7	7.1	6.8	7.8	125.0
230.0	230.1	6706167	A	Barlow, Kirk A.	10.7	14.8	17.2	22.0	19.6	14.1	6.6	1.8	0.0	0.0	0.0	11.0	117.6
1	1	6706221	A	Dale Mitchek, LLC	6.72	8.94	10.41	11.85	12.17	10.86	8.23	7.28	6.17	5.70	5.42	6.25	100.00
2005	2005	6706288	A	Lawrence A. and Charlene K. Monks	8.40	11.17	13.01	14.81	15.21	13.58	10.28	9.10	7.71	7.13	6.77	7.81	124.98
230	230.1	6706329	A	Barlow, Kirk A.	5.37	7.39	8.60	11.01	9.79	7.02	3.30	0.88	0.00	0.00	0.00	5.48	58.84
16	16	6706337	A	City of Lamar	1.82	2.51	2.93	3.74	3.33	2.39	1.12	0.30	0.00	0.00	0.00	1.86	20.00
16	16	6706338	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	16	6706339	A	City of Lamar	0.55	0.75	0.88	1.12	1.00	0.72	0.34	0.09	0.00	0.00	0.00	0.56	6.01
173	173	6706376	A	Prowers County Grazing, Inc.	15.67	21.58	25.12	32.14	28.57	20.51	9.63	2.56	0.00	0.00	0.00	15.99	171.77
173	173	6706381	A	Prowers County Grazing, Inc.	15.67	21.58	25.12	32.14	28.57	20.51	9.63	2.56	0.00	0.00	0.00	15.99	171.77
230	230.1	6706394	A	Barlow, Kirk A.	2.68	3.69	4.30	5.50	4.89	3.51	1.65	0.44	0.00	0.00	0.00	2.74	29.40
3009	3009	6706396	A	VA Cemetery Well	7.30	10.05	11.70	14.97	13.31	9.55	4.48	1.19	0.00	0.00	0.00	7.45	80.00
16	16	6706397	A	City of Lamar (Shop Well)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	16	6706406	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 2 - Projected Pumping For Alluvial Wells In Table 1

(sorted by Structure ID)

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Farm Group	Farm Unit	Structure ID	Suffix	Name	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	TOTAL (Apr19 - Feb20)
					2019 Augmentation Plan Year												
16	*16*	6706408	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
2009	*2009*	6706452	A	Furniture Row COLO, LLC	1.62	1.46	1.72	1.33	1.59	1.95	0.00	4.74	5.49	3.67	3.12	1.62	**28.31**
2009	*2009*	6706453	A	Furniture Row COLO, LLC	3.36	4.47	5.21	5.92	6.08	5.43	4.11	3.64	3.08	2.85	2.71	3.13	**49.99**
2009	*2009*	156617	A	Furniture Row COLO, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
282	*282*	239888		Bentwood Ranch, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
Totals					1,100.43	1,525.72	1,778.09	2,229.86	2,004.58	1,478.54	711.23	264.35	80.74	99.59	98.85	1,132.57	**12,504.55**

Table 3 - Projected Pumping And Maximum Annual Stream Depletions For Bedrock Wells In Table 1

(sorted by Structure Id)

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Structure ID	Suffix	Name	2019 Augmentation Plan Year													
			Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	TOTAL (Apr19 - Feb20)	Maximum Annual Stream Depletion
1706216	A	Mountain Prairie, LLC	1.44	1.28	3.01	3.80	2.32	0.58	4.72	3.91	1.03	1.70	1.85	1.54	27.18	0.78
1706220	A	Mountain Prairie, LLC	6.71	6.48	4.64	7.66	5.18	4.04	6.01	4.91	4.00	6.88	6.38	5.96	68.85	1.79
1706360	A	DiRezza Land and Cattle	0.25	0.24	0.21	0.00	1.34	0.00	0.49	0.28	0.06	0.06	0.18	2.23	5.34	0.71
1706360	A	DiRezza Land and Cattle	0.25	0.24	0.21	0.00	1.34	0.00	0.49	0.28	0.06	0.06	0.18	2.23	5.34	0.14
1706415	A	Mountain Prairie, LLC	1.54	1.81	2.31	3.19	2.35	2.49	2.30	1.36	1.35	1.34	1.78	0.47	22.29	0.72
1706416	A	Mountain Prairie, LLC	1.12	1.45	1.46	1.69	0.00	0.09	1.33	1.05	1.65	1.07	1.01	1.01	12.93	1.00
1706417	A	Mountain Prairie, LLC	1.26	1.47	0.38	1.47	4.42	1.98	1.86	1.10	1.10	1.14	0.99	0.93	18.10	0.72
1706418	A	Mountain Prairie, LLC	1.96	2.15	2.27	2.66	2.19	1.87	0.28	0.00	0.71	1.78	1.58	1.43	18.88	1.01
1706419	A	Mountain Prairie, LLC	0.16	0.13	0.23	0.40	0.30	0.22	0.18	0.23	0.24	0.32	0.13	0.16	2.70	0.58
1706420	A	Mountain Prairie, LLC	1.40	1.21	1.86	2.96	2.63	1.93	1.50	1.79	1.76	2.22	1.05	1.29	21.60	0.43
1706421	A	Mountain Prairie, LLC	1.10	0.99	1.38	1.45	0.90	0.91	1.19	0.96	0.47	0.41	0.19	0.73	10.68	0.43
1706422	A	Mountain Prairie, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1706423	A	Mountain Prairie, LLC	0.01	0.01	0.01	0.02	0.03	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.13	0.00
1706487	A	Mountain Prairie, LLC	0.31	0.43	1.96	0.51	1.87	2.21	2.11	1.21	0.05	0.73	0.27	0.09	11.75	0.29
1706488	A	Mountain Prairie, LLC	0.38	0.06	1.28	2.32	1.03	0.84	2.73	1.52	1.22	0.01	0.00	0.00	11.39	0.43
6705304	A	Broyles Land & Water LLLP	0.44	0.58	0.68	0.77	0.79	0.71	0.53	0.47	0.40	0.37	0.35	0.41	6.50	5.70
6706217	A	Bristol-Granada Cemetary District	0.32	0.44	0.52	0.66	0.59	0.42	0.20	0.05	0.00	0.00	0.00	0.33	3.53	1.00
6706332	A	R. E. Turpin Trust	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6706340	A	Pioneer Pork, LLC	0.00	0.00	2.23	0.00	1.87	0.00	1.84	0.00	1.23	0.08	0.00	0.00	7.25	0.15
6706347	A	WhiteStone Farms, LLC (Dry Creek)	0.00	18.08	8.07	10.38	9.14	10.73	7.92	9.18	9.19	0.69	5.64	5.50	94.52	0.53
6706348	A	WhiteStone Farms, LLC (Dry Creek)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	0.00	0.00	0.80	0.00
6706349	A	WhiteStone Farms, LLC (Dry Creek)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6706356	A	Colorado Pork, LLC	0.00	4.17	2.69	2.72	1.79	1.39	0.97	0.57	0.22	0.20	1.46	0.00	16.18	0.00
6706359	A	WhiteStone Farms, LLC (Rocky Ridge)	3.34	1.77	2.28	2.18	1.44	2.44	2.01	2.11	2.19	2.70	2.00	1.97	26.43	0.14
6706360	A	WhiteStone Farms, LLC (Rocky Ridge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6706361	A	R. E. Turpin Trust	1.52	1.65	1.32	1.44	1.23	1.63	1.13	1.31	1.07	0.72	0.55	0.86	14.43	1.61
6706367	A	Colorado Pork, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.61	0.00	0.00	0.61	0.15
6706368	A	WhiteStone Farms, LLC (Rocky Ridge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6706380	A	Colorado Pork, LLC	0.00	0.00	0.29	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.00
6706382	A	Granada Water Association	0.21	0.33	0.37	0.44	1.07	0.59	0.31	0.18	0.11	0.43	0.26	0.00	4.30	0.15
6706384	A	Lamar Community College	1.18	1.63	1.89	2.42	2.15	1.55	0.73	0.19	0.00	0.00	0.00	1.20	12.94	0.28
6706398	A	Beef City, Inc	4.64	4.80	4.64	4.80	4.80	4.64	4.80	4.64	4.80	4.80	4.33	4.80	56.50	0.00
6706399	A	Beef City, Inc	3.29	3.40	3.29	3.40	3.40	3.29	3.40	3.29	3.40	3.40	3.07	3.40	40.00	0.95
6706400	A	Beef City, Inc	3.29	3.40	3.29	3.40	3.40	3.29	3.40	3.29	3.40	3.40	3.07	3.40	40.00	0.77
6706401	A	Beef City, Inc	3.29	3.40	3.29	3.40	3.40	3.29	3.40	3.29	3.40	3.40	3.07	3.40	40.00	0.33
6706402	A	Beef City, Inc	4.64	4.80	4.64	4.80	4.80	4.64	4.80	4.64	4.80	4.80	4.33	4.80	56.50	0.00
6706403	A	Beef City, Inc	3.29	3.40	3.29	3.40	3.40	3.29	3.40	3.29	3.40	3.40	3.07	3.40	40.00	0.42
6706404	A	Beef City, Inc	3.29	3.40	3.29	3.40	3.40	3.29	3.40	3.29	3.40	3.40	3.07	3.40	40.00	0.44
- - -	- -	Granada Feeders, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
- - -	- -	Granada Feeders, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
- - -	- -	Granada Feeders, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
- - -	- -	Granada Feeders, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6706407	A	Granada Feeders, LLC	11.67	11.04	15.78	9.44	15.58	7.89	1.87	1.65	2.57	3.13	1.44	4.89	86.95	0.63
6706408	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6706409	A	Granada Feeders, LLC	7.25	0.00	9.78	27.79	13.10	10.56	15.81	13.98	14.73	7.13	4.68	7.77	132.58	0.00
6706459	A	Colorado Division of Wildlife	0.40	0.00	1.23	1.23	1.23	1.23	0.00	0.00	0.00	0.00	0.00	0.00	5.32	0.00
6706460	A	East Prowers Cemetery District	0.15	0.96	0.55	1.09	0.20	0.21	0.71	0.00	0.00	0.00	0.09	0.04	4.00	0.72
6706461	A	East Prowers Cemetery District	1.46	3.86	2.98	2.42	1.70	1.48	2.72	0.00	0.00	0.00	0.65	1.93	19.20	0.15
6706462	A	Holly School District	0.30	0.00	2.79	3.12	2.84	1.80	1.55	0.00	0.00	0.00	0.00	0.01	12.41	0.00

6706469	A	McClave School District RE-2	1.02	0.00	0.72	0.77	0.53	0.70	0.31	0.00	0.00	0.00	0.00	0.00	**4.05**	**0.00**
6706881	A	Seaboard Foods LLC Farm 31	1.20	1.65	3.08	3.29	2.26	1.89	1.38	1.00	0.80	1.41	1.12	1.12	**20.20**	**1.96**
6706882	A	Seaboard Foods LLC Farm 31	1.20	1.65	3.08	3.29	2.26	1.89	1.38	1.00	0.80	1.41	1.12	1.12	**20.20**	**1.96**
6706883	A	Seaboard Foods LLC Farm 31	1.20	1.65	3.08	3.29	2.26	1.89	1.38	1.00	0.80	1.41	1.12	1.12	**20.20**	**1.96**
6706885	A	Cheyenne Aquifer Well No. 3	32.21	30.47	43.56	26.06	43.00	21.78	5.16	4.55	7.09	8.64	3.98	13.50	**240.00**	**3.06**
Totals			108.69	124.47	153.90	157.55	157.52	113.68	99.69	81.59	81.50	74.04	64.06	86.42	**1,303.09**	**22.28**

Table 4 - Surface Area For Gravel Pits Listed In Table 1

(sorted by Structure ID)

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Structure ID	Name	Surface Area (acres)
1706490	Bent County Ready-Mix (M-95-7)	1.8
6705999	All Rite Paving & Redi-Mix, Inc. (M-87-79)	3.6
6706357	Prowers County (M-97-16)	3.3
6706362	Carder, Inc. (J-S Farms Pit) (M-96-46)	29.2
6706366	Carder, Inc. (Hard Scrabble Pit) (M-98-46)	46.1
6706369	Midwestern Farms Resources (M-93-59)	99.5
6706383	Carder Inc. S-C Farms Pit (M-92-076)	41.7
6706388	Eastern Colorado Aggregates, LLLP (M-01-41)	4.7
6706389	Ritchie Paving, Inc. (Fletcher Pit) (M-02072)	0.0
6706410	Carder Inc. Tamarack Pit (M-01066)	0.4
- - -	Carder Inc. Butte Creek Pit	0.0

Notes:
a) Gravel pit surface area based on pits' sizes from 2017 aerial photography.
b) The Carder Inc. S-C Farms Pit (M-92-076, SEO Id No. 6706383) first 20 acres of surface area are augmented in Case No. 94CW037.

Table 5 - Projected Diversions For Structures In Table 1

(sorted by Structure Group and Structure ID)

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

SEO ID No. (1)	Suffix (2)	Name (3)	Apr-19 (4)	May-19 (5)	Jun-19 (6)	Jul-19 (7)	Aug-19 (8)	Sep-19 (9)	Oct-19 (10)	Nov-19 (11)	Dec-19 (12)	Jan-20 (13)	Feb-20 (14)	Mar-20 (15)	TOTAL (Apr19 - Feb20) (16)
		Alluvial Wells													
1705059	A	Spady Brothers	3.35	4.62	5.38	6.88	6.12	4.39	2.06	0.55	0.00	0.00	0.00	3.42	36.77
1705061	A	Spady Brothers	3.35	4.62	5.38	6.88	6.12	4.39	2.06	0.55	0.00	0.00	0.00	3.42	36.77
1705062	A	Spady Brothers	3.35	4.62	5.38	6.88	6.12	4.39	2.06	0.55	0.00	0.00	0.00	3.42	36.77
1705708	B	Huerfano River Management	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	12.00
1706249	A	Las Animas Golf Course	4.46	9.82	14.15	10.19	11.34	11.19	4.73	2.46	0.53	0.75	0.74	1.65	72.01
6705029	A	Prowers Enterprises, LLC	9.76	13.45	15.66	20.03	17.81	12.78	6.00	1.59	0.00	0.00	0.00	9.97	107.05
6705030	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705035	A	Prowers Enterprises, LLC	6.87	9.46	11.01	14.09	12.53	8.99	4.22	1.12	0.00	0.00	0.00	7.01	75.30
6705037	A	Prowers Enterprises, LLC	9.66	13.30	15.49	19.81	17.61	12.64	5.94	1.58	0.00	0.00	0.00	9.86	105.89
6705039	A	Prowers Enterprises, LLC	6.87	9.46	11.01	14.09	12.53	8.99	4.22	1.12	0.00	0.00	0.00	7.01	75.30
6705041	A	Prowers Enterprises, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705043	A	Prowers Enterprises, LLC	9.66	13.30	15.49	19.81	17.61	12.64	5.94	1.58	0.00	0.00	0.00	9.86	105.89
6705044	A	Prowers Enterprises, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705045	A	Prowers Enterprises, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705046	A	Prowers Enterprises, LLC	9.66	13.30	15.49	19.81	17.61	12.64	5.94	1.58	0.00	0.00	0.00	9.86	105.89
6705076	A	CO Dept of Corrections - Ft Lyon	6.65	9.16	10.67	13.65	12.13	8.71	4.09	1.09	0.00	0.00	0.00	6.79	72.94
6705077	A	CO Dept of Corrections - Ft Lyon	6.65	9.16	10.67	13.65	12.13	8.71	4.09	1.09	0.00	0.00	0.00	6.79	72.94
6705078	A	CO Dept of Corrections - Ft Lyon	8.18	11.27	13.12	16.78	14.92	10.71	5.03	1.34	0.00	0.00	0.00	8.35	89.70
6705079	A	CO Dept of Corrections - Ft Lyon	8.05	11.08	12.90	16.51	14.68	10.54	4.95	1.31	0.00	0.00	0.00	8.21	88.23
6705080	A	CO Dept of Corrections - Ft Lyon	5.50	7.57	8.82	11.28	10.03	7.20	3.38	0.90	0.00	0.00	0.00	5.61	60.29
6705103	A	Larry Winger, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705104	A	Donald C. and Peggy E. Brown	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705105	A	Larry Winger, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705106	A	Larry Winger, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705107	B	Colorado Beef	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705108	A	Colorado Beef	14.66	31.02	35.22	24.42	24.05	30.68	0.00	15.82	9.82	35.06	37.86	33.67	292.28
6705109	A	Rock Tran, LLC	12.52	17.25	20.08	25.69	22.84	16.39	7.70	2.05	0.00	0.00	0.00	12.78	137.30
6705224	A	Wiley School	1.46	2.01	2.34	2.99	2.66	1.91	0.90	0.24	0.00	0.00	0.00	1.49	16.00
6705244	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705245	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705246	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705247	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705248	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705249	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705250	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705251	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705252	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705253	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705254	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705255	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705256	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705257	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705258	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705259	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705260	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705261	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705262	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705263	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705264	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705265	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705266	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705267	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705268	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705269	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 5 - Projected Diversions For Structures In Table 1

(sorted by Structure Group and Structure ID)

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

SEO ID No. (1)	Suffix (2)	Name (3)	Apr-19 (4)	May-19 (5)	Jun-19 (6)	Jul-19 (7)	Aug-19 (8)	Sep-19 (9)	Oct-19 (10)	Nov-19 (11)	Dec-19 (12)	Jan-20 (13)	Feb-20 (14)	Mar-20 (15)	TOTAL (Apr19 - Feb20) (16)
6705270	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705271	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705277	A	Lamar - Utilities Board, City of	0.07	0.09	0.10	0.12	0.12	0.11	0.08	0.07	0.06	0.06	0.05	0.06	0.99
6705292	A	City of Lamar	1.93	2.66	3.10	3.96	3.52	2.53	1.19	0.32	0.00	0.00	0.00	1.97	21.18
6705293	A	City of Lamar	1.82	2.51	2.93	3.74	3.33	2.39	1.12	0.30	0.00	0.00	0.00	1.86	20.00
6705299	A	Colorado State Parks (Lake Hasty)	4.56	6.28	7.31	9.36	8.32	5.97	2.80	0.74	0.00	0.00	0.00	4.65	49.99
6705300	A	U.S. Corps of Engineers (Lake Hasty)	2.19	3.01	3.51	4.49	3.99	2.87	1.35	0.36	0.00	0.00	0.00	2.23	24.00
6705350	A	GP Resources, LLC	6.86	9.12	10.62	12.09	12.41	11.08	8.39	7.43	6.29	5.82	5.52	6.38	102.01
6705355	A	GP Resources, LLC	6.79	9.03	10.51	11.97	12.29	10.97	8.31	7.36	6.23	5.76	5.47	6.31	101.00
6705355	B	GP Resources, LLC	0.47	0.63	0.73	0.83	0.85	0.76	0.58	0.51	0.43	0.40	0.38	0.44	7.01
6705372	A	City of Lamar	1.93	2.66	3.10	3.96	3.52	2.53	1.19	0.32	0.00	0.00	0.00	1.97	21.18
6705373	A	GP Resources, LLC	0.47	0.63	0.73	0.83	0.85	0.76	0.58	0.51	0.43	0.40	0.38	0.44	7.01
6705373	B	GP Resources, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705374	A	GP Resources, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705388	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705389	A	Roth and Sons, John	10.80	14.87	17.32	22.15	19.70	14.14	6.64	1.76	0.00	0.00	0.00	11.02	118.40
6705390	A	Roth and Sons, John	10.80	14.87	17.32	22.15	19.70	14.14	6.64	1.76	0.00	0.00	0.00	11.02	118.40
6705398	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705423	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705424	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705432	A	Prowers County Grazing, Inc.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705475	A	Jones, Carl	2.68	3.69	4.30	5.50	4.89	3.51	1.65	0.44	0.00	0.00	0.00	2.74	29.40
6705477	G	GP Irrigated Farms LLC	7.83	10.79	12.56	16.07	14.29	10.26	4.81	1.28	0.00	0.00	0.00	7.99	85.88
6705481	A	GP Resources, LLC	4.97	6.62	7.70	8.77	9.01	8.04	6.09	5.39	4.56	4.22	4.01	4.63	74.01
6705491	A	GP Resources, LLC	4.97	6.62	7.70	8.77	9.01	8.04	6.09	5.39	4.56	4.22	4.01	4.63	74.01
6705495	A	Granada Feeders, LLC	2.82	3.75	4.37	4.98	5.11	4.56	3.46	3.06	2.59	2.39	2.27	2.63	41.99
6705513	A	Elk Mountain Cattle Co.	10.13	13.95	16.24	20.78	18.48	13.26	6.23	1.65	0.00	0.00	0.00	10.34	111.06
6705514	A	Elk Mountain Cattle Co.	9.23	12.71	14.80	18.93	16.83	12.08	5.67	1.51	0.00	0.00	0.00	9.42	101.18
6705515	A	Colorado Division of Wildlife, XY Ranch SWA	22.82	31.44	36.60	46.82	41.63	29.88	14.03	3.73	0.00	0.00	0.00	23.29	250.24
6705515	B	Colorado Division of Wildlife, XY Ranch SWA (Moist Soil Impoundments)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705516	A	Colorado Division of Wildlife, XY Ranch SWA	22.69	31.25	36.38	46.55	41.38	29.71	13.95	3.71	0.00	0.00	0.00	23.16	248.78
6705517	A	Colorado Division of Wildlife, XY Ranch SWA	22.69	31.25	36.38	46.55	41.38	29.71	13.95	3.71	0.00	0.00	0.00	23.16	248.78
6705517	B	Colorado Division of Wildlife, XY Ranch SWA (Moist Soil Impoundments)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705518	A	Colorado Division of Wildlife, XY Ranch SWA	22.69	31.25	36.38	46.55	41.38	29.71	13.95	3.71	0.00	0.00	0.00	23.16	248.78
6705519	A	Colorado Division of Wildlife, XY Ranch SWA	22.69	31.25	36.38	46.55	41.39	29.71	13.95	3.71	0.00	0.00	0.00	23.16	248.79
6705520	A	Colorado Division of Wildlife, XY Ranch SWA	22.69	31.25	36.38	46.55	41.39	29.71	13.95	3.71	0.00	0.00	0.00	23.16	248.79
6705520	B	Colorado Division of Wildlife, XY Ranch SWA (Moist Soil Impoundments)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705521	A	Colorado Division of Wildlife, XY Ranch SWA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705522	A	Colorado Division of Wildlife, XY Ranch SWA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705523	A	Colorado Division of Wildlife, XY Ranch SWA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705524	A	Colorado Division of Wildlife, XY Ranch SWA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705525	A	Colorado Division of Wildlife, XY Ranch SWA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705526	A	Colorado Division of Wildlife, XY Ranch SWA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705527	A	Lower Arkansas Water Management Association	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705528	A	Colorado Division of Wildlife, XY Ranch SWA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705529	A	J-S Farms	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705530	A	J-S Farms	2.15	2.96	3.44	4.40	3.91	2.81	1.32	0.35	0.00	0.00	0.00	2.19	23.53
6705531	A	J-S Farms	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705532	A	Lower Arkansas Water Management Association	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705539	A	GP Resources, LLC	4.97	6.62	7.70	8.77	9.01	8.04	6.09	5.39	4.56	4.22	4.01	4.63	74.01
6705543	G	GP Irrigated Farms LLC	16.31	22.46	26.15	33.46	29.75	21.35	10.02	2.66	0.00	0.00	0.00	16.65	178.81
6705543	B	GP Resources, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705545	G	GP Irrigated Farms LLC	16.42	22.61	26.33	33.68	29.94	21.49	10.09	2.68	0.00	0.00	0.00	16.76	180.00

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LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

SEO ID No. (1)	Suffix (2)	Name (3)	Apr-19 (4)	May-19 (5)	Jun-19 (6)	Jul-19 (7)	Aug-19 (8)	Sep-19 (9)	Oct-19 (10)	Nov-19 (11)	Dec-19 (12)	Jan-20 (13)	Feb-20 (14)	Mar-20 (15)	TOTAL (Apr19 - Feb20) (16)
6705546	G	GP Irrigated Farms LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705655	A	Roth and Sons, John	10.80	14.87	17.32	22.15	19.70	14.14	6.64	1.76	0.00	0.00	0.00	11.02	118.40
6705656	A	Roth and Sons, John	10.80	14.87	17.32	22.15	19.70	14.14	6.64	1.76	0.00	0.00	0.00	11.02	118.40
6705657	A	Roth and Sons, John	10.80	14.87	17.32	22.15	19.70	14.14	6.64	1.76	0.00	0.00	0.00	11.02	118.40
6705717	H	GP Irrigated Farms LLC	29.12	40.11	46.70	59.75	53.12	38.13	17.90	4.76	0.00	0.00	0.00	29.72	319.31
6705720	H	GP Irrigated Farms LLC	29.12	40.11	46.70	59.75	53.12	38.13	17.90	4.76	0.00	0.00	0.00	29.72	319.31
6705722	H	GP Irrigated Farms LLC	29.23	40.26	46.87	59.96	53.31	38.27	17.96	4.77	0.00	0.00	0.00	29.83	320.46
6705723	H	GP Irrigated Farms LLC	29.23	40.26	46.87	59.96	53.31	38.27	17.96	4.77	0.00	0.00	0.00	29.83	320.46
6705724	H	GP Irrigated Farms LLC	29.12	40.11	46.70	59.75	53.12	38.13	17.90	4.76	0.00	0.00	0.00	29.72	319.31
6705725	H	GP Irrigated Farms LLC	29.12	40.11	46.70	59.75	53.12	38.13	17.90	4.76	0.00	0.00	0.00	29.72	319.31
6705726	H	GP Irrigated Farms LLC	29.12	40.11	46.70	59.75	53.12	38.13	17.90	4.76	0.00	0.00	0.00	29.72	319.31
6705727	H	GP Irrigated Farms LLC	29.12	40.11	46.70	59.75	53.12	38.13	17.90	4.76	0.00	0.00	0.00	29.72	319.31
6705728	H	GP Irrigated Farms LLC	29.12	40.11	46.70	59.75	53.12	38.13	17.90	4.76	0.00	0.00	0.00	29.72	319.31
6705729	H	GP Irrigated Farms LLC	29.12	40.11	46.70	59.75	53.12	38.13	17.90	4.76	0.00	0.00	0.00	29.72	319.31
6705731	H	GP Irrigated Farms LLC	29.12	40.11	46.70	59.75	53.12	38.13	17.90	4.76	0.00	0.00	0.00	29.72	319.31
6705733	H	GP Irrigated Farms LLC	29.12	40.11	46.70	59.75	53.12	38.13	17.90	4.76	0.00	0.00	0.00	29.72	319.31
6705736	H	GP Irrigated Farms LLC	29.12	40.11	46.70	59.75	53.12	38.13	17.90	4.76	0.00	0.00	0.00	29.72	319.31
6705737	H	GP Irrigated Farms LLC	29.12	40.11	46.70	59.75	53.12	38.13	17.90	4.76	0.00	0.00	0.00	29.72	319.31
6705760	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705774	H	GP Irrigated Farms LLC	29.23	40.26	46.87	59.96	53.31	38.27	17.96	4.77	0.00	0.00	0.00	29.83	320.46
6705775	H	GP Irrigated Farms LLC	29.23	40.26	46.87	59.96	53.31	38.27	17.96	4.77	0.00	0.00	0.00	29.83	320.46
6705805	A	Butte Creek & River Reserve GP	10.73	14.78	17.21	22.01	19.57	14.05	6.59	1.75	0.00	0.00	0.00	10.95	117.64
6705808	A	Butte Creek & River Reserve GP	10.73	14.78	17.21	22.01	19.57	14.05	6.59	1.75	0.00	0.00	0.00	10.95	117.64
6705809	A	Butte Creek & River Reserve GP	10.73	14.78	17.21	22.01	19.57	14.05	6.59	1.75	0.00	0.00	0.00	10.95	117.64
6705866	A	Arambel Ranch	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6705910	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6706021	A	Prowers Enterprises, LLC	9.66	13.30	15.49	19.81	17.61	12.64	5.94	1.58	0.00	0.00	0.00	9.86	105.89
6706101	A	Rush Creek Farms	24.32	33.50	39.00	49.90	44.36	31.84	14.95	3.97	0.00	0.00	0.00	24.82	266.66
6706101	B	Rush Creek Farms	8.40	11.17	13.01	14.81	15.21	13.58	10.28	9.10	7.71	7.13	6.77	7.81	124.98
6706142	A	National Park Service	1.98	2.63	3.06	3.48	3.58	3.20	2.42	2.14	1.81	1.68	1.59	1.84	29.41
6706153	A	Barlow, Kirk A.	13.41	18.47	21.51	27.52	24.46	17.56	8.24	2.19	0.00	0.00	0.00	13.69	147.05
6706154	A	Rush Creek Farms	24.32	33.50	39.00	49.90	44.36	31.84	14.95	3.97	0.00	0.00	0.00	24.82	266.66
6706154	B	Rush Creek Farms	8.40	11.17	13.01	14.81	15.21	13.58	10.28	9.10	7.71	7.13	6.77	7.81	124.98
6706167	A	Barlow, Kirk A.	10.73	14.78	17.21	22.01	19.57	14.05	6.59	1.75	0.00	0.00	0.00	10.95	117.64
6706221	A	Dale Mitchek, LLC	6.72	8.94	10.41	11.85	12.17	10.86	8.23	7.28	6.17	5.70	5.42	6.25	100.00
6706288	A	Lawrence A. and Charlene K. Monks	8.40	11.17	13.01	14.81	15.21	13.58	10.28	9.10	7.71	7.13	6.77	7.81	124.98
6706329	A	Barlow, Kirk A.	5.37	7.39	8.60	11.01	9.79	7.02	3.30	0.88	0.00	0.00	0.00	5.48	58.84
6706337	A	City of Lamar	1.82	2.51	2.93	3.74	3.33	2.39	1.12	0.30	0.00	0.00	0.00	1.86	20.00
6706338	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6706339	A	City of Lamar	0.55	0.75	0.88	1.12	1.00	0.72	0.34	0.09	0.00	0.00	0.00	0.56	6.01
6706376	A	Prowers County Grazing, Inc.	15.67	21.58	25.12	32.14	28.57	20.51	9.63	2.56	0.00	0.00	0.00	15.99	171.77
6706381	A	Prowers County Grazing, Inc.	15.67	21.58	25.12	32.14	28.57	20.51	9.63	2.56	0.00	0.00	0.00	15.99	171.77
6706394	A	Barlow, Kirk A.	2.68	3.69	4.30	5.50	4.89	3.51	1.65	0.44	0.00	0.00	0.00	2.74	29.40
6706396	A	VA Cemetery Well	7.30	10.05	11.70	14.97	13.31	9.55	4.48	1.19	0.00	0.00	0.00	7.45	80.00
6706397	A	City of Lamar (Shop Well)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6706406	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6706408	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6706452	A	Furniture Row COLO, LLC	1.62	1.46	1.72	1.33	1.59	1.95	0.00	4.74	5.49	3.67	3.12	1.62	28.31
6706453	A	Furniture Row COLO, LLC	3.36	4.47	5.21	5.92	6.08	5.43	4.11	3.64	3.08	2.85	2.71	3.13	49.99
156617	A	Furniture Row COLO, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
239888	0	Bentwood Ranch, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sub-Total			1,100.43	1,525.72	1,778.09	2,229.86	2,004.58	1,478.54	711.23	264.35	80.74	99.59	98.85	1,132.57	12,504.55
			Bedrock Wells												
1706216	A	Mountain Prairie, LLC	1.44	1.28	3.01	3.80	2.32	0.58	4.72	3.91	1.03	1.70	1.85	1.54	27.18
1706220	A	Mountain Prairie, LLC	6.71	6.48	4.64	7.66	5.18	4.04	6.01	4.91	4.00	6.88	6.38	5.96	68.85

Prowers
1041 Ex I

Table 5 - Projected Diversions For Structures In Table 1

(sorted by Structure Group and Structure ID)

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

SEO ID No. (1)	Suffix (2)	Name (3)	Apr-19 (4)	May-19 (5)	Jun-19 (6)	Jul-19 (7)	Aug-19 (8)	Sep-19 (9)	Oct-19 (10)	Nov-19 (11)	Dec-19 (12)	Jan-20 (13)	Feb-20 (14)	Mar-20 (15)	TOTAL (Apr19 - Feb20) (16)
1706360	A	DiRezza Land and Cattle	0.25	0.24	0.21	0.00	1.34	0.00	0.49	0.28	0.06	0.06	0.18	2.23	5.34
1706360	A	DiRezza Land and Cattle	0.25	0.24	0.21	0.00	1.34	0.00	0.49	0.28	0.06	0.06	0.18	2.23	5.34
1706415	A	Mountain Prairie, LLC	1.54	1.81	2.31	3.19	2.35	2.49	2.30	1.36	1.35	1.34	1.78	0.47	22.29
1706416	A	Mountain Prairie, LLC	1.12	1.45	1.46	1.69	0.00	0.09	1.33	1.05	1.65	1.07	1.01	1.01	12.93
1706417	A	Mountain Prairie, LLC	1.26	1.47	0.38	1.47	4.42	1.98	1.86	1.10	1.10	1.14	0.99	0.93	18.10
1706418	A	Mountain Prairie, LLC	1.96	2.15	2.27	2.66	2.19	1.87	0.28	0.00	0.71	1.78	1.58	1.43	18.88
1706419	A	Mountain Prairie, LLC	0.16	0.13	0.23	0.40	0.30	0.22	0.18	0.23	0.24	0.32	0.13	0.16	2.70
1706420	A	Mountain Prairie, LLC	1.40	1.21	1.86	2.96	2.63	1.93	1.50	1.79	1.76	2.22	1.05	1.29	21.60
1706421	A	Mountain Prairie, LLC	1.10	0.99	1.38	1.45	0.90	0.91	1.19	0.96	0.47	0.41	0.19	0.73	10.68
1706422	A	Mountain Prairie, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1706423	A	Mountain Prairie, LLC	0.01	0.01	0.01	0.02	0.03	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.13
1706487	A	Mountain Prairie, LLC	0.31	0.43	1.96	0.51	1.87	2.21	2.11	1.21	0.05	0.73	0.27	0.09	11.75
1706488	A	Mountain Prairie, LLC	0.38	0.06	1.28	2.32	1.03	0.84	2.73	1.52	1.22	0.01	0.00	0.00	11.39
6705304	A	Broyles Land & Water LLLP	0.44	0.58	0.68	0.77	0.79	0.71	0.53	0.47	0.40	0.37	0.35	0.41	6.50
6706217	A	Bristol-Granada Cemetary District	0.32	0.44	0.52	0.66	0.59	0.42	0.20	0.05	0.00	0.00	0.00	0.33	3.53
6706332	A	R. E. Turpin Trust	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6706340	A	Pioneer Pork, LLC	0.00	0.00	2.23	0.00	1.87	0.00	1.84	0.00	1.23	0.08	0.00	0.00	7.25
6706347	A	WhiteStone Farms, LLC (Dry Creek)	0.00	18.08	8.07	10.38	9.14	10.73	7.92	9.18	9.19	0.69	5.64	5.50	94.52
6706348	A	WhiteStone Farms, LLC (Dry Creek)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	0.00	0.00	0.80
6706349	A	WhiteStone Farms, LLC (Dry Creek)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6706356	A	Colorado Pork, LLC	0.00	4.17	2.69	2.72	1.79	1.39	0.97	0.57	0.22	0.20	1.46	0.00	16.18
6706359	A	WhiteStone Farms, LLC (Rocky Ridge)	3.34	1.77	2.28	2.18	1.44	2.44	2.01	2.11	2.19	2.70	2.00	1.97	26.43
6706360	A	WhiteStone Farms, LLC (Rocky Ridge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6706361	A	R. E. Turpin Trust	1.52	1.65	1.32	1.44	1.23	1.63	1.13	1.31	1.07	0.72	0.55	0.86	14.43
6706367	A	Colorado Pork, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.61	0.00	0.00	0.61
6706368	A	WhiteStone Farms, LLC (Rocky Ridge)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6706380	A	Colorado Pork, LLC	0.00	0.00	0.29	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33
6706382	A	Granada Water Association	0.21	0.33	0.37	0.44	1.07	0.59	0.31	0.18	0.11	0.43	0.26	0.00	4.30
6706384	A	Lamar Community College	1.18	1.63	1.89	2.42	2.15	1.55	0.73	0.19	0.00	0.00	0.00	1.20	12.94
6706398	A	Beef City, Inc	4.64	4.80	4.64	4.80	4.80	4.64	4.80	4.64	4.80	4.80	4.33	4.80	56.50
6706399	A	Beef City, Inc	3.29	3.40	3.29	3.40	3.40	3.29	3.40	3.29	3.40	3.40	3.07	3.40	40.00
6706400	A	Beef City, Inc	3.29	3.40	3.29	3.40	3.40	3.29	3.40	3.29	3.40	3.40	3.07	3.40	40.00
6706401	A	Beef City, Inc	3.29	3.40	3.29	3.40	3.40	3.29	3.40	3.29	3.40	3.40	3.07	3.40	40.00
6706402	A	Beef City, Inc	4.64	4.80	4.64	4.80	4.80	4.64	4.80	4.64	4.80	4.80	4.33	4.80	56.50
6706403	A	Beef City, Inc	3.29	3.40	3.29	3.40	3.40	3.29	3.40	3.29	3.40	3.40	3.07	3.40	40.00
6706404	A	Beef City, Inc	3.29	3.40	3.29	3.40	3.40	3.29	3.40	3.29	3.40	3.40	3.07	3.40	40.00
- - -	- -	Granada Feeders, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
- - -	- -	Granada Feeders, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
- - -	- -	Granada Feeders, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
- - -	- -	Granada Feeders, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6706407	A	Granada Feeders, LLC	11.67	11.04	15.78	9.44	15.58	7.89	1.87	1.65	2.57	3.13	1.44	4.89	86.95
6706408	A	City of Lamar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6706409	A	Granada Feeders, LLC	7.25	0.00	9.78	27.79	13.10	10.56	15.81	13.98	14.73	7.13	4.68	7.77	132.58
6706459	A	Colorado Division of Wildlife	0.40	0.00	1.23	1.23	1.23	1.23	0.00	0.00	0.00	0.00	0.00	0.00	5.32
6706460	A	East Prowers Cemetery District	0.15	0.96	0.55	1.09	0.20	0.21	0.71	0.00	0.00	0.00	0.09	0.04	4.00
6706461	A	East Prowers Cemetery District	1.46	3.86	2.98	2.42	1.70	1.48	2.72	0.00	0.00	0.00	0.65	1.93	19.20
6706462	A	Holly School District	0.30	0.00	2.79	3.12	2.84	1.80	1.55	0.00	0.00	0.00	0.00	0.01	12.41
6706469	A	McClave School District RE-2	1.02	0.00	0.72	0.77	0.53	0.70	0.31	0.00	0.00	0.00	0.00	0.00	4.05
6706881	A	Seaboard Foods LLC Farm 31	1.20	1.65	3.08	3.29	2.26	1.89	1.38	1.00	0.80	1.41	1.12	1.12	20.20
6706882	A	Seaboard Foods LLC Farm 31	1.20	1.65	3.08	3.29	2.26	1.89	1.38	1.00	0.80	1.41	1.12	1.12	20.20
6706883	A	Seaboard Foods LLC Farm 31	1.20	1.65	3.08	3.29	2.26	1.89	1.38	1.00	0.80	1.41	1.12	1.12	20.20
6706885	A	Cheyenne Aquifer Well No. 3	32.21	30.47	43.56	26.06	43.00	21.78	5.16	4.55	7.09	8.64	3.98	13.50	240.00
Sub-Total			108.69	124.47	153.90	157.55	157.52	113.68	99.69	81.59	81.50	74.04	64.06	86.42	1,303.09
Gravel Pit Related Structures															
1706490		Bent County Ready-Mix (M-95-7)	0.72	0.90	1.18	1.18	1.10	0.82	0.58	0.32	0.26	0.24	0.30	0.44	8.04

Table 5 - Projected Diversions For Structures In Table 1

(sorted by Structure Group and Structure ID)

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

SEO ID No. (1)	Suffix (2)	Name (3)	Apr-19 (4)	May-19 (5)	Jun-19 (6)	Jul-19 (7)	Aug-19 (8)	Sep-19 (9)	Oct-19 (10)	Nov-19 (11)	Dec-19 (12)	Jan-20 (13)	Feb-20 (14)	Mar-20 (15)	TOTAL (Apr19 - Feb20) (16)
6705785		Midwestern Farms Resources (Part of Gravel Pit Operations)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	12.00
6706369		Midwestern Farms Resources (M-93-59)	39.78	48.96	61.20	65.28	57.12	44.88	30.60	18.36	14.28	13.26	17.33	23.61	434.66
6705953		All Rite Paving & Redi-Mix, Inc. (Part of Gravel Pit Operations)	2.88	2.88	2.88	2.88	2.88	2.88	2.88	3.90	0.00	0.00	2.88	2.88	29.83
6705999		All Rite Paving & Redi-Mix, Inc. (M-87-79)	1.70	2.12	2.71	2.85	2.53	1.98	1.38	0.78	0.60	0.55	0.69	1.01	18.91
6706357		Prowers County (M-97-16)	0.29	0.36	0.53	0.90	1.12	1.43	1.51	1.34	1.04	0.73	0.41	0.32	9.99
6706362		Carder, Inc. (J-S Farms Pit) (M-96-46)	11.07	13.69	17.65	18.45	16.45	12.85	9.00	5.16	3.97	3.78	4.62	6.73	123.42
6706366		Carder, Inc. (Hard Scrabble Pit) (M-98-46)	2.56	2.93	4.08	4.46	3.79	3.58	2.30	1.83	1.32	5.71	1.01	1.67	35.24
6706388		Eastern Colorado Aggregates, LLLP (M-01-41)	1.48	1.84	2.36	2.48	2.20	1.72	1.20	0.68	0.52	0.48	0.60	0.88	16.44
6706389		Ritchie Paving, Inc. (Fletcher Pit) (M-02072)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6706383		Carder Inc. S-C Farms Pit (M-92-076)	8.03	9.98	12.80	13.45	11.94	9.33	6.51	3.69	2.82	2.60	3.26	4.77	89.19
6706410		Carder Inc. Tamarack Pit (M-01066)	0.19	0.23	0.30	0.30	0.27	0.21	0.15	0.09	0.07	0.07	0.08	0.12	2.05
- - -		Carder Inc. Butte Creek Pit	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sub-Total			69.69	84.90	106.70	113.24	100.39	80.68	57.11	37.14	25.87	28.41	32.17	43.44	779.76
		Ponds & Other Structures													
1703508		Division of Wildlife - Dawn Pond	4.98	6.62	7.71	8.77	9.01	8.05	6.09	5.39	4.57	4.22	4.01	4.63	74.05
1703925		Division of Wildlife - Las Animas Fish Hatchery	37.41	6.90	19.62	-1.87	9.32	0.93	-17.15	1.56	1.17	1.17	1.38	2.15	62.59
6700544		Gerald Verhoeff Ditch - L. Verhoeff	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6700579		James Cushny Ditch - L. Verhoeff	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6700580		Lyvere Ditch - L. Verhoeff	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6700581		Swallow Seepage Ditch - L. Verhoeff	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6700624		August Reyher Seepage Ditch No. 1 - B. Heckman	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6700625		August Reyher Seepage Ditch No. 2 - B. Heckman	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6700630		Dudley Ditch No. 1 - L. Verhoeff	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6702060		Halde Sand & Gravel, Inc. - Halde Spring	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6706363		City of Lamar - Lamar N. Gateway Pond No. 1	2.67	3.31	4.45	4.87	4.17	3.12	2.18	1.23	0.87	0.94	1.10	1.60	30.51
6706454		Raymond Dechant - Dechant Pond	0.20	0.27	0.31	0.36	0.37	0.33	0.25	0.22	0.19	0.17	0.16	0.19	3.00
6706474		City of Lamar - Lamar N. Gateway Pond No. 2	6.46	8.10	10.86	12.19	10.36	7.67	5.38	3.04	2.13	2.30	2.70	4.09	75.28
6707823		Bonnie Place Pond - Reyher Enterprises, Inc.	7.65	3.19	14.27	10.83	3.58	24.35	7.53	1.05	0.83	0.83	0.94	1.49	76.51
Burt White Heckman		August Reyher Seepage Reservoir	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cottonwood Creek Pond		Santa Fe Trail River Ranch	0.06	0.00	0.00	0.00	0.00	1.18	8.13	1.55	1.18	1.18	1.20	0.82	15.30
East Parrish Pond		Santa Fe Trail River Ranch	0.25	0.32	0.35	0.31	0.25	0.42	0.19	0.11	0.07	0.04	0.21	0.18	2.71
East Pond		Santa Fe Trail River Ranch	0.44	0.40	0.24	0.00	1.37	0.43	0.29	1.00	0.16	0.15	0.30	0.35	5.16
Enstrom-Bristol Properties, LLC		Enstrom Water Fowl Pond	3.62	4.77	5.78	6.01	5.39	4.00	2.77	1.62	1.23	1.23	1.39	2.16	39.96
Enstrom-Bristol Properties, LLC		Enstrom Pump	0.00	0.00	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09
Grant's Pond		Bentwood Ranch, LLC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Parrish Pond		Santa Fe Trail River Ranch	0.21	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.23	0.72
Reyher Enterprises, Inc.		Underground Drain No. 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Reyher Enterprises, Inc.		Underground Drain No. 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Reyher Enterprises, Inc.		Underground Drain No. 3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ullom Farm		Colorado Beef	32.02	28.92	35.36	32.63	32.82	30.93	20.00	62.21	14.98	12.53	10.59	13.02	326.00
Vap Pond		Jeffrey L. Vap	0.15	0.19	0.23	0.24	0.21	0.16	0.11	0.06	0.05	0.05	0.06	0.09	1.60
Sub-Total			96.11	63.05	99.21	74.38	76.85	81.57	35.78	79.04	27.43	24.82	24.27	31.00	713.49
Total			1,374.92	1,798.13	2,137.90	2,575.03	2,339.35	1,754.47	903.81	462.12	215.54	226.85	219.35	1,293.42	15,300.89

* Diversion amounts estimated from 2018 plan year operations or number of shares owned by member.
* Meter suffix G and H represent co-mingled wells that serve multiple center pivots
* Permit Application receipt number is used if no SEO ID No. is given

Table 6 - Projected Stream Depletions From Projected Diversions For April 2019 Through March 2020

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

Month	Rch 1	Rch 2	Rch 3	Rch 4	Rch 5	Rch 6	Rch 7	Rch 8	Rch 9	Rch 10	Rch 11	Rch 12	Rch 13	Rch 14	Rch 15	Rch 16	Rch 17	Rch 18	Rch 19	Rch 20	Rch 21	Total
Apr-19	0.00	0.00	0.00	0.00	0.00	0.00	0.81	3.62	50.12	10.59	7.62	31.21	105.77	27.23	57.40	32.81	41.59	252.27	0.00	0.00	14.85	635.88
May-19	0.00	0.00	0.00	0.00	0.00	0.00	1.58	5.29	23.67	7.01	8.03	51.92	112.00	32.05	63.35	40.28	56.94	350.50	0.00	0.00	11.23	763.83
Jun-19	0.00	0.00	0.00	0.00	0.00	0.00	2.36	7.00	40.70	19.13	8.58	63.46	128.37	38.28	70.88	49.46	70.10	439.39	0.00	0.00	10.00	947.70
Jul-19	0.00	0.00	0.00	0.00	0.00	0.00	3.19	8.94	22.81	16.87	10.32	76.29	123.96	42.83	79.13	59.24	84.73	537.16	0.00	0.00	9.90	1,075.36
Aug-19	0.00	0.00	0.00	0.00	0.00	0.00	3.88	10.67	35.55	10.73	9.44	82.48	120.74	44.49	86.03	67.41	96.19	607.64	0.00	0.00	11.31	1,186.56
Sep-19	0.00	0.00	0.00	0.00	0.00	0.00	4.09	11.42	27.00	32.13	7.74	72.58	116.52	42.72	87.70	70.64	97.22	602.24	0.00	0.00	14.53	1,186.54
Oct-19	0.00	0.00	0.00	0.00	0.00	0.00	3.78	11.09	6.08	15.30	5.22	52.56	81.69	38.35	90.79	67.90	88.75	528.17	0.00	0.00	18.14	1,007.80
Nov-19	0.00	0.00	0.00	0.00	0.00	0.00	3.13	10.00	21.72	8.30	3.49	31.06	117.73	32.15	78.92	60.66	75.22	419.77	0.00	0.00	20.63	882.77
Dec-19	0.00	0.00	0.00	0.00	0.00	0.00	2.43	8.76	18.36	7.37	2.59	16.77	58.77	27.36	71.10	52.32	62.84	322.83	0.00	0.00	21.09	672.61
Jan-20	0.00	0.00	0.00	0.00	0.00	0.00	1.88	7.71	16.36	6.73	2.17	10.14	63.22	24.00	65.27	45.38	53.97	255.49	0.00	0.00	19.86	572.17
Feb-20	0.00	0.00	0.00	0.00	0.00	0.00	1.48	6.87	15.36	6.32	1.72	7.28	68.34	22.24	61.14	40.38	47.67	210.52	0.00	0.00	17.85	507.18
Mar-20	0.00	0.00	0.00	0.00	0.00	0.00	1.59	7.11	17.12	6.90	5.42	21.77	72.22	23.19	62.50	40.35	52.70	264.74	0.00	0.00	14.33	589.93
Total	0.00	0.00	0.00	0.00	0.00	0.00	30.19	98.48	294.85	147.37	72.32	517.52	1,169.32	394.89	874.22	626.83	827.91	4,790.72	0.00	0.00	183.70	10,028.33
Apr-Oct	0.00	0.00	0.00	0.00	0.00	0.00	19.69	58.03	205.93	111.76	56.94	430.50	789.04	265.95	535.28	387.74	535.51	3,317.36	0.00	0.00	89.95	6,803.67
Nov-Mar	0.00	0.00	0.00	0.00	0.00	0.00	10.50	40.45	88.92	35.61	15.37	87.03	380.28	128.94	338.94	239.09	292.40	1,473.36	0.00	0.00	93.75	3,224.66

Table 7 - Consumable Water Delivered For Replacement Purposes For Pumping April 2019 Through March 2020

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION
(values in ac-ft)

Row	River Reach	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Total Apr-Mar
	REPLACEMENT REQUIREMENTS													
	In State Replacement Obligations													
1	Rule 14 Plan Replacement Obligation	654	941	1,220	1,515	1,758	1,854	1,781	78	66	58	52	55	10,032
2	LAWMA Aug. Plan Replacement Obligation	328	346	429	443	472	473	373	43	37	33	30	33	3,040
3	LAWMA SWSP Plan Replacement Obligation	0	0	1	1	1	1	1	1	1	0	0	0	8
4	**Sub-Total**	**982**	**1,287**	**1,650**	**1,959**	**2,231**	**2,328**	**2,155**	**122**	**104**	**91**	**82**	**88**	**13,079**
	Stateline Replacement Obligation													
5	Rule 14 Plan Replacement Obligation	640	870	1,089	1,344	1,537	1,550	1,396	809	672	574	516	569	11,566
6	LAWMA Aug. Plan Replacement Obligation	323	430	529	642	727	728	653	860	658	586	518	593	7,247
7	LAWMA SWSP Plan Replacement Obligation	0	0	0	0	0	0	0	0	0	0	0	0	1
8	500 ac-ft of water Required to Fund Offset Account	0	0	0	0	250	250	0	0	0	0	0	0	500
9	**Sub-Total**	**963**	**1,300**	**1,618**	**1,986**	**2,514**	**2,528**	**2,049**	**1,669**	**1,330**	**1,160**	**1,034**	**1,162**	**19,314**
10	**Total**	**1,945**	**2,588**	**3,268**	**3,945**	**4,745**	**4,856**	**4,204**	**1,791**	**1,434**	**1,251**	**1,116**	**1,250**	**32,394**

Row	Replacement Source	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Total Apr-Mar
	REPLACEMENT SOURCES													
	In State Replacement Sources													
11	Fry-Ark Project Water	63	86	91	145	200	181	141	116	99	86	76	68	1,354
12	Highland Canal Direct Flow (02CW181)	0	0	0	0	0	0	0	0	0	0	0	0	0
13	Highland Canal Direct Flow (10CW85)	20	26	39	50	59	28	7	0	0	0	0	0	228
14	Highland Ditch Transit Loss	10	10	10	10	10	10	10	0	0	0	0	0	70
15	Fort Lyon Canal (Pending)													
16	Farm 60 Recharge Site	37	45	54	48	40	27	20	14	6	5	5	12	315
17	Horse Creek Augmentation Station	189	248	319	280	226	136	86	45	0	0	0	42	1,572
18	Farm 27 Augmentation Station	124	164	212	187	152	93	60	33	0	0	0	27	1,052
19	Farm 36 Augmentation Station	41	54	69	61	50	31	21	12	0	0	0	10	348
20	Farm 132/133 Augmentation Station	59	76	97	86	70	43	29	17	0	0	0	15	492
21	Farm 132/133 Recharge Site	48	60	75	66	54	35	24	15	3	2	2	13	398
22	Limestone Creek Aug Station	25	32	40	35	29	18	12	7	0	0	0	7	205
23	Farm 65 Recharge Site	19	24	29	26	21	14	10	7	2	2	2	6	161
24	McClave Lateral Aug Station	50	65	83	73	59	37	24	14	0	0	0	13	418
25	Graveyard Creek Aug Station	40	53	67	59	48	30	20	11	0	0	0	10	338
26	Riverview Drain Aug Station	41	54	69	60	49	30	21	12	0	0	0	10	347
27	Farm 110 Recharge Site	0	0	0	0	0	0	0	0	0	0	0	0	0
28	Farm 63b Recharge Site	31	40	51	44	36	22	15	9	0	0	0	8	255
29	Wheatridge Aug Station	0	0	0	0	0	0	0	0	0	0	0	0	0
30	Keesee II Direct Flow (05CW52)	137	219	202	260	237	207	149	0	0	0	0	0	1,411
31	Fort Bent-LAWMA Aug Station (02CW181)	82	112	137	158	142	97	65	0	0	0	0	0	793
32	Fort Bent-LAWMA Aug Station (10CW85)	11	14	18	21	18	10	6	0	0	0	0	0	99
33	Fort Bent-LAWMA Aug Station (17CW3068 Pending)	18	25	30	35	32	21	14	0	0	0	0	0	176

Table 7 - Consumable Water Delivered For Replacement Purposes For Pumping April 2019 Through March 2020

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

(values in ac-ft)

34	City of Lamar Excess Credits	5	5	5	6	9	8	9	11	13	12	9	8	100
35	Lamar shares at Aug Stations (02CW181)	946	1,148	1,495	1,548	1,298	1,002	784	0	0	0	0	0	8,220
36	Lamar shares at Aug Stations (15CW3067)	105	128	169	173	138	99	72	0	0	0	0	0	882
37	West Farm Gravel Pit	0	0	0	0	250	250	250	0	0	0	0	0	750
38	Manvel Article II at Aug Stations (02CW181)	0	0	0	0	0	250	250	0	0	0	0	0	500
39	Misc. Other Supplies	0	0	0	0	0	0	0	0	0	0	0	0	0
40	Consumable Water in John Martin (Article II Accounts)	0	0	0	0	0	0	64	0	7	7	8	0	86
41	**Sub-Total**	**2,103**	**2,686**	**3,361**	**3,432**	**3,229**	**2,677**	**2,161**	**323**	**129**	**115**	**103**	**252**	**20,570**
	Stateline Replacement Sources													
42	Excess In-State Credits	1,118	1,396	1,708	1,470	995	346	67	201	25	24	20	163	7,533
43	GIC shares at Aug Stations (15CW3067)	253	310	427	434	325	203	114	0	0	0	0	0	2,065
44	X-Y Ditch Direct Flow (02CW181)	318	454	506	563	662	521	379	0	0	0	0	0	3,404
45	X-Y Ditch Direct Flow (15CW3067)	9	13	15	16	19	15	11	0	0	0	0	0	99
46	Manvel Ditch Direct Flow	150	150	150	150	150	0	0	0	0	0	0	0	750
47	Stubbs Ditch Direct Flow	36	36	36	36	36	36	36	0	0	0	0	0	252
48	Sisson Ditch Direct Flow	36	36	36	36	36	36	36	0	0	0	0	0	252
49	Offset Accnt Release-Transit Loss	0	0	0	100	100	100	0	0	0	0	0	0	300
50	Consumable Water in John Martin (combination of Offset Account, Article II Accounts or Offset Credit at the Stateline)	161	140	0	37	66	135	579	1,463	1,305	1,136	1,014	999	7,035
51	**Sub-Total**	**2,080**	**2,536**	**2,878**	**2,843**	**2,389**	**1,392**	**1,222**	**1,664**	**1,330**	**1,160**	**1,034**	**1,162**	**21,690**
52	**Total Replacement Sources**	**3,066**	**3,826**	**4,530**	**4,805**	**4,623**	**3,723**	**3,316**	**1,786**	**1,434**	**1,251**	**1,116**	**1,250**	**34,726**

			IN-STATE ACCOUNTING											**Total**
Row	Item		Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-Mar
53	Total of Replacement Sources (+)		2,103	2,686	3,361	3,432	3,229	2,677	2,161	323	129	115	103	252	20,570
54	Credit From Last Month (+)		0	0	0	0	0	0	0	0	0	0	0	0	0
55	Total Replacement Obligation (-)		982	1,287	1,650	1,959	2,231	2,328	2,155	122	104	91	82	88	13,079
56	In-State Credits delivered below Buffalo Canal		1,116	1,394	1,706	1,468	993	344	1	201	25	24	20	163	7,455
57	Credit Lost due to One Month Carry Forward Limit (-)		0	0	0	0	0	0	0	0	0	0	0	0	0
58	Transit Loss for Month (-)		5	5	5	5	5	5	5	0	0	0	0	0	35
59	Debit From Last Month (-)		0	0	0	0	0	0	0	0	0	0	0	0	0
60	Balance - Sum of (+) and (-) in above rows		0	0	0	0	0	0	0	0	0	0	0	0	
61	Credit Carried Forward to Next Month	0	0	0	0	0	0	0	0	0	0	0	0	0	
62	Debit Carried Forward to Next Month	0	0	0	0	0	0	0	0	0	0	0	0	0	

			STATELINE ACCOUNTING										**Total**
Row	Item	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-Mar
63	Total of Replacement Sources (+)	2,080	2,536	2,878	2,843	2,389	1,392	1,222	1,664	1,330	1,160	1,034	1,162	21,690

Prowers
1041 Ex I

Table 7 - Consumable Water Delivered For Replacement Purposes For Pumping April 2019 Through March 2020

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION
(values in ac-ft)

64	Credit From Last Month (+)		0	1,112	2,343	2,873	2,838	2,384	1,243	411	406	406	406	406	14,827
65	Total Replacement Obligation (-)		963	1,300	1,618	1,986	2,514	2,528	2,049	1,669	1,330	1,160	1,034	1,162	19,314
66	Stateline Credit Delivered to Stateline (-)		0	0	725	886	324	0	0	0	0	0	0	0	1,935
67	Transit Loss for Month (-)		5	5	5	5	5	5	5	0	0	0	0	0	35
68	Debit From Last Month (-)		0	0	0	0	0	0	0	0	0	0	0	0	0
69	Balance - Sum of (+) and (-) in above rows		1,112	2,343	2,873	2,838	2,384	1,243	411	406	406	406	406	406	
70	Credit Carried Forward to Next Month	0	1,112	2,343	2,873	2,838	2,384	1,243	411	406	406	406	406	406	
71	Debit Carried Forward to Next Month	0	0	0	0	0	0	0	0	0	0	0	0	0	

			CONSUMABLE WATER IN JOHN MARTIN												Total
Row	Item		Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-Mar
72	Offset account Inflow from Highland		422	472	709	907	1,080	501	123	0	0	0	0	0	4,214
73	Keesee Direct Flow		137	219	202	260	237	207	149	0	0	0	0	0	1,411
74	Account Inflow from Article II Water		1,653	0	0	0	0	0	0	0	0	0	0	647	2,300
75	This Month Depletions paid with CU Account		161	140	0	37	66	135	643	1,463	1,312	1,143	1,022	999	7,121
76	Evap Loss and other Losses		179	282	350	444	458	381	217	106	28	25	48	90	2,609
77	End of Month Storage	9,303	11,175	11,444	12,730	14,302	15,419	15,611	15,022	13,453	12,112	10,944	9,874	9,433	

Row Explanations

1 In-State river replacement obligation from well pumping in LAWMA's 2019 Rule 14 plan.
2 In-State river replacement obligation from well pumping from LAWMA's 2019 augmentation plan.
3 In-State river replacement obligation from well pumping from LAWMA's 2019 SWSPs using LAWMA shares.
4 Equals Sum of Rows 1 through 3
5 Stateline river replacement obligation from well pumping in LAWMA's 2019 Rule 14 plan.
6 Stateline river replacement obligation from well pumping in LAWMA's 2019 augmentation plan.
7 Stateline river replacement obligation from well pumping in LAWMA's 2019 SWSPs using LAWMA shares.
8 The amount of water delivered to the Offset Account / Charge Sub-Account for the establishment of the 2019 Offset Account.
9 Sum of Rows 5 through 8
10 Sum of Row 4 and Row 9
11 Fry-Ark Return flows purchased from SECWCD for 2019 and return flows from 2017 Fort Lyon Canal project water delivered in 2019
12 Estimated yield of the Highland Canal water right changed in Case No. 02CW181. Yield estimated at 100% of average.
13 Estimated yield of the Highland Canal water right changed in Case No. 10CW85. Yield estimated at 100% of average.
14 Estimated transit loss for Highland Canal water measured at the Purgatoire River below the Highland Dam to the Purgatoire River near Las Animas as calculated by the DEO.
15 Fort Lyon Canal water delivered through various augmentation stations and recharge sites. Yield estimated at 100% of average. USED IN RULE 14 PLAN ONLY.
16 Fort Lyon Canal water delivered through the Farm 60 Recharge site.
17 Fort Lyon Canal water delivered through the Horse Creek Augmentation Station.
18 Fort Lyon Canal water delivered through the Farm 27 Augmentation Station.
19 Fort Lyon Canal water delivered through the Farm 36 Augmentation Station.
20 Fort Lyon Canal water delivered through the Farm 132/133 Augmentation Station.
21 Fort Lyon Canal water delivered through the Farm 132/133 Recharge Site.
22 Fort Lyon Canal water delivered through the Limestone Creek Augmentation Station.
23 Fort Lyon Canal water delivered through the Farm 65 Recharge Site.
24 Fort Lyon Canal water delivered through the Mclave Lateral Augmentation Station.
25 Fort Lyon Canal water delivered through the Graveyard Creek Augmentation Station.

Table 7 - Consumable Water Delivered For Replacement Purposes For Pumping April 2019 Through March 2020

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION
(values in ac-ft)

26 Fort Lyon Canal water delivered through the Riverview Drain Augmentation Station.
27 Fort Lyon Canal water delivered through the Farm 110 Recharge Site.
28 Fort Lyon Canal water delivered through the Farm 63b Recharge Site.
29 Fort Lyon Canal water delivered through the Wheatridge Augmentation Station.
30 One half of the Keesee Ditch water rights changed in Case No. 05CW52 delivered to the river. Yield estimated at 100% of average.
31 Fort Bent Ditch water delivered to the Fort Bent Augmentation station from Fort Bent shares changed in Case No. 02CW181. Yield estimated at 100% of average.
32 Fort Bent Ditch water delivered to the Fort Bent Augmentation station from Fort Bent shares changed in Case No. 10CW85. Yield estimated at 100% of average.
33 Fort Bent Ditch water delivered to the Fort Bent augmentation station in pending Case No. 17CW3068. Yield estimated at 100% of average. USED IN RULE 14 PLAN ONLY
34 Excess credits from the City of Lamar's Rule 14 and Augmentation Plan. USED IN RULE 14 PLAN ONLY
35 Lamar Canal water delivered to the Lamar Canal augmentation stations changed in Case No. 02CW181. Yield estimated at 100% of average.
36 Lamar Canal water delivered to the Lamar Canal augmentation stations in Case No. 15CW3067. Yield estimated at 100% of average.
37 Consumable water delivered from the West Farm Gravel pit.
38 Manvel Article II water released from John Martin Reservoir and delivered to the Lamar Canal for delivery through the West Farm Augmentation Station.
39 Miscellaneous Other Supplies for example the Busk-Ivanhoe lagged return flows LAWMA acquired in 2013 that has a residual return flow amount in 2019 and consumable water stored in the West Farm Gravel Pit
40 Release of Article II account water from John Martin Reservoir to meet an outstanding replacement obligations from Row 3
41 Sum of Rows 11 through 40
42 Consumptive use credits not used to replace in-state replacement obligations. Row 26 - Row 4
43 Lamar Canal water delivered to the Lamar Canal augmentation stations in Case No. 15CW3067. Yield estimated at 100% of average.
44 Estimated yield of the 67 / 69 cfs of the X-Y Ditch direct flow water right changed in Case No. 02CW181. Yield estimated at 100% of average.
45 Estimated yield of 2.0 / 69 cfs of the X-Y Ditch direct flow water rights in Case No. 15CW3067. Yield estimated at 100% of average.
46 Estimated yield of the Manvel Ditch direct flow water right changed in Case No. 02CW181. Estimated yield based on volumetric limits.
47 Estimated yield of the Stubbs Ditch direct flow water right changed in Case No. 02CW181. Estimated yield based on Colorado-Kansas Agreement regarding Sisson-Stubbs water rights.
48 Estimated yield of the Sisson Ditch direct flow water right changed in Case No. 10CW85. Estimated yield based on Colorado-Kansas Agreement regarding Sisson-Stubbs water rights.
49 Transit loss credits calculated from delivery of the Offset Account consumable water to the Stateline. Estimated yield based on past Offset Account deliveries.
50 Use of water delivered to the Stateline from the Offset Account, Article II Account releases or use of Stateline Credits already delivered to the Offset Account to meet Stateline Replacement Obligations. It should be noted that this total is typically used during the non-irrigation season.
51 Sum of Rows 42 through 50
52 Calculated as Row 41 + Row 51 - Row 42. Excess in-state credits is removed from the total to not account for in-state credits twice.
53 Calculated from Row 41
54 Calculated from previous month Row 61
55 Calculated from Row 4
56 Calculated as Row 53 + Row 54 - Row 55 - Row 56
57 Calculated as the maximum of the previous month Row 61 - Row 4 or zero.
58 Estimated transits loss of delivery of consumptive use credits. Estimate from previous years deliveries.
59 Calculated from previous month Row 62
60 Calculated as Row 53 + Row 54 - Row 55 - Row 56 - Row 57 - Row 58 - Row 59
61 Calculated as the maximum of Row 60 or zero.
62 Calculated as the minimum of Row 60 or zero.
63 Calculated as Row 51
64 Calculated from previous month Row 70
65 Calculated from Row 9
66 Calculated as maximum of Row 70 - Row 9 or zero.
67 Estimated transits loss of delivery of consumptive use credits. Estimate from previous years deliveries.
68 Calculated from previous month Row 71
69 Calculated as Row 63 + Row 64 - Row 65 - Row 66 - Row 67 - Row 68
70 Calculated as the maximum of Row 69 or zero.
71 Calculated as the minimum of Row 69 or zero.

Table 7 - Consumable Water Delivered For Replacement Purposes For Pumping April 2019 Through March 2020

LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION
(values in ac-ft)

72 Estimated yield of the Highland Canal water right changed in Case No. 02CW181 not used for in-state replacement. Yield estimated at 100% of average.
73 Estimated yield of one half of the Keesee Ditch water rights changed in Case No. 02CW181 delivered to the Offset Account. Yield estimated at 100% of average.
74 Estimated accrual of water into John Martin Reservoir Article II accounts owned by LAWMA.
75 The amount of water delivered from the Article II accounts, Offset Account to the Stateline during the year, or Stateline Credits from previous years Offset Account deliveries.
76 Estimated evaporation and other transit losses for delivery of storage water.
77 End of month storage amount that includes Article II accounts, Offset Account water to the Stateline during the year, or Stateline Credits from previous years Offset Account deliveries.

Prowers 1041 Exhibit J

Cut/Fill Report

Generated:	2018-12-04 12:25:35
By user:	Todd Yee
Drawing:	P:\16127 Lamar Aug Ponds and Lateral Ditch Structures\Drawings\Plan Sheets\Recharge Ponds\63b-Lat 230 & 230g\P:\16127 Lamar Aug Ponds and Lateral Ditch Structures\Drawings\Plan Sheets\Recharge Ponds\63b-Lat 230 & 230g\JT-63b Ponds.dwg

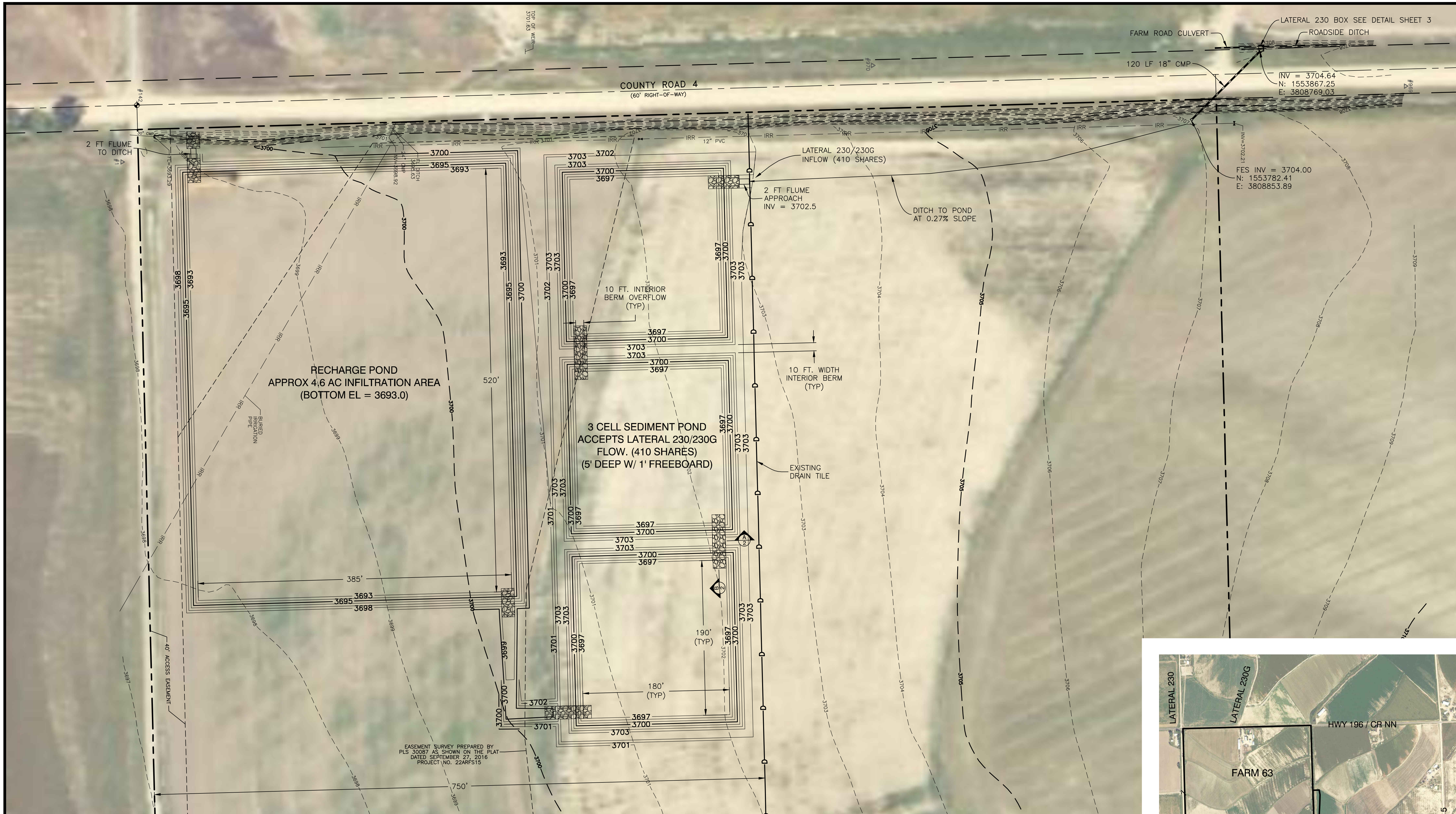
Volume Summary

Name	Type	Cut Factor	Fill Factor	2d Area (Sq. Ft.)	Cut (Cu. Yd.)	Fill (Cu. Yd.)	Net (Cu. Yd.)
VOL-JT-63b-Existing-Recharge	full	1.000	1.000	438479.50	72225.27	1746.55	70478.72<Cut>

Totals

	2d Area (Sq. Ft.)	Cut (Cu. Yd.)	Fill (Cu. Yd.)	Net (Cu. Yd.)
Total	438479.50	72225.27	1746.55	70478.72<Cut>

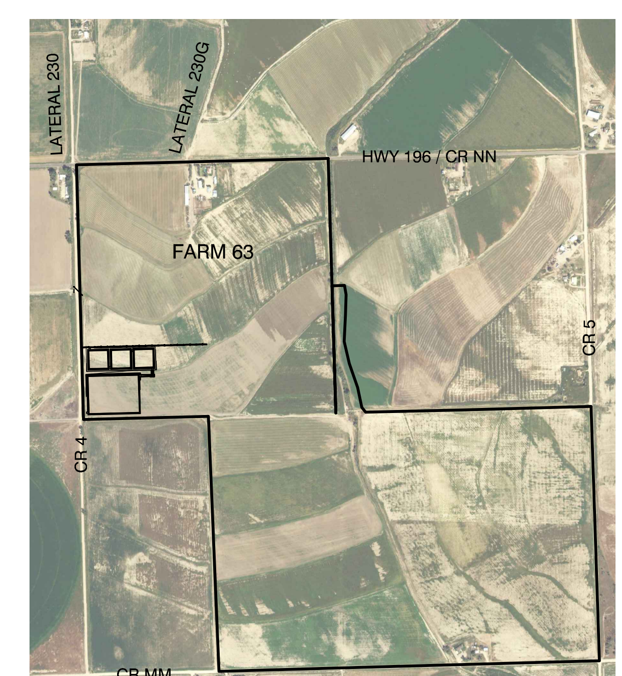
* Value adjusted by cut or fill factor other than 1.0



60 30 0 60 120 180
SCALE IN FEET

Farm 63 - Recharge Pond Stage Storage						
Contour Elevation (ft)	Contour Area (sq-ft)	Contour Area (ac)	Incremental Volume (cu-ft)	Cumulative Volume (cu-ft)	Incremental Volume (ac-ft)	Cumulative Volume (ac-ft)
3,693	200,201	4.60	0	0	0.00	0.00
3,694	205,667	4.72	202,928	202,928	4.66	4.66
3,695	211,205	4.85	208,430	411,358	4.78	9.44
3,696	216,815	4.98	214,004	625,361	4.91	14.36
3,697	222,497	5.11	219,650	845,011	5.04	19.40
3,698	228,251	5.24	225,368	1,070,379	5.17	24.57

Farm 63 - Sediment Pond Stage Storage						
Contour Elevation (ft)	Contour Area (sq-ft)	Contour Area (ac)	Incremental Volume (cu-ft)	Cumulative Volume (cu-ft)	Incremental Volume (ac-ft)	Cumulative Volume (ac-ft)
3,697	102,600	2.36	0	0	0.00	0.00
3,698	109,368	2.51	105,966	105,966	2.43	2.43
3,699	116,352	2.67	112,842	218,808	2.59	5.02
3,700	123,552	2.84	119,934	338,742	2.75	7.78
3,701	130,968	3.01	127,242	465,984	2.92	10.70
3,702	138,600	3.18	134,766	600,750	3.09	13.79



VICINITY MAP
SCALE 1" = 1000'

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Fort Lupton, CO 80621
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Lateral 230 / 230G
Farm 63
Sediment / Recharge Ponds
Pond Layout for Full Flow

Arkansas River Farms

REVISIONS

No	Date	By	Chk	Description

Job #	16127
Date	12.4.18
Drawn By	TPY
Designed By	TPY
Checked By	JCY
File	JT-63b Ponds
Scale	As Shown

Sheet: 1 Of: 3

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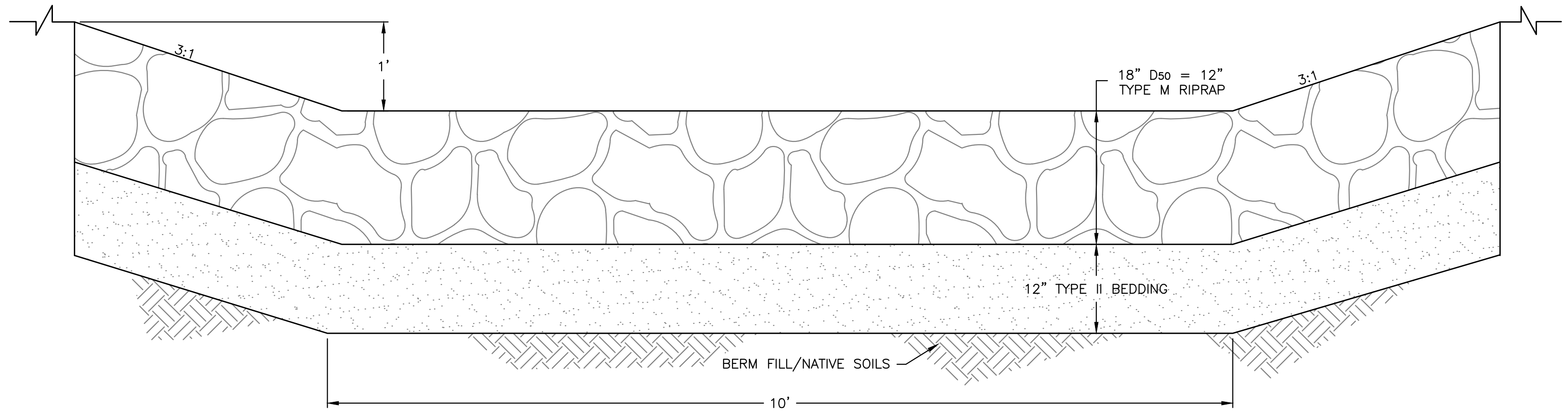
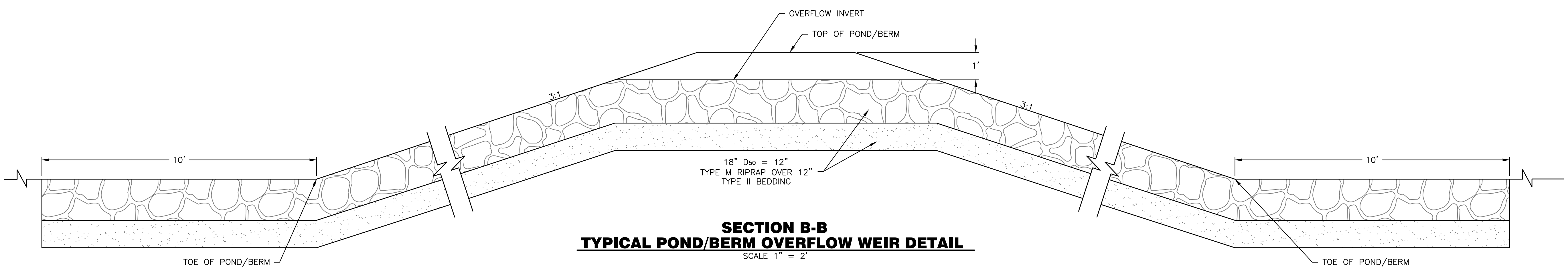
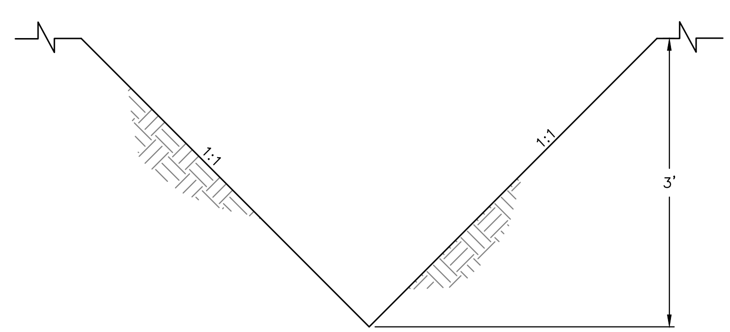


SECTION A-A
TYPICAL POND/BERM OVERFLOW WEIR DETAIL
SCALE 1" = 1'



SECTION B-B
TYPICAL POND/BERM OVERFLOW WEIR DETAIL
SCALE 1" = 2'



TYPICAL DITCH SECTION DETAIL
SCALE 1" = 1'

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Lateral 230/230G
Farm 63
Sediment / Recharge Ponds
Details

Arkansas River Farms

REVISIONS

No	Date	By	Chk	Description

Job #	16127
Date	2.1.17
Drawn By	WSS
Designed By	TPY
Checked By	JCY
File	230 det
Scale	As Shown

Sheet: **2** Of: **3**

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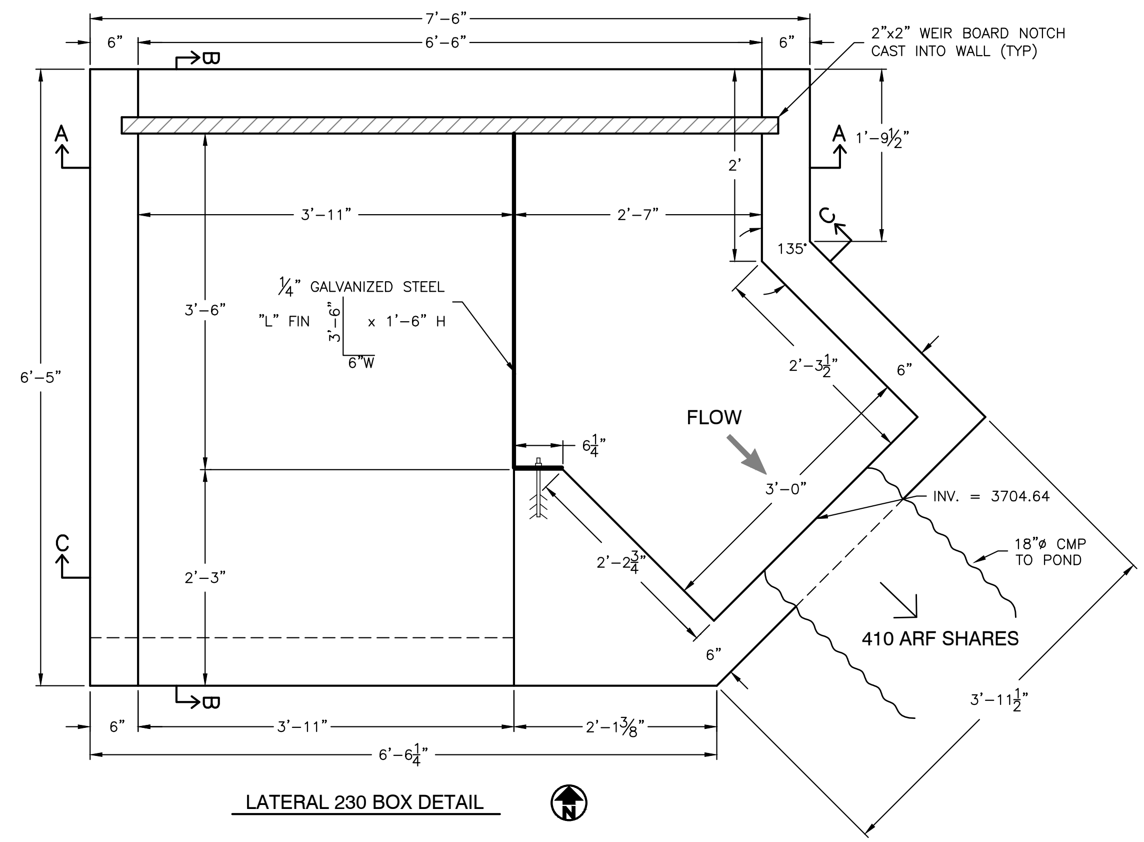
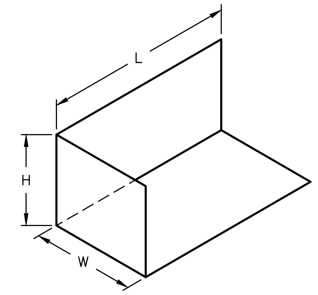
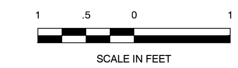
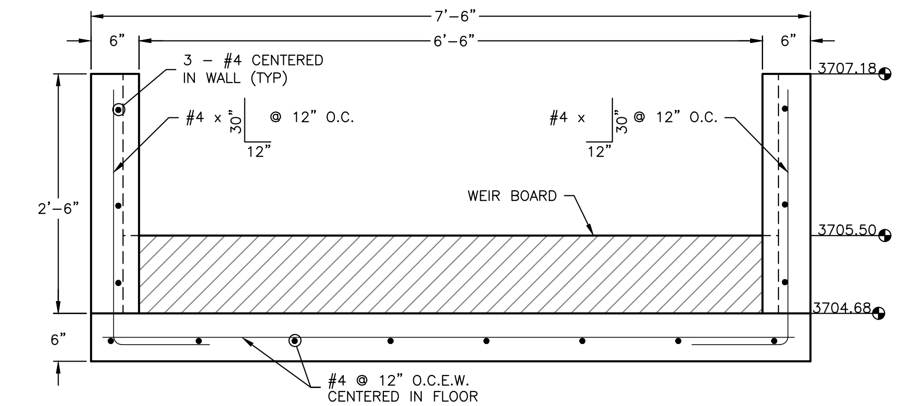


LATERAL 230 BOX DETAIL



TYPICAL "L" FIN DIMENSIONS





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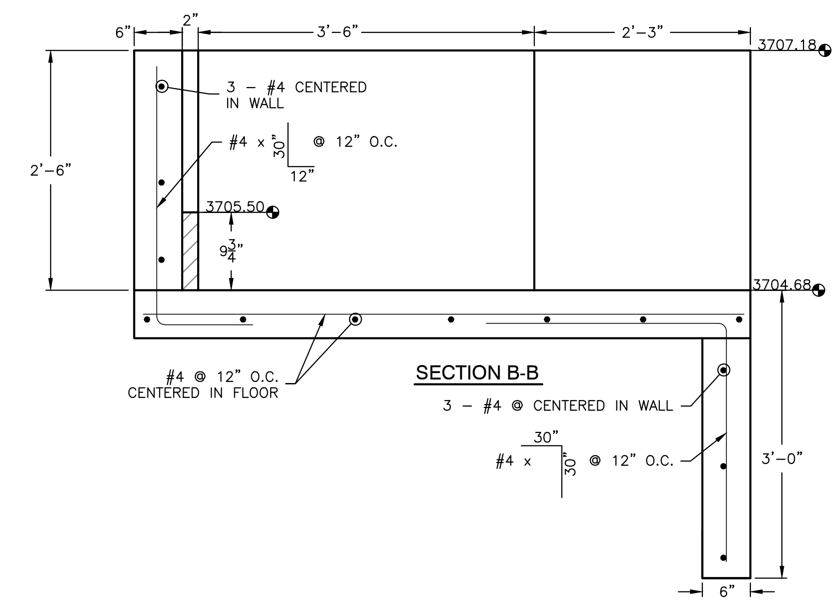
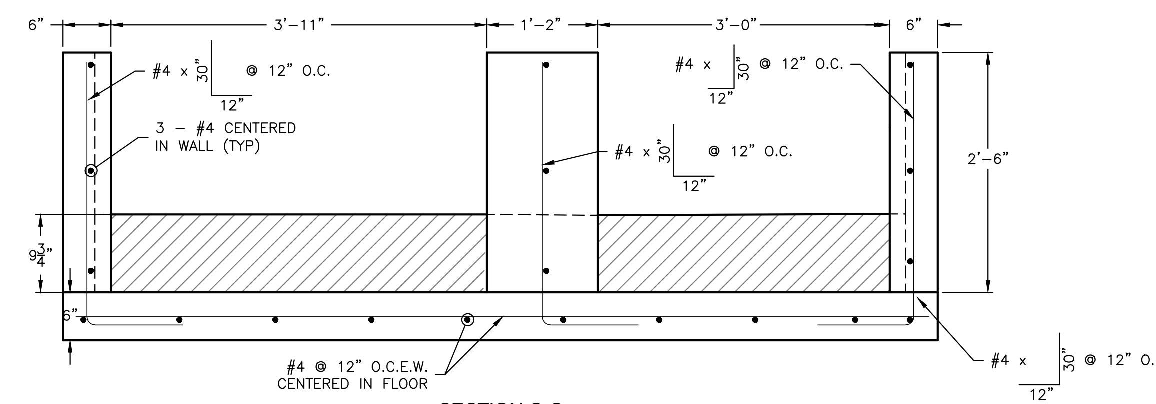


SECTION B-B



SECTION C-C

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Lateral 230
Farm 63
Sediment / Recharge Ponds
Lateral 230 Details

Arkansas River Farms

REVISIONS

No	Date	By	Chk	Description

Job #	16127
Date	11.27.18
Drawn By	WSS
Designed By	TPY
Checked By	JCY
File	230 det
Scale	1/2" = 1'

Sheet: 3 Of: 3

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Culvert Report

Prowers 1041 Exhibit J

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc.

Friday, Nov 16 2018

Farm Road Culvert

Invert Elev Dn (ft)	=	3704.35
Pipe Length (ft)	=	30.00
Slope (%)	=	0.20
Invert Elev Up (ft)	=	3704.41
Rise (in)	=	18.0
Shape	=	Circular
Span (in)	=	18.0
No. Barrels	=	1
n-Value	=	0.025
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Projecting
Coeff. K,M,c,Y,k	=	0.034, 1.5, 0.0553, 0.54, 0.9

Embankment

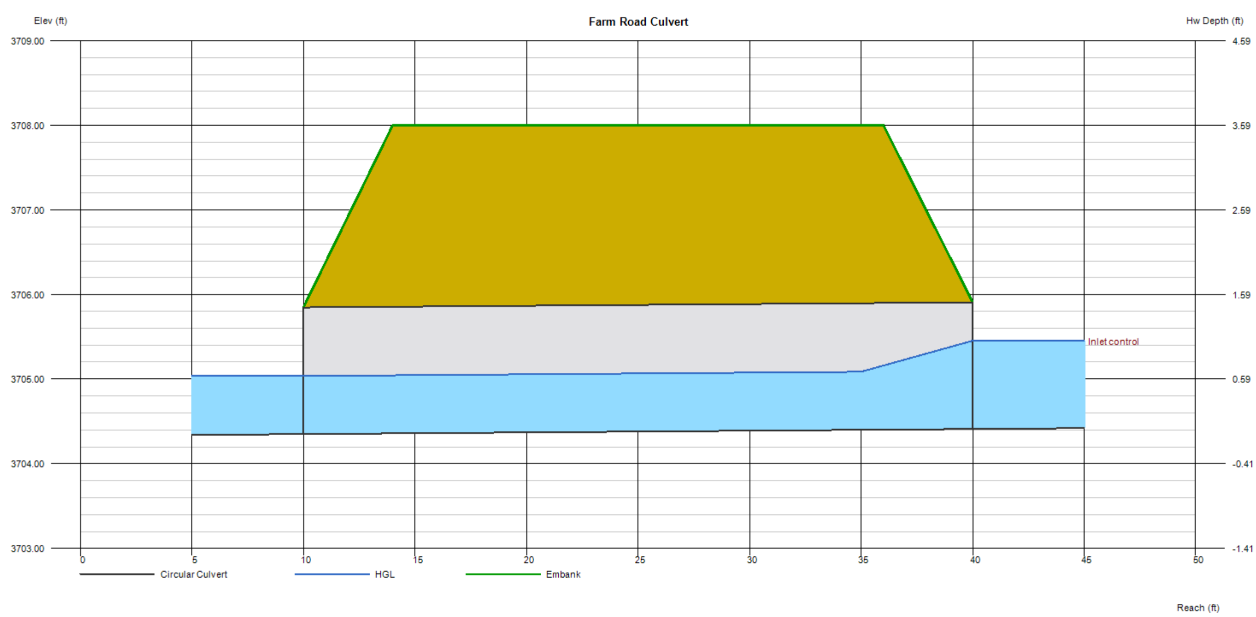
Top Elevation (ft)	=	3708.00
Top Width (ft)	=	22.00
Crest Width (ft)	=	5.00

Calculations

Qmin (cfs)	=	3.24
Qmax (cfs)	=	3.24
Tailwater Elev (ft)	=	3704.86

Highlighted

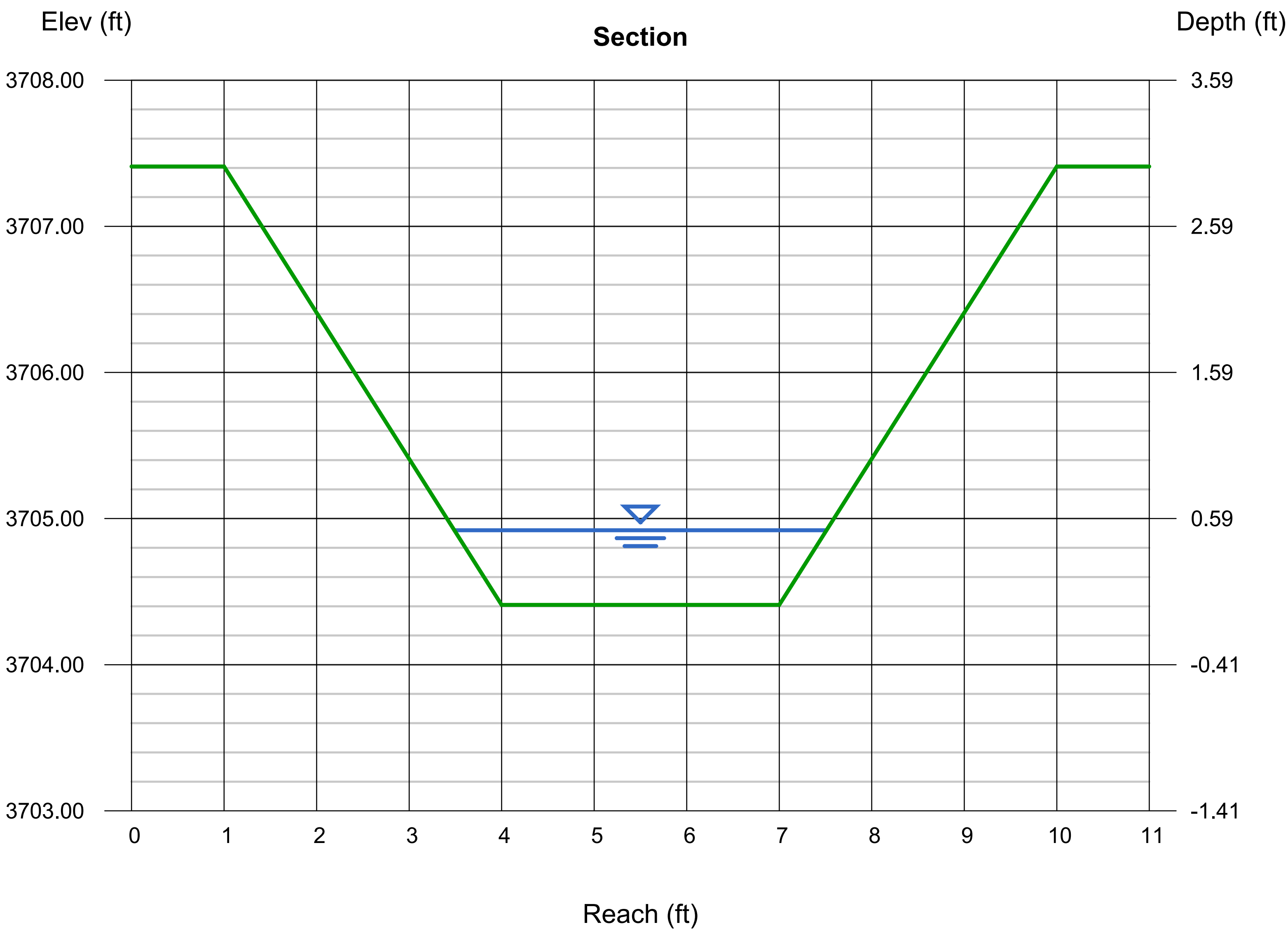
Qtotal (cfs)	=	3.24
Qpipe (cfs)	=	3.24
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	4.12
Veloc Up (ft/s)	=	4.12
HGL Dn (ft)	=	3705.04
HGL Up (ft)	=	3705.10
Hw Elev (ft)	=	3705.45
Hw/D (ft)	=	0.69
Flow Regime	=	Inlet Control



Channel Report

Roadside Ditch

Trapezoidal		**Highlighted**	
Bottom Width (ft)	= 3.00	Depth (ft)	= 0.51
Side Slopes (z:1)	= 1.00, 1.00	Q (cfs)	= 3.240
Total Depth (ft)	= 3.00	Area (sqft)	= 1.79
Invert Elev (ft)	= 3704.41	Velocity (ft/s)	= 1.81
Slope (%)	= 0.20	Wetted Perim (ft)	= 4.44
N-Value	= 0.020	Crit Depth, Yc (ft)	= 0.32
		Top Width (ft)	= 4.02
Calculations		EGL (ft)	= 0.56
Compute by:	Known Q		
Known Q (cfs)	= 3.24		



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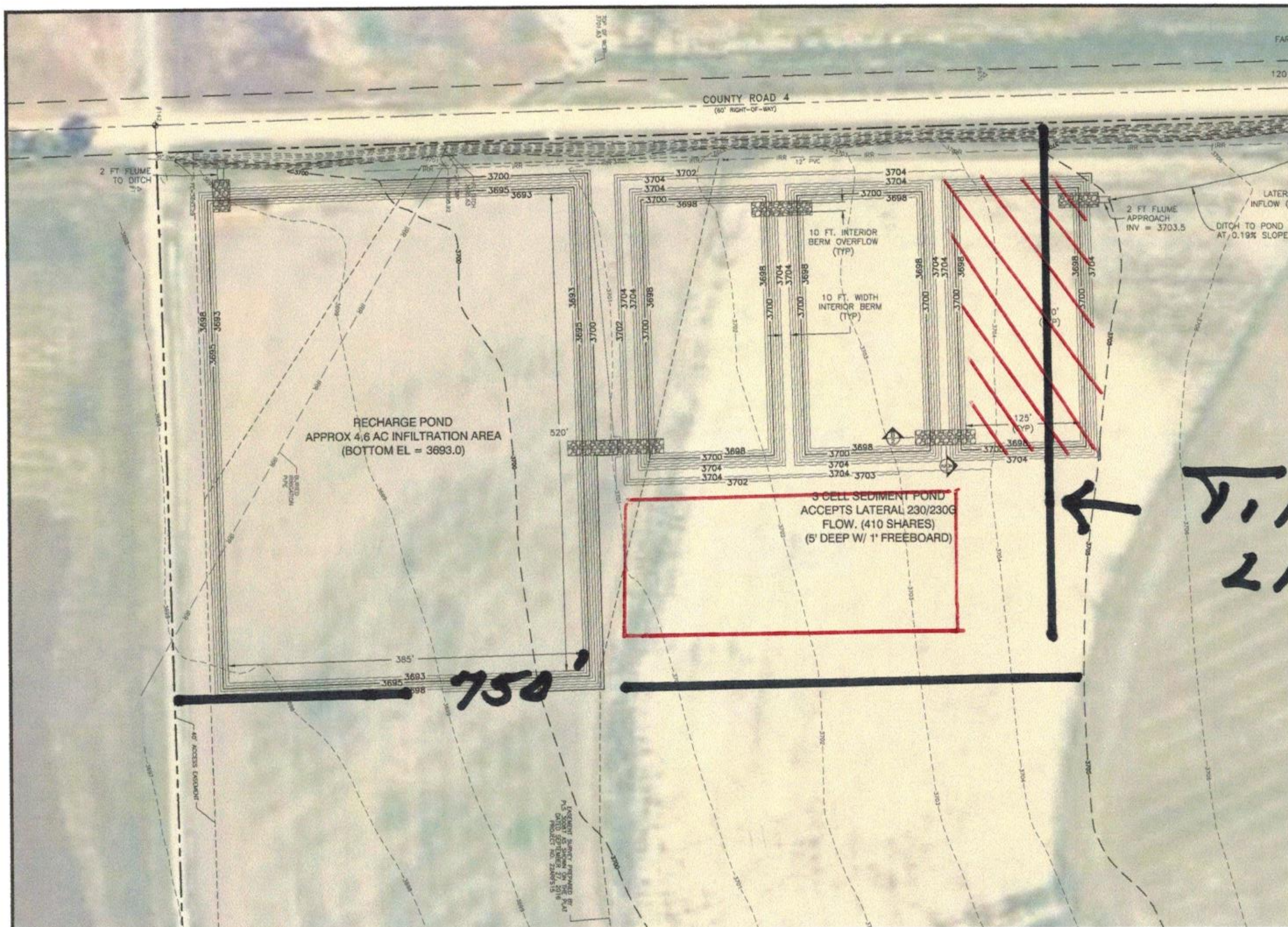

Farm 63 - Recharge Pond Stage Storage						
Contour Elevation (ft)	Contour Area (sq-ft)	Contour Area (ac)	Incremental Volume (cu-ft)	Cumulative Volume (cu-ft)	Incremental Volume (ac-ft)	Cumulative Volume (ac-ft)
3,693	200,201	4.60	0	0	0.00	0.00
3,694	205,667	4.72	202,928	202,928	4.66	4.66
3,695	211,205	4.85	208,430	411,358	4.78	9.44
3,696	216,815	4.98	214,004	625,361	4.91	14.36
3,697	222,497	5.11	219,650	845,011	5.04	19.40
3,698	228,251	5.24	225,368	1,070,379	5.17	24.57

Farm 63 - Sediment Pond Stage Storage						
Contour Elevation (ft)	Contour Area (sq-ft)	Contour Area (ac)	Incremental Volume (cu-ft)	Cumulative Volume (cu-ft)	Incremental Volume (ac-ft)	Cumulative Volume (ac-ft)
3,698	101,250	2.32	0	0	0.00	0.00
3,699	108,468	2.49	104,838	104,838	2.41	2.41
3,700	115,902	2.66	112,164	217,003	2.57	4.98
3,701	123,552	2.84	119,707	336,709	2.75	7.73
3,702	131,418	3.02	127,465	464,174	2.93	10.66
3,703	139,500	3.20	135,439	599,613	3.11	13.77

VICINITY MAP
SCALE 1" = 1000'

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Lateral 230 / 230G
Farm 63
Sediment / Recharge Ponds
Pond Layout for Full Flow

Arkansas River Farms

REVISIONS				
No	Date	By	Chk	Description

Job #	16127
Date	11.29.18
Drawn By	TPY
Designed By	TPY
Checked By	JCY
File	JT-63b Ponds
Scale	As Shown

Sheet: 1 Of: 3

Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Nov 16 2018

Lat 230 Culvert

Invert Elev Dn (ft)	= 3704.00
Pipe Length (ft)	= 120.00
Slope (%)	= 0.53
Invert Elev Up (ft)	= 3704.64
Rise (in)	= 18.0
Shape	= Circular
Span (in)	= 18.0
No. Barrels	= 1
n-Value	= 0.020
Culvert Type	= Circular Corrugate Metal Pipe
Culvert Entrance	= Projecting
Coeff. K,M,c,Y,k	= 0.034, 1.5, 0.0553, 0.54, 0.9

Embankment

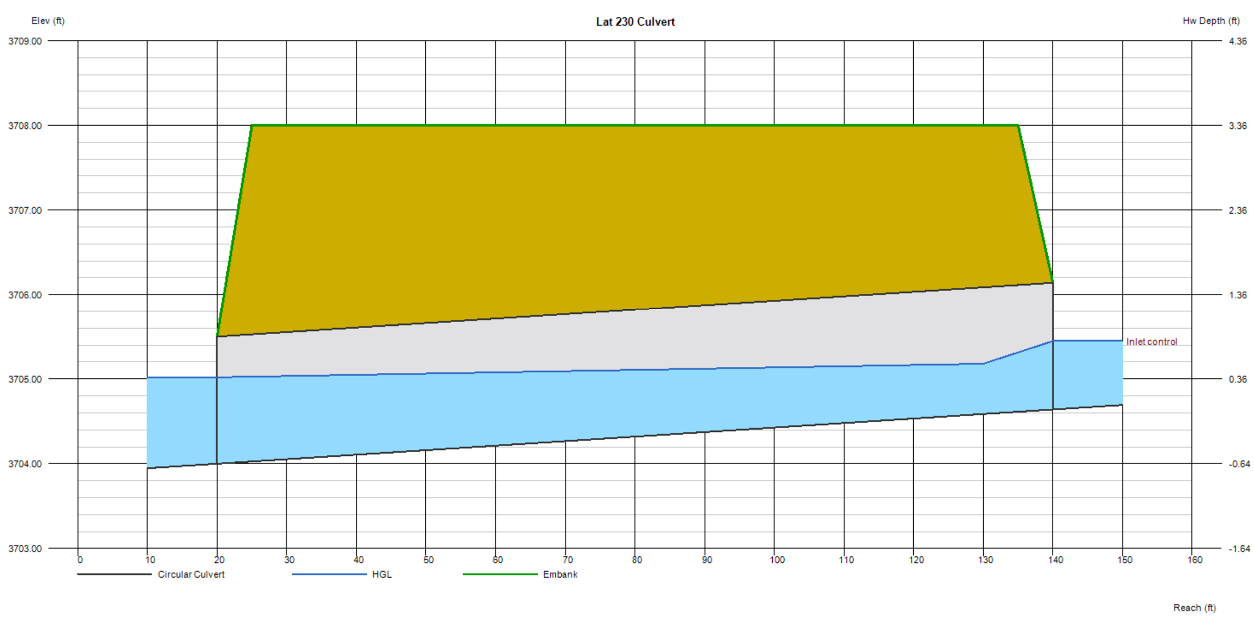
Top Elevation (ft)	= 3708.00
Top Width (ft)	= 110.00
Crest Width (ft)	= 20.00

Calculations

Qmin (cfs)	= 2.16
Qmax (cfs)	= 2.16
Tailwater Elev (ft)	= 3705.02

Highlighted

Qtotal (cfs)	= 2.16
Qpipe (cfs)	= 2.16
Qovertop (cfs)	= 0.00
Veloc Dn (ft/s)	= 1.69
Veloc Up (ft/s)	= 3.64
HGL Dn (ft)	= 3705.02
HGL Up (ft)	= 3705.19
Hw Elev (ft)	= 3705.45
Hw/D (ft)	= 0.54
Flow Regime	= Inlet Control

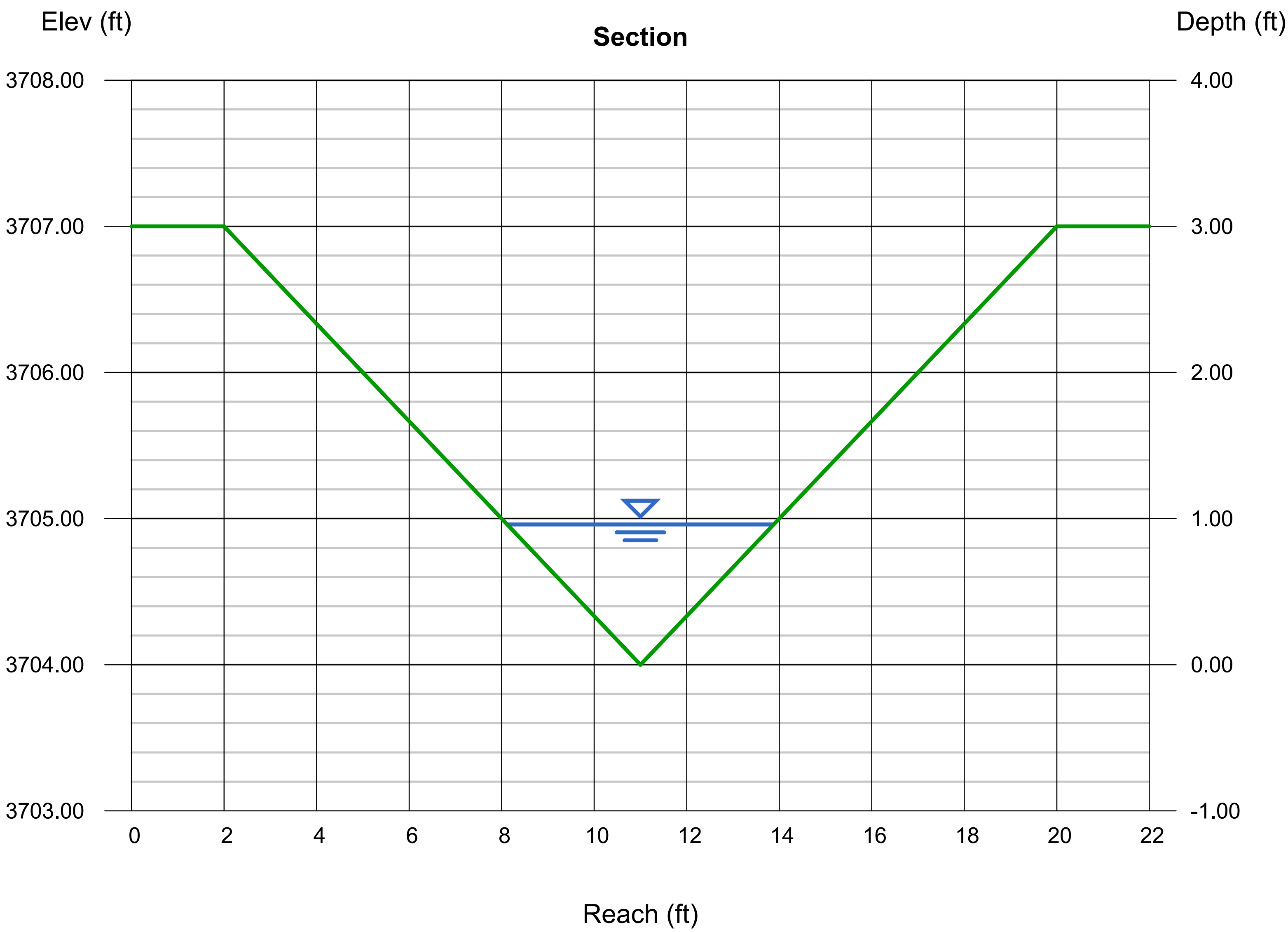


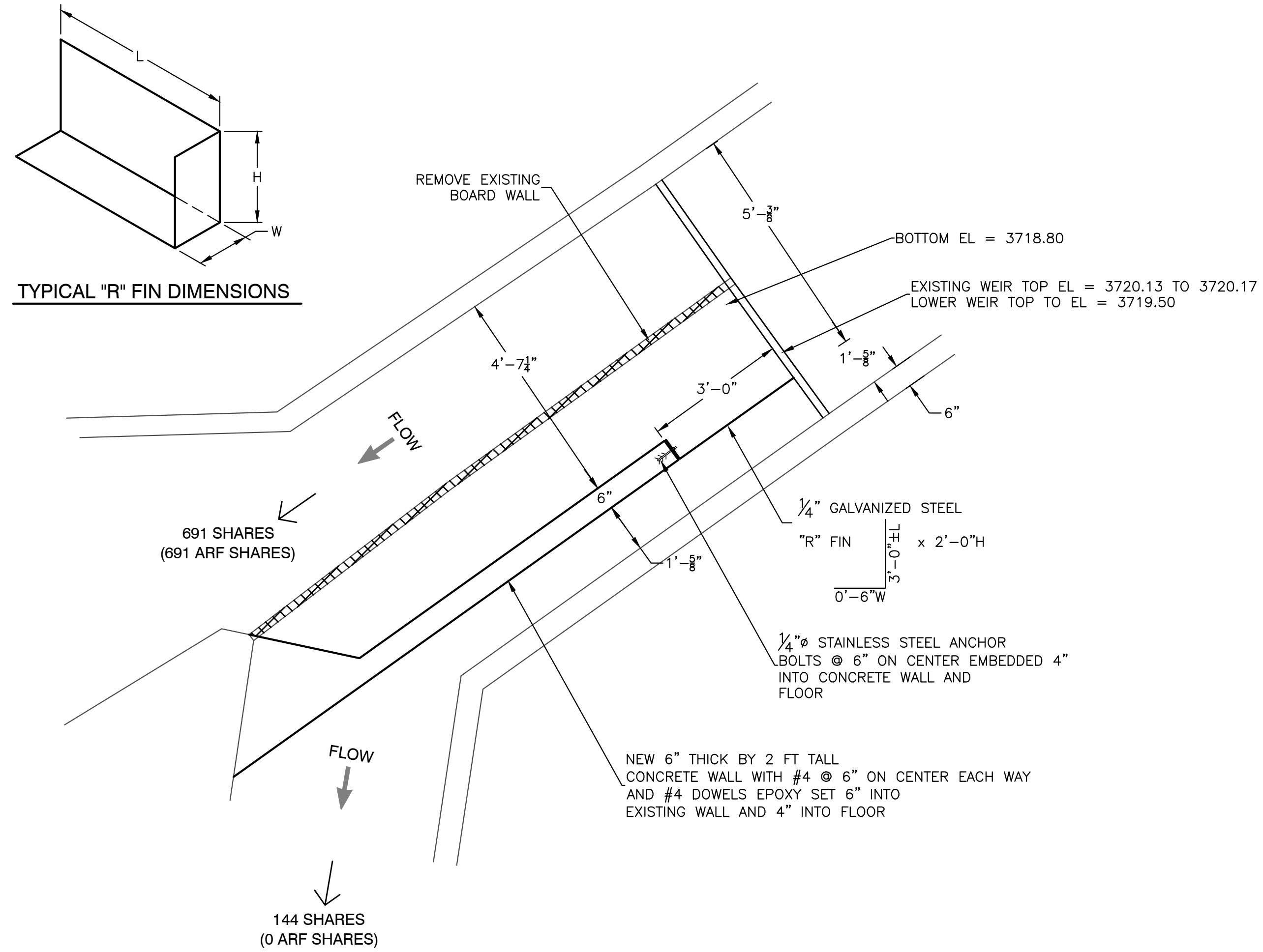
Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. — Tuesday, Dec 4 2018

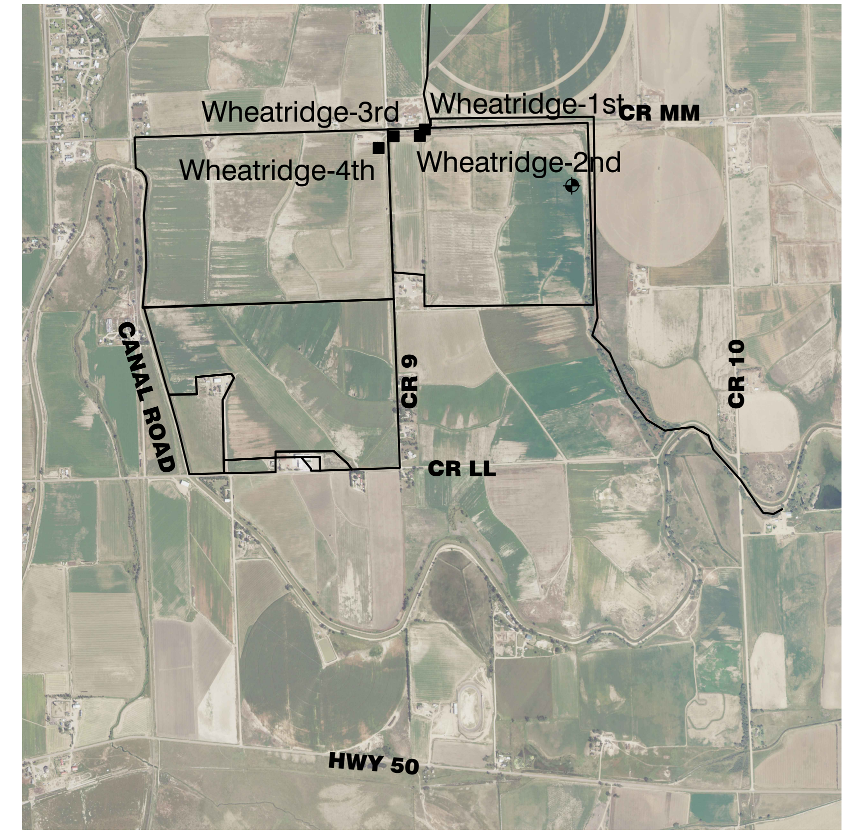
230-230g Ditch to Pond

Triangular		**Highlighted**	
Side Slopes (z:1)	= 3.00, 3.00	Depth (ft)	= 0.96
Total Depth (ft)	= 3.00	Q (cfs)	= 6.150
		Area (sqft)	= 2.76
Invert Elev (ft)	= 3704.00	Velocity (ft/s)	= 2.22
Slope (%)	= 0.27	Wetted Perim (ft)	= 6.07
N-Value	= 0.020	Crit Depth, Yc (ft)	= 0.77
		Top Width (ft)	= 5.76
Calculations		EGL (ft)	= 1.04
Compute by:	Known Q		
Known Q (cfs)	= 6.15		





LATERAL 259 (WHEATRIDGE)
SCALE 1" = 2'



KEYMAP
N.T.S.

LATERAL 259 (WHEATRIDGE) PLAN
N.T.S.

4TH DIVIDE BOX

J&T Consulting, Inc.
305 Denver Avenue - Suite D
Fort Lupton, CO 80621
Ph: 303-857-6222 Fax: 303-857-6224
www.j-tconsulting.com

ARF Divide Boxes
Lateral 259 (Wheatridge)

Arkansas River Farms

REVISIONS

No	Date	By	Chk	Description

Job #	16127
Date	2/4/19
Drawn By	WSS
Designed By	TPY
Checked By	JCY
File	JT-Divide Box Details
Scale	

Sheet: Of:

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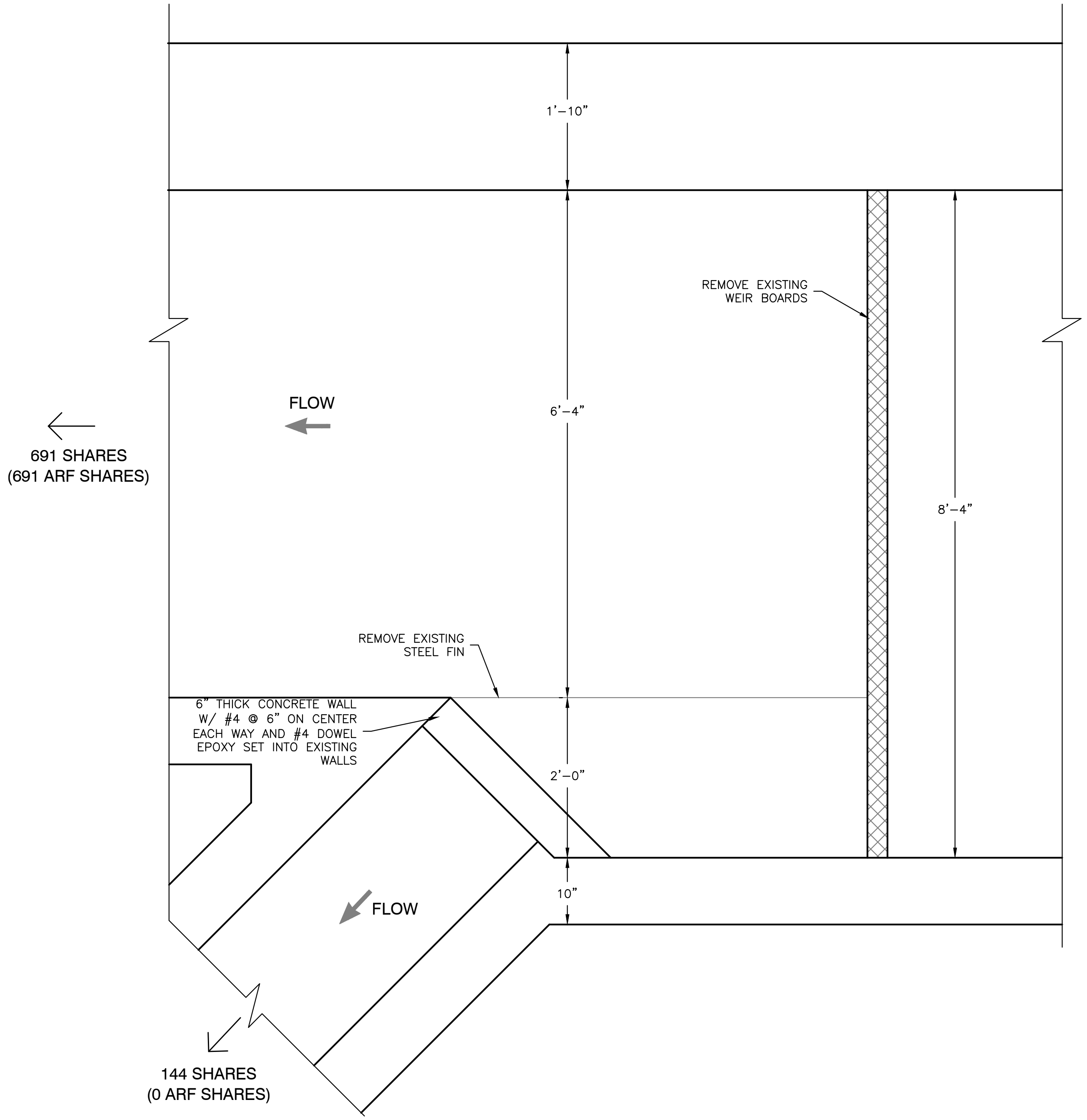
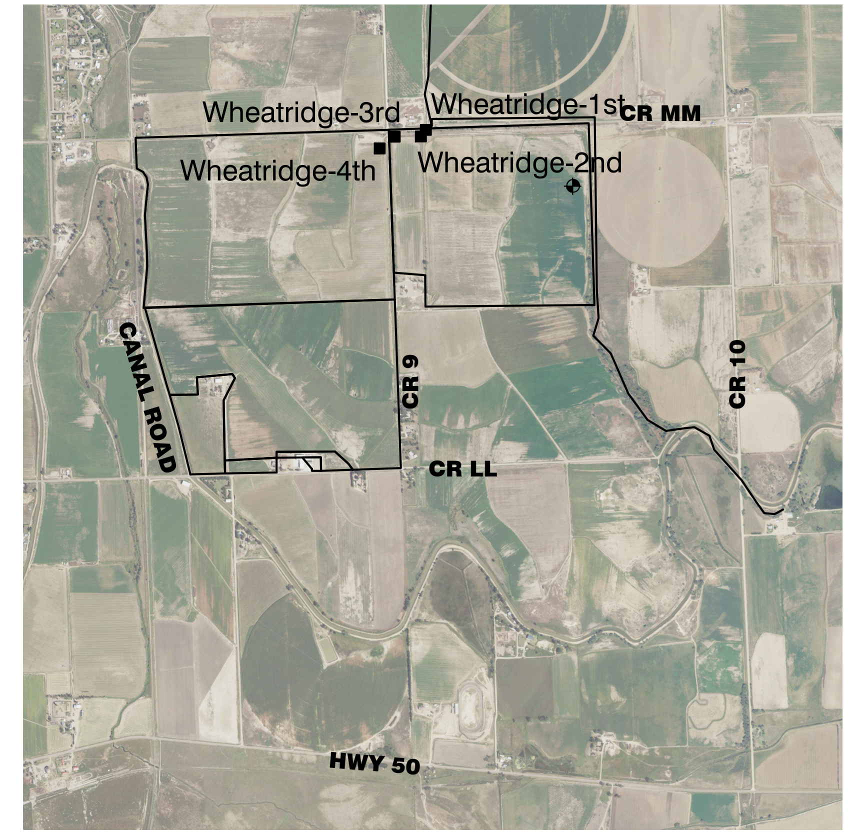


3RD DIVIDE BOX MODIFICATION DETAIL



KEYMAP
N.T.S.

3RD DIVIDE BOX

3RD DIVIDE BOX

LATERAL 259 (WHEATRIDGE)
SCALE 1" = 1'

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Ph: 303-857-6222 Fax: 303-857-6224
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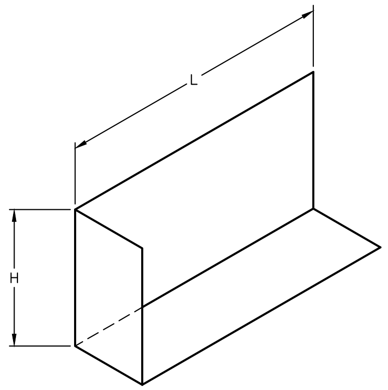
ARF Divide Boxes
Lateral 259 (Wheatridge)

Arkansas River Farms

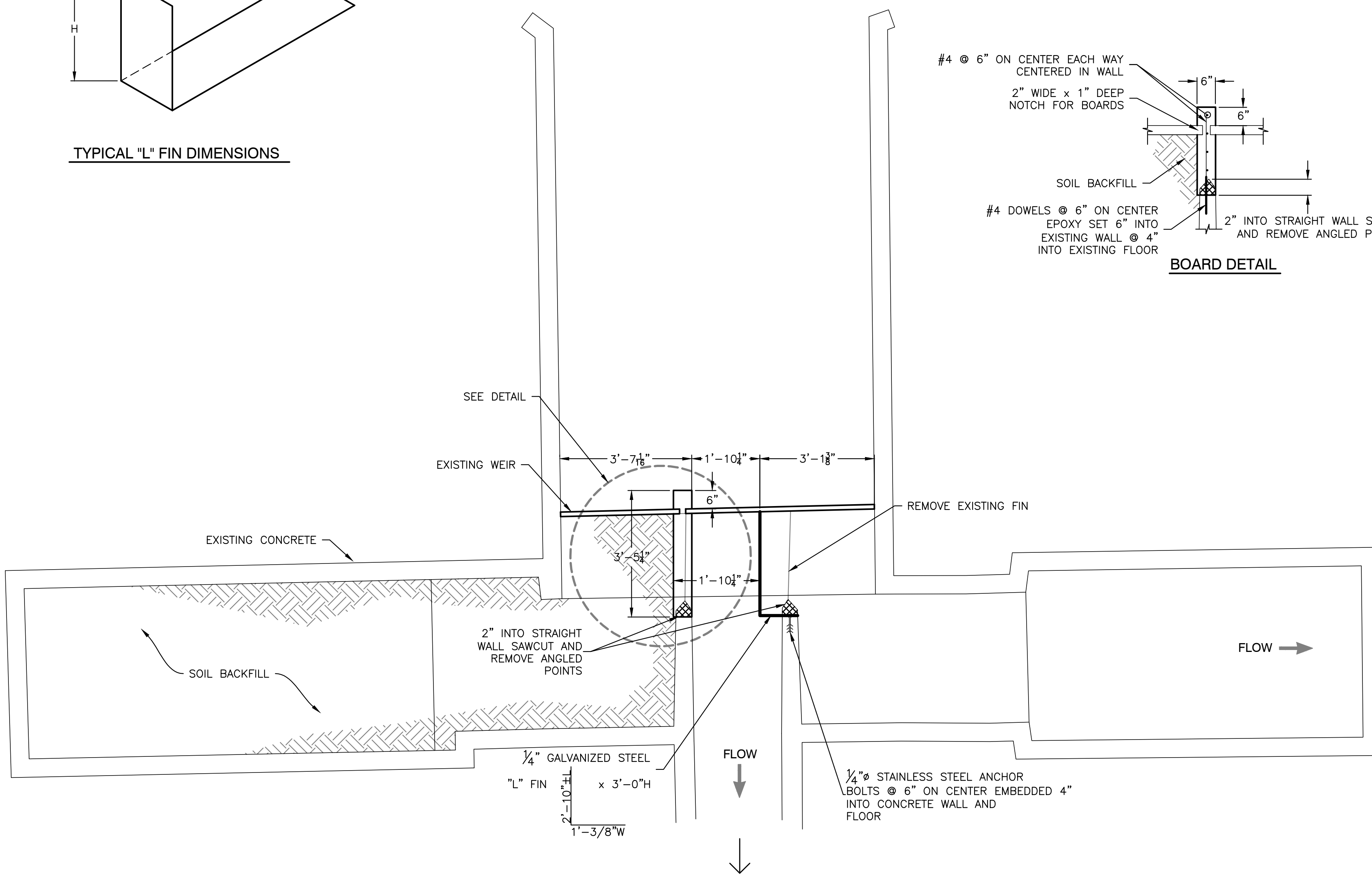
REVISIONS				
No	Date	By	Chk	Description

Job #	16127
Date	2/4/19
Drawn By	WSS
Designed By	TPY
Checked By	JCY
File	JT-Divide Box Details
Scale	

Sheet: Of:



TYPICAL "L" FIN DIMENSIONS



LATERAL 160
SCALE 1" = 2'

KEYMAP
N.T.S.

LATERAL 160 BOX

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ARF Divide Boxes

Lateral 160

Arkansas River Farms

REVISIONS

No	Date	By	Chk	Description

Job #	16127
Date	2/4/19
Drawn By	WSS
Designed By	TPY
Checked By	JCY
File	JT-Lateral 160
Scale	

Sheet: Of:

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ARKANSAS RIVER FARMS:
INVESTING IN DIVERSIFYING THE REGION'S AGRICULTURAL ECONOMY

-- Economic and fiscal impacts in Prowers County

Presented by
Doug Jeavons
Managing Director

September 2018
www.bbcresearch.com

Background

- ARF owns nearly 14,000 acres of cropland in Bent, Prowers and Otero Counties

- ARF is consolidating farm operations to its best parcels in the Arkansas River basin. The company is divesting unproductive farmland, consolidating water rights for ongoing farm operation, or selling water rights and then dryland farming or restoring the remaining parcels to natural vegetation.

- ARF has already invested over $44 million to acquire farms and $1.6 million in augmentation improvements to date. They expect to spend up to $9 million more to develop up to 4,300 flexible irrigated acres.

- The purpose of ARF's investments is to support the development of natural resource-related industries in the Lower Arkansas Valley, including dairies, greenhouse producers and gravel suppliers.

Overview of Regional Economic Benefits from ARF's Activities

- **Long-term:**
  - Production will increase on ARF's farms, supporting more employment and economic activity in the region.
  - ARF provided 2,500 LAWMA shares to be used for the development of the Holly Dairy.
  - The Holly Dairy's operations will support direct and indirect jobs in Prowers County, and increase the local market for farm producers.
- **Short-term:**
  - ARF is investing about $420,000 in irrigation system and water delivery infrastructure improvements in Prowers County.
  - Investments by ARF's partners in developing the Holly Dairy will support additional short-term regional employment, income and tax revenues.

Long-term Regional Benefits Examples: Economic Effects from New Holly Dairy

- GP Irrigated is investing about $30 million to develop the dairy, which has been increased to 12,000 milking cows.

- The dairy is expected to produce about $50 million per year in milk and related products, and to directly employ over 100 workers.

- Apart from the regional economic stimulus from these new jobs and salaries, the largest economic contribution from the dairy will result from purchases of feed from farms in the region.

- The Dairy is expected to purchase over $15 million in forage and grains per year (apart from production from GP Irrigated's farms). Much of this feed is likely to be purchased from Prowers County producers.

ARF Acreage and Uses – Before and After

Historical Use of ARF Acreage			
County	**Flood Irrigated**	**Pasture**	**Total**
Bent County	9,929	2,120	12,049
Otero County	252	8	260
Prowers County	1,241	124	1,365
Total	11,422	2,252	13,674

Future Use of ARF Acreage						
County	**Pivot Irrigated**	**Flood Irrigated**	**Dry-land**	**Pasture**	**Revegetation**	**Total**
Bent County	4,300	1,195	2,724	2,120	1,710	12,049
Otero County	0	0	113	8	139	260
Prowers County	350	322	569	124	0	1,365
Total	4,650	1,517	3,406	2,252	1,849	13,674

Source: ARF 2017.

Effects on Tax Revenues

- Construction activity for ARF's irrigation improvements and ARF's partners' dairies will generate short-term sales tax revenues in Prowers County.
- ARF's activity will affect longer-term property tax revenues in each county due to reclassification of some agricultural lands and enhanced productivity of pivot irrigated acres.
- The expansion of the Holly Diary resulting from water provided by ARF will generate additional property taxes in Prowers County.

Property Tax Effects in Prowers County

- In Prowers County, ARF owns eight farms totaling over 1,300 acres. Most of this land has historically been flood irrigated. ARF plans to convert some of the land to pivot irrigation with enhanced water supply, and to convert some of the land to dry-land production.
  - In 2017, ARF paid $24,776 in property taxes for its Prowers County farms
  - After ARF's planned conversions of the farms, property tax revenues are projected to decline to about $16,457 per year
  - This would represent a $3,353/year reduction in property tax revenues for the County general fund, and a $4,966/year reduction in property taxes for other entities (primarily the school district)
  - Due to the school funding equalization formula in Colorado, actual effect on revenues for the school district would be minimal

Other Property Tax Effects in Prowers County

- The 2,500 LAWMA shares ARF provided to expand the Holly Dairy allowed the new dairy to increase its capacity from 5,000 to 12,000 milking cows. The larger dairy will produce more property tax revenues.

  – Without the expansion, the dairy would have produced about $210,000 per year in total property tax revenue (including about $100,000 per year for the County general fund).

  – The expanded dairy is projected to produce about $500,000 per year in property tax revenues in Prowers County, including $236,000 for the County general fund and $266,000 for other taxing entities (special districts and schools).

  – The expansion is projected to add about $136,000 per year to Prowers County general fund property tax revenues and about $156,000 per year to property tax revenues for other entities in the county.

Summary of Key Findings – Prowers County

- **ARF Irrigation Improvements:**
  - Prowers County property tax revenues from ARF's farms (including school districts and special districts) projected to decline by about $8,300 per year.
- **Holly Dairy:**
  - Dairy will purchase about $15 million of feed per year (beyond dedicated production from GP Irrigated farms), likely much of this will be purchased from Prowers County producers.
  - Economic activity supported by dairy feed purchases, and other dairy activity, projected to generate $24,000 to $37,000 per year in sales tax revenues in Prowers County.
  - Expansion of the diary resulting from water provided by ARF projected to produce $290,000 per year in additional property tax revenues in Prowers County.

D. Helton Consulting, LLC	N	0 0.5 1 2 Miles	Arkansas River Farms
Drawn by: ACO			
File: ARF_large.mxd	Checked by:		
Job No. A601/H3201 · Date: 6/28/2016	Rev. Date:		

Hendrix Wai Engineering, Inc.

Water Resources, Water Rights and GIS/Computer Modeling

P.O. Box 4487
Parker, CO 80134

Telephone: (720) 930-4360
E-Mail: Randy@Hendrix-Wai.com

HISTORIC CONSUMPTIVE USE ANALYSIS OF THE ARKANSAS RIVER FARMS FORT LYON CANAL SHARES TO BE INCLUDED IN THE LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION'S RULE 14 PLAN

PREPARED FOR: LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

PREPARED BY: RANDY HENDRIX, P.E.

FEBRUARY 28, 2017

Prowers 1041 Exhibit M

Hendrix Wai Engineering, Inc.

Water Resources, Water Rights and GIS/Computer Modeling

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Parker, CO 80134

Telephone: (720) 930-4360
E-Mail: Randy@Hendrix-Wai.com

HISTORIC CONSUMPTIVE USE ANALYSIS OF THE ARKANSAS RIVER FARMS FORT LYON CANAL SHARES TO BE INCLUDED IN THE LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION'S RULE 14 PLAN

PREPARED FOR: LOWER ARKANSAS WATER MANAGEMENT ASSOCIATION

The technical material in this report was prepared by the undersigned, whose seal as a Professional Engineer is affixed below:

Randall L. Hendrix

February 28, 2017

Hendrix Wai Engineering, Inc.
Water Resources, Water Rights and GIS/Computer Modeling

P.O. Box 4487
Parker, CO 80134

Telephone: (720) 930-4360
E-Mail: Randy@Hendrix-Wai.com

TABLE OF CONTENTS

Hendrix Wai Engineering, Inc.
Water Resources, Water Rights and GIS/Computer Modeling

P.O. Box 4487
Parker, CO 80134

Telephone: (720) 930-4360
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In 2017, the Lower Arkansas Water Management Association (LAWMA) will acquire 7,509 shares of Fort Lyon Canal Company (FLCC) stock (Trade Shares) currently owned by Arkansas River Farms (ARF). In exchange for acquiring the Trade Shares, LAWMA will issue LAWMA common stock to ARF. LAWMA will then use the 7,509 FLCC shares for augmentation and replacement uses within LAWMA's decreed plan for augmentation and approved Rule 14 plans, Rule 10 plans, and substitute water supply plans.

The purposes of this memorandum are (1) to provide background data and information about the FLCC and the water rights owned by the company, (2) to provide information about the crops and acreage historically irrigated by the Trade Shares, (3) to present our assessment of the stream depletions caused by the historical irrigation use of the Trade Shares, and (4) to present our recommendations for future calculations of and limitations on augmentation and replacement credit from LAWMA's use of the Trade Shares. In this effort, we reviewed the information and data collected during our earlier work on behalf of LAWMA in LAWMA's Case No. 02CW181 and Colorado Beef's Case No. 08CW83 wherein Colorado Beef changed the use of 492 shares of stock in the FLCC. We also acquired additional records, documents and information related to the Trade Shares, and in some instances refined the engineering procedures that were used in Case Nos. 02CW181 and 08CW83.

1. Fort Lyon Canal Company

The FLCC is a mutual ditch company that has 93,989.4166 shares of outstanding stock. The FLCC system is a large system consisting of the Fort Lyon Canal (Main Canal), Fort Lyon Storage Canal (Storage Canal), Horse Creek Reservoir, Adobe Creek Reservoir, and Thurston Reservoir. Water is diverted into the FLCC canal system from the Arkansas River, Horse Creek and Adobe Creek. Additional water is delivered to the Main Canal by release from the three reservoirs identified above. Water is also stored in John Martin Reservoir and is exchanged back upstream to the FLCC headgate for delivery into the Main Canal.

LAWMA is expected to acquire the 7,509 Trade Shares in exchange for LAWMA common shares. The 7,509 shares of FLCC equate to approximately 8% (7,509 / 93,989.4166) of the outstanding stock in FLCC. The FLCC Trade Shares to be acquired by LAWMA were historically used on 40 different farms. A copy of the share certificate(s) associated with each farm is provided within the appendix that corresponds to our historical use analysis for that farm.

The FLCC has a total of five divisions that are operated by four separate ditch riders. These divisions are the La Junta, Horse Creek, Las Animas, Limestone, and Lamar, from upstream to downstream.[1] LAWMA will acquire Trade Shares from 2 farms in the La Junta Division, 4 farms in the Horse Creek Division, 15 farms in the Las Animas Division, 14 farms in the Limestone Division and 4 farms in the Lamar Division, as shown on **Plate 1**. The Trade Shares represent 149 shares of FLCC in the La Junta Division, 803 shares of FLCC in the Horse Creek Division, 3,025 shares of FLCC in the Las Animas Division, 2,218 shares of FLCC in the Limestone Division, and 1,314 shares of FLCC in the Lamar Division. **Table 1** provides, on a farm-by-farm basis, general legal descriptions and share information for the specific farms historically irrigated with the Trade Shares. **Table 1** also includes other information to be discussed later in this report.

As a shareholder in FLCC, LAWMA will be entitled to its pro rata interest in the decreed water rights that have been adjudicated for the FLCC. Please see the **FLCC Water Rights** section below for further information. Water is delivered to the shareholders at 150% head for a 48-hour run at 1 cfs per 100 shares of stock. Some of the farms historically irrigated by the Trade Shares ("Trade Farms") take delivery of water directly from the Main Canal, and other of the Trade Farms take delivery through a shared lateral from the Main Canal. The details of each farm's delivery of water will be discussed later within this report.

2. FLCC Water Rights

As shown in **Table 2**, the FLCC has three direct-flow water rights totaling 933 cfs for irrigation purposes. The direct-flow water rights divert from the Arkansas River in the NE ¼ of Section 32, Township 23 South, Range 55 West of the 6th P.M. The first two priorities (Priority No. 4 and Priority No. 6) were adjudicated to Arkansas River Land, Reservoir and Canal Company, the predecessor to the FLCC. The Trade Shares involved in this analysis represent 74.54 cfs (933 x 7,509 / 93,989.4166) of the total direct-flow water rights.

Additional water is delivered to the Main Canal from releases from the three reservoirs identified above. **Table 3** lists the various storage water rights associated with the reservoirs and includes water stored in John Martin Reservoir within the FLCC Article III account. These releases to the Main Canal provide the FLCC flexibility in delivery to the various FLCC divisions. The Storage Canal is used to deliver water from the Arkansas River in the NE ¼ of Section 24, Township 22 South, Range 58 West of the 6th P.M. to Horse Creek and Adobe Creek Reservoirs. Adobe Creek Reservoir is also filled with water rights on Adobe Creek. The headgate on Adobe Creek is located in the NW ¼ of Section 26, Township 20 South, Range 53 West of the 6th P.M. Horse Creek Reservoir is also filled by water rights on Horse Creek. The headgate on Horse Creek is located on the section line between Sections 6 and 7 of Township 22 South, Range 54

[1] The Horse Creek Division does not have a separate ditch rider. Water is delivered to the headgates in the Horse Creek Division by the ditch riders in the La Junta and Las Animas Divisions.

West of the 6th P.M. Thurston Reservoir is filled via the Main Canal and via a seepage right. Water stored in John Martin Reservoir is exchanged upstream to the Main Canal headgate.

Table 4 identifies other water rights and operations associated with the FLCC. LAWMA does not seek any changes in these water rights or operations. **Table 4** identifies LAWMA's pro rata interests associated with the Trade Shares.

3. Historical Consumptive Use Analysis

As part of the case that LAWMA will file in the Division 2 Water Court to change the decreed use of the water rights associated with the Trade Shares, we will complete a historical consumptive use (HCU) analysis for each farm using components of the Hydrologic-Institutional (H-I) Model and the engineering methods underlying the latest decreed change of use of FLCC shares (by Colorado Beef in Case No. 08CW83). We will initially analyze the Trade Shares associated with each farm as follows:

1. We will use a study period of 1950 to the last year when the Trade Shares were used for irrigation of lands under the Fort Lyon Canal (the "Study Period") to determine volumetric limits on LAWMA's future farm headgate deliveries. We will aggregate Trade Farms that utilize the same augmentation stations and / or recharge sites to deliver LAWMA's HCU credit to the stream.
2. We will use a subset of the Study Period of 1979 to the last year when the Trade Shares were used for irrigation of lands under the Fort Lyon Canal to determine monthly consumptive use factors. This study period takes into account the change in FLCC operations as a result of the beginning of the Winter Water Storage Program. As with our analysis of the farm headgate volumetric limits, we will combine the Trade Farms that utilize common augmentation stations and / or recharge sites to determine monthly consumptive use factors for the augmentation stations and the appropriate return flow factors for recharge sites.
3. We will use diversion records from the Study Period. The monthly diversion records will be primarily from diversion records compiled by the Division of Water Resources, Division 2 Office as part of the dataset used within the H-I Model, with corrections to the monthly records from the Fort Lyon Canal annual reports where necessary. We will determine each Trade Farm's pro rata diversions from the monthly diversion records based on the total FLCC shares historically used on that farm. If the number of Trade Shares LAWMA acquires on a specific Trade Farm is less than the total number of FLCC shares historically used on that farm (e.g., on Farm No. 21, as shown in **Table 1**), then LAWMA will only take credit for its pro rata amount of the HCU. The annual and monthly summaries of Main Canal diversions at the river headgate for the study period of 1950 to 2014 are shown in **Tables 5** and **6** respectively.

4. We will apply a canal loss of 36.7% to the Main Canal river headgate diversions. A canal loss of 36.7% is consistent with the H-I Model.
5. Reservoir releases for the study period of 1950 to 2014 are summarized in **Tables 7** through **10**. The sources of this information are reservoir release records compiled by the Division of Water Resources, Division 2 Office as part of the dataset used within the H-I Model, with corrections to the monthly records from the Fort Lyon Canal annual reports where necessary.
6. We will apply a weighted canal loss of 35.13% for all reservoir releases to the Main Canal. The weighted canal loss is consistent with the canal loss for reservoir releases in Colorado Beef's Case No. 08CW83. The weighted canal loss was calculated using a canal loss of 36.7% for releases from Horse Creek Reservoir and a canal loss of 34.5% for releases from Adobe Creek Reservoir and weighting the canal loss by the volume of water released from the reservoirs.
7. We will calculate Off-Farm Lateral Loss using a factor of 3.5%. The Off-Farm Lateral Loss of 3.5% is consistent with the H-I Model.
8. We will calculate On-Farm Lateral Loss using a factor of 3.5%. The On-Farm Lateral loss of 3.5% is consistent with the H-I Model.
9. We will set a maximum farm efficiency of 65% for each Trade Farm, which is consistent with flood and / or furrow irrigation. This efficiency is also consistent with the H-I Model.
10. We will calculate tailwater or surface water return flows at 10% of the farm headgate delivery. This is consistent with other HCU analyses of farms on which flood or furrow irrigation was used.
11. We will set an initial deep percolation factor of 22.6% of the farm headgate delivery.
12. We will determine the available water holding capacity and starting soil moisture storage content for each Trade Farm based on the soils at each farm. These values will vary from farm to farm. We will determine the average rooting depth from the crop mix used in the H-I Model for the Fort Lyon Canal. The H-I Model crop mix for the Fort Lyon Canal is based on statistics from the National Agricultural Statistics Service and is weighted as 6% Otero County, 56% Bent County, and 38% Prowers County. The crop mix is shown in **Table 11**.
13. We will use the potential evapotranspiration (PET) values from the H-I Model. The PET values in the H-I Model were developed by calibrating modified Blaney-Criddle crop coefficients to crop coefficients developed using the Penman-Monteith methodology. The PET represents the volume of water necessary to meet the crop's evapotranspiration (ET) needs so that the vegetative growth and plant production are not limited by water. PET monthly values are shown in **Table 12**. In December, January, and February a non-growing season PET was estimated as part of the H-I Model for soil evaporation during those months.

14. We will obtain precipitation data from the H-I Model input data set. **Table 13** shows the monthly precipitation values for the Fort Lyon Canal to be used in the HCU analysis.
15. Effective precipitation is that portion of the precipitation that was available for crop use. We will calculate effective precipitation using the same methodology used in the H-I Model, which is similar to the Bureau of Reclamation's methodology of applying a percentage to each inch of precipitation. The first inch of precipitation has more effective precipitation while the amount of effective precipitation per inch decreases as the precipitation amount increases, as summarized in Note (b) to **Table 14**.
16. The crop irrigation requirement (CIR) is determined as the amount of water necessary to meet the PET that is not satisfied by the effective precipitation, i.e., the PET minus the effective precipitation. If the effective precipitation is greater than the PET then the CIR would be zero. Calculated CIR for all crops under the Fort Lyon Canal is shown in **Table 15**.
17. Acreage varies from Trade Farm to Trade Farm and will be discussed in further detail for each farm in a later section. The acreage for the 1950 to 2014 study period for each Trade Farm is shown in **Table 16**. To determine the acreage, we obtained available aerial photographs from 1947 to 2013 for each Trade Farm and geo-referenced the photographs into ArcGIS (a geographic information system (GIS) software), if necessary. Once the photographs were registered to the quadrangles, we identified and digitized the irrigated fields for each year for which there was an aerial photograph. We are still in the process of refining the GIS data to ensure the accuracy of the historically irrigated acreage during the Study Period. For that reason, certain of the data included in Table 16 remain subject to change.
18. Secondary evapotranspiration (SEV) is the amount of consumptive use attributable to phreatophytes along canals and laterals and from tailwater or surface water runoff. There will be no SEV credits claimed in this HCU analysis for canal loss as the Main Canal will not be dried up. SEV credits on tailwater or surface water runoff and on-farm lateral losses will be claimed on all Trade Farms. All of the Trade Farms will be dried up following LAWMA's acquisition of the Trade Shares; thus there will no longer be any tailwater or surface water runoff from the Trade Farms. SEV credits from off-farm laterals will vary from farm to farm depending on each farm's location relative to the Main Canal and if water is still delivered through a shared lateral or not.

4. Individual Farm Details

We will complete an HCU analysis for each farm using the methodology described in the HCU Analysis section above. In this section a brief description is provided for each Trade Farm, including the legal location, the FLCC division, the number of Trade Shares LAWMA will acquire, the FLCC certificate numbers, the augmentation station where the consumptive use water will be delivered, and the recharge site where lagged return flows and consumptive use water may be delivered. This information is also listed in **Table 1**.

a. ARF – Farm No. 1

On Farm No. 1, ARF owns the land historically irrigated by 204 of the Trade Shares ("Farm No. 1 Shares"). ARF will exchange and convey to LAWMA all 204 of the Farm No. 1 Shares. The average annual irrigated acreage on Farm No. 1 for the 1950 to 2014 study period was 148.5 acres as shown in **Table 16.**[2] The 1985 irrigated acreage on Farm No. 1 was 134.4 acres, and the 2013 irrigated acreage on Farm No. 1 was 165.0 acres. LAWMA's acquisition of the Farm No. 1 Shares will include a covenant requiring ARF to dry up 165.0 acres historically irrigated with the Farm No. 1 Shares ("Farm No. 1 Dry-Up"). LAWMA's acquisition of the Farm No. 1 Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 1 Dry-Up.

The Farm No. 1 Dry-Up is generally located in the NW ¼ of Section 25 and the NE ¼ of Section 26, Township 22 South, Range 51 West in Bent County, Colorado as shown in **Figure 1**. Farm No. 1's location is within H-I Model Reach 10 and is above the John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 1 Dry-Up are represented by Share Certificate No. 10475 and were delivered in the Fort Lyon Company's Las Animas Division.

A summary of our annual HCU analysis for Farm No. 1 is shown in **Table 17**. Water is delivered to the farm via a shared lateral from headgate 126 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 224 ac-ft, as shown in Column 19 of Table 17. LAWMA's pro rata portion of the average annual HCU on Farm No. 1 is 224 ac-ft (224 x 204 / 204). Groundwater return flows will be lagged back to Gageby Creek, which is the closest live stream to the farm. Consumptive use credits and return flows will be delivered to Gageby Creek via the Gageby Creek Farm 27 augmentation station. Background information including a copy of the FLCC certificate, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the unit response function (URF) for the farm is shown in **Appendix 1**.

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[2] As explained above, we are still in the process of refining and ensuring the accuracy of the GIS data for the Trade Farms. As a result, there may be small discrepancies between the 1985 and 2013 historically irrigated acreage identified in the text (which we have verified as accurate) and the 1985 and 2013 historically irrigated acreage included in Table 16.

b. ARF – Farm No. 2

On Farm No. 2, ARF owns the land historically irrigated by 144 of the Trade Shares ("Farm No. 2 Shares"). ARF will exchange and convey to LAWMA all 144 of the Farm No. 2 Shares. The average annual irrigated acreage on Farm No. 2 for the 1950 to 2014 study period was 89.1 acres as shown in **Table 16.** The 1985 irrigated acreage on Farm No. 2 was 92.3 acres, and the 2013 irrigated acreage on Farm No. 2 was 86.5 acres. LAWMA's acquisition of the Farm No. 2 Shares will include a covenant requiring ARF to dry up 92.3 acres historically irrigated with the Farm No. 2 Shares ("Farm No. 2 Dry-Up"). LAWMA's acquisition of the Farm No. 2 Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 2 Dry-Up.

The Farm No. 2 Dry-Up is generally located in the SE ¼ of Section 23, Township 22 South, Range 51 West in Bent County, Colorado as shown in **Figure 2**. Farm No. 2's location is within H-I Model Reach 10 and is above the John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 2 Dry-Up are represented by Share Certificate No. 10476 and were delivered in the Fort Lyon Company's Las Animas Division.

A summary of our annual HCU analysis for Farm No. 2 is shown in **Table 18**. Water is delivered to the farm via a shared lateral from headgate 126 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 146 ac-ft, as shown in Column 19 of Table 18. LAWMA's pro rata portion of the average annual HCU is 146 ac-ft (146 x 144 / 144). Groundwater return flows will be lagged back to Gageby Creek, which is the closest live stream to the farm. Consumptive use credits and return flows will be delivered to Gageby Creek via the Gageby Creek Farm 27 augmentation station. Background information including a copy of the FLCC certificate, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 2**.

c. ARF – Farm No. 3

On Farm No. 3, ARF owns the land historically irrigated by 83 shares in the Fort Lyon Company ("Farm No. 3 Shares"), including 82 of the Trade Shares. ARF will exchange and convey to LAWMA 82 of the Farm No. 3 Shares. The average annual irrigated acreage on Farm No. 3 for the 1950 to 2014 study period was 73.5 acres as shown in **Table 16.** The 1985 irrigated acreage on Farm No. 3 was 76.8 acres, and 2013 irrigated acreage on Farm No. 3 was 77.0 acres. LAWMA's acquisition of the 82 Farm No. 3 Shares will include a covenant requiring ARF to dry up 77.0 acres historically irrigated with the Farm No. 3 Shares ("Farm No. 3 Dry-Up").

LAWMA's acquisition of the 82 Farm No. 3 Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 3 Dry-Up.

The Farm No. 3 Dry-Up is generally located in the SE ¼, the SE ¼ of the NE ¼, and the SW ¼ of the NE ¼ Section 30, Township 23 South, Range 54 West in Otero County, Colorado as shown in **Figure 3**. Farm No. 3's location is within H-I Model Reach 8 and is above the John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 3 Dry-Up are represented by Share Certificate No. 10488 and were delivered in the Fort Lyon Company's La Junta Division.

A summary of our annual HCU analysis for Farm No. 3 is shown in **Table 19**. Water is delivered to the farm via a shared lateral from headgate 17 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 94 ac-ft, as shown in Column 19 of Table 19. LAWMA's pro rata portion of the average annual HCU is 93 ac-ft (94 x 82 / 83). Groundwater return flows will be lagged back to the Arkansas River, which is the closest live stream to the farm. Consumptive use credits and return flows will be delivered to Arkansas River via a recharge site on Farm No. 60. Background information including a copy of the FLCC certificate, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 3**.

d. ARF – Farm No. 13

On Farm No. 13, ARF owns the land historically irrigated by 188 of the Trade Shares ("Farm No. 13 Shares"). ARF will exchange and convey to LAWMA all 188 of the Farm No. 13 Shares. The average annual irrigated acreage on Farm No. 13 for the 1950 to 2014 study period was 107.2 acres as shown in **Table 16.** The 1985 irrigated acreage on Farm No. 13 was 105.7 acres, and the 2013 irrigated acreage on Farm No. 13 was 104.5 acres. LAWMA's acquisition of the Farm No. 13 Shares will include a covenant requiring ARF to dry up 105.7 acres historically irrigated with the Farm No. 13 Shares ("Farm No. 13 Dry-Up"). LAWMA's acquisition of the Farm No. 13 Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 13 Dry-Up.

The Farm No. 13 Dry-Up is generally located in the SW ¼ of Section 29, Township 22 South, Range 52 West in Bent County, Colorado, as shown in **Figure 4**. Farm No. 13's location is within H-I Model Reach 9 and is above the John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 13 Dry-Up are represented by Share Certificate No. 10516 and were delivered in the Fort Lyon Company's Horse Creek Division.

A summary of our annual HCU analysis for Farm No. 13 is shown in **Table 20**. Water is delivered to the farm via laterals from headgates 74 and 75 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 197 ac-ft, as shown in Column 19 of Table 20. LAWMA's pro rata portion of the average annual HCU is 197 ac-ft (197 x 188 / 188). Groundwater return flows will be lagged back to the Arkansas River, which is the closest live stream to the farm. Consumptive use credits and return flows will be delivered to the Arkansas River via the DiRezza Farm augmentation station on Horse Creek. Background information including a copy of the FLCC certificate, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 4**.

e. ARF – Farm No. 14

On Farm No. 14, ARF owns the land historically irrigated by 118 of the Trade Shares ("Farm No. 14 Shares"). ARF will exchange and convey to LAWMA all 118 of the Farm No. 14 Shares. The average annual irrigated acreage on Farm No. 14 for the 1950 to 2014 study period was 151.8 acres as shown in **Table 16.** The 1985 irrigated acreage on Farm No. 14 was 150.6 acres, and the 2013 irrigated acreage on Farm No. 14 was 137.7 acres. LAWMA's acquisition of the Farm No. 14 Shares will include a covenant requiring ARF to dry up 150.6 acres historically irrigated with the Farm No. 14 Shares ("Farm No. 14 Dry-Up"). LAWMA's acquisition of the Farm No. 14 Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 14 Dry-Up.

The Farm No. 14 Dry-Up is generally located in the S ½ of the NW ¼ and the SW ¼ of Section 19, Township 22 South, Range 49 West in Bent County, Colorado, as shown in **Figure 5**. Farm No. 14's location is within H-I Model Reach 10 and is above the John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 14 Dry-Up are represented by Share Certificate No. 10451 and were delivered in the Fort Lyon Company's Las Animas Division.

A summary of our annual HCU analysis for Farm No. 14 is shown in **Table 21**. Water is delivered to the farm via a lateral from headgate 148 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 130 ac-ft, as shown in Column 19 of Table 21. LAWMA's pro rata portion of the average annual HCU is 130 ac-ft (130 x 118 / 118). Groundwater return flows will be lagged back to Prowers Arroyo, which is the closest live stream to the farm. The consumptive use credits will be delivered to Arkansas River via the Recharge Site on Farm 132/133 and the return flow component will be delivered to the Lubers Drain via the Headgate 151E. Background information including a copy of the FLCC certificate, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 5**.

f. ARF – Farm No. 15

Farm No. 15 was historically irrigated by 219 of the Trade Shares ("Farm No. 15 Shares"). ARF will exchange and convey to LAWMA all 219 of the Farm No. 15 Shares. The average annual irrigated acreage on Farm No. 15 for the 1950 to 2014 study period was 299.1 acres as shown in **Table 16.** The 1985 irrigated acreage on Farm No. 15 was 262.5 acres, and the 2013 irrigated acreage on Farm No. 15 was 270.6 acres. LAWMA's acquisition of the Farm No. 15 Shares will include assignment of ARF's covenant requiring the dry-up of 270.6 acres historically irrigated with the Farm No. 15 Shares ("Farm No. 15 Dry-Up"). LAWMA's acquisition of the Farm No. 15 Shares also will include assignment of ARF's covenant requiring the revegetation or dry-land farming of the Farm No. 15 Dry-Up.

The Farm No. 15 Dry-Up is generally located in the W ½ and the NE ¼ of Section 31, Township 22 South, Range 49 West in Bent County, Colorado, as shown in **Figure 6**. Farm No. 15's location is within the H-I Model Reach 10 and is above the John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 15 Dry-Up are represented by Share Certificate No. 10562 and were delivered in the Fort Lyon Company's Las Animas Division.

A summary of our annual HCU analysis for Farm No. 15 is shown in **Table 22**. Water is delivered to the farm via a shared lateral from headgate 145 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 241 ac-ft, as shown in Column 19 of Table 22. LAWMA's pro rata portion of the average annual HCU is 241 ac-ft (241 x 219 / 219). Groundwater return flows will be lagged back to Prowers Arroyo, which is the closest live stream to the farm. The consumptive use credits will be delivered to Arkansas River via the Recharge Site on Farm 132/133 and the return flow component will be delivered to the Lubers Drain via the Headgate 151E. Background information including a copy of the FLCC certificate, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 6**.

g. ARF – Farm No. 19

On Farm No. 19, ARF owns the land historically irrigated by 288 of the Trade Shares ("Farm No. 19 Shares"). ARF will exchange and convey to LAWMA all 288 of the Farm No. 19 Shares. The average annual irrigated acreage on Farm No. 19 for the 1950 to 2014 study period was 189.6 acres as shown in **Table 16.** The 1985 irrigated acreage on Farm No. 19 was 159.0 acres, and the 2013 irrigated acreage on Farm No. 19 was 189.1 acres. LAWMA's acquisition of the Farm No. 19 Shares will include a covenant requiring ARF to dry up 189.1 acres historically irrigated with the Farm No. 19 Shares ("Farm No. 19 Dry-Up"). LAWMA's acquisition of the Farm No. 19 Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 19 Dry-Up.

The Farm No. 19 Dry-Up is generally located in the E ½ of Section 17, Township 22 South, Range 51 West in Bent County, Colorado, as shown in **Figure 7**. Farm No. 19's location is within H-I Model Reach 10 and is above the John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 19 Dry-Up are represented by Share Certificate Nos. 10506 and 10507 and were delivered in the Fort Lyon Company's Las Animas Division.

A summary of our annual HCU analysis for Farm No. 19 is shown in **Table 23**. Water is delivered to the farm via laterals from headgates 114D and 115 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 303 ac-ft, as shown in Column 19 of Table 23. LAWMA's pro rata portion of the average annual HCU is 303 ac-ft (303 x 288 / 288). Groundwater return flows will be lagged back to the Arkansas River, which is the live stream with surface water rights that is closest to the farm. Consumptive use credits and return flows will be delivered to the Arkansas River via the DiRezza Farm augmentation station on Horse Creek. Background information including a copy of the FLCC certificates, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 7**.

h. ARF – Farm No. 21

On Farm No. 21, ARF owns the land historically irrigated by 196 shares in the Fort Lyon Company ("Farm No. 21 Shares"), including 162 of the Trade Shares. ARF will exchange and convey to LAWMA 162 of the Farm No. 21 Shares. The average annual irrigated acreage on Farm No. 21 for the 1950 to 2014 study period was 63.7 acres as shown in **Table 16.** The 1985 irrigated acreage on Farm No. 21 was 55.1 acres, and the 2013 irrigated acreage on Farm No. 21 was 50.8 acres. LAWMA's acquisition of 162 of the Farm No. 21 Shares will include a covenant requiring ARF to dry up 55.1 acres historically irrigated with the Farm No. 21 Shares. LAWMA's acquisition of the 162 of the Farm No. 21 Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 21 Dry-Up.

The Farm No. 21 Dry-Up is generally located in the N ½ of the SE ¼ of Section 20, Township 22 South, Range 51 West in Bent County, Colorado, as shown in **Figure 8**. Farm No. 21's location is within H-I Model Reach 10 and is above John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 21 Dry-Up are represented by Share Certificate No. 10438 and were delivered in the Fort Lyon Company's Las Animas Division.

A summary of our annual HCU analysis for Farm No. 21 is shown in **Table 24**. Water is delivered to the farm via a shared lateral from headgate 112 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 137 ac-ft, as shown in Column 19 of Table 24. LAWMA's pro rata portion of the average annual HCU is 113 ac-ft (137 x 162 / 196). Groundwater return flows will be lagged back to the Arkansas River, which is the live stream with surface water rights that is closest to the farm. Consumptive use credits and return flows will be delivered to the Arkansas River via the DiRezza Farm augmentation station on Horse Creek. Background information including a copy of the FLCC certificate, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 8**.

i. ARF – Farm No. 22

On Farm No. 22, ARF owns the land historically irrigated by 108 shares in the Fort Lyon Company ("Farm No. 22 Shares"), including 101 of the Trade Shares. ARF will exchange and convey to LAWMA 101 of the Farm No. 22 Shares. The average annual irrigated acreage on Farm No. 22 for the 1950 to 2014 study period was 76.4 acres as shown in **Table 16.** The 1985 irrigated acreage on Farm No. 22 was 74.3 acres, and the 2013 irrigated acreage on Farm No. 22 was 74.6 acres. LAWMA's acquisition of 101 of the Farm No. 22 Shares will include a covenant requiring ARF to dry up 74.6 acres historically irrigated with the Farm No. 22 Shares ("Farm No. 22 Dry-Up"). LAWMA's acquisition of 101 of the Farm No. 22 Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 22 Dry-Up.

The Farm No. 22 Dry-Up is generally located in the N ½ of the SE ¼ and the NE ¼ of the SW ¼ of Section 31, Township 22 South, Range 51 West, in Bent County, Colorado, as shown in **Figure 9**. Farm No. 22's location is within H-I Model Reach 10 and is above John Martin Dam.

The Trade Shares historically used to irrigate the Farm No. 22 Dry-Up are represented by Share Certificate Nos. 10477 and 10478 and were delivered in the Fort Lyon Company's Las Animas Division.

A summary of our annual HCU analysis for Farm No. 22 is shown in **Table 25**. Water is delivered to the farm via a shared lateral from headgate 101 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 116 ac-ft, as shown in Column 19 of Table 25. LAWMA's pro rata portion of the average annual HCU is 109 ac-ft (116 x 101 / 108). Groundwater return flows will be lagged back to the Arkansas River, which is the closest live stream to the farm. Consumptive use credits and return flows will be delivered to the Arkansas River via the DiRezza Farm augmentation station on Horse Creek. Background information including a copy of the FLCC certificates, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 9**.

j. ARF – Farm No. 23

On Farm No. 23, ARF owns the land historically irrigated by 245 of the Trade Shares ("Farm No. 23 Shares"). ARF will exchange and convey to LAWMA all 245 of the Farm No. 23 Shares. The average annual irrigated acreage on Farm No. 23 for the 1950 to 2014 study period was 137.8 acres as shown in **Table 16.** The 1985 irrigated acreage on Farm No. 23 was 144.1 acres, and the 2013 irrigated acreage on Farm No. 23 was 136.8 acres. LAWMA's acquisition of the Farm No. 23 Shares will include a covenant requiring ARF to dry up 144.1 acres historically irrigated with the Farm No. 23 Shares ("Farm No. 23 Dry-Up"). LAWMA's acquisition of the Farm No. 23 Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 23 Dry-Up.

The Farm No. 23 Dry-Up is generally located in the S ½ of the S ½ of Section 31, Township 22 South, Range 51 West, in Bent County, Colorado, as shown in **Figure 10**. Farm No. 23's location is within H-I Model Reach 10 and is above John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 23 Dry-Up are represented by Share Certificate No. 10483 and were delivered in the Fort Lyon Company's Las Animas Division.

A summary of our annual HCU analysis for Farm No. 23 is shown in **Table 26**. Water is delivered to the farm via a lateral from headgate 100 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 251 ac-ft, as shown in Column 19 of Table 26. LAWMA's pro rata portion of the average annual HCU is 251 ac-ft (251 x 245 / 245). Groundwater return flows will be lagged back to the Arkansas River, which is the closest live stream to the farm. Consumptive use credits and return flows will be delivered to the Arkansas River via the DiRezza Farm augmentation station on Horse Creek. Background information including a copy of the FLCC certificate, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 10**.

k. ARF – Farm No. 25

On Farm No. 25, ARF owns the land historically irrigated by 322 of the Trade Shares ("Farm No. 25 Shares"). ARF will exchange and convey to LAWMA all 322 of the Farm No. 25 Shares. The average annual irrigated acreage on Farm No. 25 for the 1950 to 2014 study period was 479.4 acres as shown in **Table 16.** The 1985 irrigated acreage on Farm No. 25 was 462 acres, and the 2013 irrigated acreage on Farm No. 25 was 444.4 acres. LAWMA's acquisition of the Farm No. 25 Shares will include a covenant requiring ARF to dry up 462 acres historically irrigated with the Farm No. 25 Shares ("Farm No. 25 Dry-Up"). LAWMA's acquisition of the Farm No. 25 Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 25 Dry-Up.

The Farm No. 25 Dry-Up is generally located in the NW ¼, the W ½ of the NE ¼, and the S ½ of Section 11; and in the S ½ of Section 2, all in Township 22 South, Range 48 West, in Bent County, Colorado, as shown in **Figure 11**. Farm No. 25's location is in H-I Model Reaches 12 & 13 and is below the John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 25 Dry-Up are represented by Share Certificate No. 10505 and were delivered in the Fort Lyon Company's Limestone Division.

A summary of our annual HCU analysis for Farm No. 25 is shown in **Table 27**. Water is delivered to the farm via laterals from headgates 182 and 182D on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 342 ac-ft, as shown in Column 19 of Table 27. LAWMA's pro rata portion of the average annual HCU is 342 ac-ft (342 x 322 / 322). Groundwater return flows will be lagged back to Riverview Drain, which is the closest live stream to the farm. Consumptive use credits and return flows will be delivered to the Arkansas River via the Riverview Drain augmentation station. Background information including copy of the FLCC certificate, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 11**.

l. ARF – Farm No. 27

On Farm No. 27, ARF owns the land historically irrigated by 660 of the Trade Shares ("Farm No. 27 Shares"). ARF will exchange and convey to LAWMA all 660 of the Farm No. 27 Shares. The average annual irrigated acreage on Farm No. 27 for the 1950 to 2014 study period was 366.9 acres as shown in **Table 16.** The 1985 irrigated acreage on Farm No. 27 was 313.4 acres, and the 2013 irrigated acreage on Farm No. 27 was 366.5 acres. LAWMA's acquisition of the Farm No. 27 Shares will include a covenant requiring ARF to dry up 366.5 acres historically irrigated with the Farm No. 27 Shares ("Farm No. 27 Dry-Up"). LAWMA's acquisition of the Farm No. 27 Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 27 Dry-Up.

The Farm No. 27 Dry-Up is generally located in the W ½ of Section 26 and the NE ¼ of Section 35, Township 22 South, Range 51 West, in Bent County, Colorado, as shown in **Figure 12**. Farm No. 27's location is within H-I Model Reach 10 and is above John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 27 Dry-Up are represented by Share Certificate Nos. 10519, 10520, 10521, and 10522, and were delivered in the Fort Lyon Company's Las Animas Division.

A summary of our annual HCU analysis for Farm No. 27 is shown in **Table 28**. Water is delivered to the farm via a shared lateral from headgate 126 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 630 ac-ft, as shown in Column 19 of Table 28. LAWMA's pro rata portion of the average annual HCU is 630 ac-ft (630 x 660 / 660). Groundwater return flows will be lagged back to the Arkansas River, which is the closest live stream to the farm. Consumptive use credits and return flows will be delivered to Gageby Creek via the Gageby Creek Farm 27 augmentation station. Background information including a copy of the FLCC certificates, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 12**.

m. ARF – Farm No. 30N

On Farm No. 30N, ARF owns the land historically irrigated by 88 of the Trade Shares ("Farm No. 30N Shares"). ARF will exchange and convey to LAWMA all 88 of the Farm No. 30N Shares. The average annual irrigated acreage on Farm No. 30N for the 1950 to 2014 study period was 88.6 acres as shown in **Table 16.** The 1985 irrigated acreage on Farm No. 30N was 94.1 acres, and the 2013 irrigated acreage on Farm No. 30N was 81.9 acres. LAWMA's acquisition of the Farm No. 30N Shares will include a covenant requiring ARF to dry up 94.1 acres historically irrigated with the Farm No. 30N Shares ("Farm No. 30N Dry-Up"). LAWMA's acquisition of the Farm No. 30N Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 30N Dry-Up.

The Farm No. 30N Dry-Up is generally located in the NW ¼ of Section 1, Township 22 South, Range 48 West in Bent County, Colorado, as shown in **Figure 13**. Farm No. 30N's location is within H-I Model Reach 13 and is below John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 30N Dry-Up are represented by Share Certificate No. 10539 and were delivered in the Fort Lyon Company's Limestone Division.

A summary of our annual HCU analysis for Farm No. 30N is shown in **Table 29**. Water is delivered to the farm via laterals from headgates 187 and 188 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 94 ac-ft, as shown in Column 19 of Table 29. LAWMA's pro rata portion of the average annual HCU is 94 ac-ft (94 x 88 / 88). Groundwater return flows will be lagged back to the Wiley Drain, which is the closest live stream to the farm. Consumptive use credits and return flows will be delivered to Arkansas River via a recharge site on Farm No. 110. Background information including a copy of the FLCC certificates, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 13**.

n. ARF – Farm No. 33

On Farm No. 33, ARF owns the land historically irrigated by 108 shares in the Fort Lyon Company ("Farm No. 33 Shares"), including 104 of the Trade Shares. ARF will exchange and convey to LAWMA 104 of the Farm No. 33 Shares. The average annual irrigated acreage on Farm No. 33 for the 1950 to 2014 study period was 125.6 acres as shown in **Table 16.** The 1985 irrigated acreage on Farm No. 33 was 67.8 acres, and the 2013 irrigated acreage on Farm No. 33 was 107.3 acres. LAWMA's acquisition of 104 of the Farm No. 33 Shares will include a covenant requiring ARF to dry up 107.3 acres historically irrigated with the Farm No. 33 Shares ("Farm No. 33 Dry-Up"). LAWMA's acquisition of 104 of the Farm No. 33 Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 33 Dry-Up.

The Farm No. 33 Dry-Up is generally located in the E ½ of Section 27; and the N ½ of the NE ¼ of Section 34, all in Township 22 South, Range 51 West, in Bent County, Colorado, as shown in **Figure 14**. Farm No. 33's location is within H-I Model Reach 10 and is above John

Martin Dam. The Trade Shares historically used to irrigate the Farm No. 33 Dry-Up are represented by Share Certificate Nos. 10473 and 10474 and were delivered in the Fort Lyon Company's Las Animas Division.

A summary of our annual HCU analysis for Farm No. 33 is shown in **Table 30**. Water is delivered to the farm via a shared lateral from headgate 122 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 119 ac-ft, as shown in Column 19 of Table 30. LAWMA's pro rata portion of the average annual HCU is 114 ac-ft (119 x 104 / 108). Groundwater return flows will be lagged back to the Arkansas River, which is the closest live stream to the farm. Consumptive use credits and return flows will be delivered to Gageby Creek via the Gageby Creek Farm 36 augmentation station. Background information including a copy of the FLCC certificates, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 14**.

o. ARF – Farm No. 36

On Farm No. 36, ARF owns the land historically irrigated by 212 of the Trade Shares ("Farm No. 36 Shares"). ARF will exchange and convey to LAWMA all 212 of the Farm No. 36 Shares. The average annual irrigated acreage on Farm No. 36 for the 1950 to 2014 study period was 141.8 acres as shown in **Table 16.** The 1985 irrigated acreage on Farm No. 36 was 147.1 acres, and the 2013 irrigated acreage on Farm No. 36 was 135.9 acres. LAWMA's acquisition of the Farm No. 36 Shares will include a covenant requiring ARF to dry up 147.1 acres historically irrigated with the Farm No. 36 Shares. LAWMA's acquisition of the Farm No. 36 Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 36 Dry-Up.

The Farm No. 36 Dry-Up is generally located in the SW ¼ of Section 14, Township 22 South, Range 51 West in Bent County, Colorado, as shown in **Figure 15**. Farm No. 36's location is within H-I Model Reach 10 and is above John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 36 Dry-Up are represented by Share Certificate Nos. 10469 and 10470 and were delivered in the Fort Lyon Company's Las Animas Division.

A summary of our annual HCU analysis for Farm No. 36 is shown in **Table 31**. Water is delivered to the farm via a lateral from headgate 125 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 226 ac-ft, as shown in Column 19 of Table 31. LAWMA's pro rata portion of the average annual HCU is 226 ac-ft (226 x 212 / 212). Groundwater return flows will be lagged back to Gageby Creek, which is the closest live stream to the farm. Consumptive use credits and return flows will be delivered to Gageby Creek via the Gageby Creek Farm 36 augmentation station. Background information including a copy of the FLCC certificates, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 15**.

p. ARF – Farm No. 37

On Farm No. 37, ARF owns the land historically irrigated by 144 of the Trade Shares ("Farm No. 37 Shares"). ARF will exchange and convey to LAWMA all 144 of the Farm No. 37 Shares. The average annual irrigated acreage on Farm No. 37 for the 1950 to 2014 study period was 157.0 acres as shown in **Table 16.** The 1985 irrigated acreage on Farm No. 37 was 153.5 acres, and the 2013 irrigated acreage on Farm No. 37 was 150.8 acres. LAWMA's acquisition of the Farm No. 37 Shares will include a covenant requiring ARF to dry up 153.5 acres historically irrigated with the Farm No. 37 Shares ("Farm No. 37 Dry-Up"). LAWMA's acquisition of the Farm No. 37 Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 37 Dry-Up.

The Farm No. 37 Dry-Up is generally located in the E ½ of Section 10, Township 22 South, Range 48 West, in Bent County, Colorado, as shown in **Figure 16**. Farm No. 37's location is within H-I Model Reach 12 and is below John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 37 Dry-Up are represented by Share Certificate No. 10537 and were delivered in the Fort Lyon Company's Limestone Division.

A summary of our annual HCU analysis for Farm No. 37 is shown in **Table 32**. Water is delivered to the farm via a lateral from headgate 177 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 153 ac-ft, as shown in Column 19 of Table 32. LAWMA's pro rata portion of the average annual HCU is 153 ac-ft (153 x 144 / 144). Groundwater return flows will be lagged back to Riverview Drain, which is the closest live stream to the farm. The consumptive use credits will be delivered to Arkansas River via the Recharge Site on Farm 132/133 and the return flow component will be delivered to the Lubers Drain via the Headgate 151E. Background information including a copy of the FLCC certificate, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 16**.

q. ARF – Farm No. 39N

On a portion of Farm No. 39, ARF owns the land historically irrigated by 200 shares in the Fort Lyon Company ("Farm No. 39 Shares"), including 191 of the Trade Shares. ARF will exchange and convey to LAWMA 191 of the Farm No. 39 Shares. The average annual irrigated acreage on Farm No. 39 for the 1950 to 2014 study period was 239.5 acres as shown in **Table 16.** The 1985 irrigated acreage on Farm No. 39 was 234.3 acres, and the 2013 irrigated acreage on Farm No. 39 was 223 acres. LAWMA's acquisition of 191 of the Farm No. 39 Shares will include a covenant requiring ARF to dry up 234.3 acres historically irrigated with the Farm No. 39 Shares ("Farm No. 39 Dry-Up"). LAWMA's acquisition of 191 of the Farm No. 39 Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 39 Dry-Up.

The Farm No. 39 Dry-Up is generally located in portions of Section 12 and 24, Township 22 South, Range 49 West in Bent County, Colorado, as shown in **Figure 17**. Farm No. 39's location is within H-I Model Reach 12 and is below John Martin Dam. The 200 Trade Shares historically used to irrigate the Farm No. 39 Dry-Up are represented by Share Certificate No. 10534 and were delivered in the Fort Lyon Company's Limestone Division.

A summary of our annual HCU analysis for Farm No. 39 is shown in **Table 33**. Water is delivered to the farm via a shared lateral from headgates 159 and 160 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 213 ac-ft, as shown in Column 19 of Table 33. LAWMA's pro rata portion of the average annual HCU is 203 ac-ft (213 x 191 / 200). Groundwater return flows will be lagged back to Limestone Creek, which is the closest live stream to the farm. Consumptive use credits and return flows will be delivered to the Arkansas River via an augmentation station on Limestone Creek. Background information including a copy of the FLCC certificate, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 17**.

r. ARF – Farm No. 40

On Farm No. 40, ARF owns the land historically irrigated by 67 of the Trade Shares ("Farm No. 40 Shares"). ARF will exchange and convey to LAWMA all 67 of the Farm No. 40 Shares. The average annual irrigated acreage on Farm No. 40 for the 1950 to 2014 study period was 60.3 acres as shown in **Table 16**. The1985 irrigated acreage on Farm No. 40 was 62.7 acres, and the 2013 irrigated acreage on Farm No. 40 was 59.8 acres. LAWMA's acquisition of the Farm No. 40 Shares will include a covenant requiring ARF to dry up 62.7 acres historically irrigated with the Farm No. 40 Shares ("Farm No. 40 Dry-Up"). LAWMA's acquisition of the Farm No. 40 Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 40 Dry-Up.

The Farm No. 40 Dry-Up is generally located in the E ½ of Section 29 and the W ½ of Section 30, Township 23 South, Range 54 West in Otero County, Colorado, as shown in **Figure 18**. Farm No. 40's location is within H-I Model Reach 8 and is above John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 40 Dry-Up are represented by Share Certificate No. 10486, and were delivered in the Fort Lyon Company's La Junta Division.

A summary of our annual HCU analysis for Farm No. 40 is shown in **Table 34**. Water is delivered to the farm via a lateral from headgate 17E on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 74 ac-ft, as shown in Column 19 of Table 34. LAWMA's pro rata portion of the average annual HCU is 74 ac-ft (74 x 67 / 67). Groundwater return flows will be lagged back to the Arkansas River, which is the closest live stream to the farm. Consumptive use credits and return flows will be delivered to Arkansas River via a recharge site on Farm No. 60. Background information including a copy of the FLCC certificate, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 18**.

s. ARF – Farm No. 41

On Farm No. 41, ARF owns the land historically irrigated by 80 shares in the Fort Lyon Company ("Farm No. 41 Shares"), including 79 of the Trade Shares. ARF will exchange and convey to LAWMA 79 of the Farm No. 41 Shares. The average annual irrigated acreage on Farm No. 41 for the 1950 to 2014 study period was 113.7 acres as shown in **Table 16**. The 1985 irrigated acreage on Farm No. 41 was 115.2 acres, and the 2013 irrigated acreage on Farm No. 41 was 105.4 acres. LAWMA's acquisition of the 79 of the Farm No. 41 Shares will include a covenant requiring ARF to dry up 115.2 acres historically irrigated with the Farm No. 41 Shares ("Farm No. 41 Dry-Up"). LAWMA's acquisition of 79 of the Farm 41 Shares will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 41 Dry-Up.

The Farm No. 41 Dry-Up is generally located in the SE ¼ of Section 24, Township 22 South, Range 50 West in Bent County, Colorado, as shown in **Figure 19**. Farm No. 41's location is within H-I Model Reach 10 and is above John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 41 Dry-Up are represented by Share Certificate No. 10452 and were delivered in the Fort Lyon Company's Las Animas Division.

A summary of our annual HCU analysis for Farm No. 41 is shown in **Table 35**. Water is delivered to the farm via a shared lateral from headgate 147 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 88 ac-ft, as shown in Column 19 of Table 35. LAWMA's pro rata portion of the average annual HCU is 87 ac-ft (88 x 79 / 80). Groundwater return flows will be lagged back to Prowers Arroyo, which is the closest live stream to the farm. The consumptive use credits will be delivered to Arkansas River via the Recharge Site on Farm 132/133 and the return flow component will be delivered to the Lubers Drain via the Headgate 151E. Background information including a copy of the FLCC certificate, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 19**.

t. ARF – Farm No. 42

On Farm No. 42, ARF owns the land historically irrigated by 166 of the Trade Shares ("Farm No. 42 Shares"). ARF will exchange and convey to LAWMA all 166 of the Farm No. 42 Shares. The average annual irrigated acreage on Farm No. 42 for the 1950 to 2014 study period was 159.4 acres as shown in **Table 16**. The 1985 irrigated acreage on Farm No. 42 was 82.3 acres, and the 2013 irrigated acreage on Farm No. 42 was 155.2 acres. LAWMA's acquisition of the Farm No. 42 Shares will include a covenant requiring ARF to dry up 155.2 acres historically irrigated with the Farm No. 42 Shares ("Farm No. 42 Dry-Up"). LAWMA's acquisition of the Farm No. 42 Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 42 Dry-Up.

The Farm No. 42 Dry-Up is generally located in the W ½ of Section 28, Township 22 South, Range 48 West, in Bent County, Colorado, as shown in **Figure 20**. Farm No. 42's location is within H-I Model Reach 12 and is below John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 42 Dry-Up are represented by Share Certificate No. 10528 and were delivered in the Fort Lyon Company's Limestone Division.

A summary of our annual HCU analysis for Farm No. 42 is shown in **Table 36**. Water is delivered to the farm via a shared lateral from headgate 166 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 175 ac-ft, as shown in Column 19 of Table 36. LAWMA's pro rata portion of the average annual HCU is 175 ac-ft (175 x 166 / 166). Groundwater return flows will be lagged back to Graveyard Creek, which is the closest live stream to the farm.

Consumptive use credits and return flows will be delivered to the Arkansas River via the McClave Drain augmentation station. Background information including a copy of the FLCC certificate, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 20**.

u. ARF – Farm No. 53

On Farm No. 53, ARF owns the land historically irrigated by 170 of the Trade Shares ("Farm No. 53 Shares"). ARF will exchange and convey to LAWMA all 170 of the Farm No. 53 Shares. The average annual irrigated acreage on Farm No. 53 for the 1950 to 2014 study period was 144.4 acres as shown in **Table 16**. The 1985 irrigated acreage on Farm No. 53 was 143.5 acres, and the 2013 irrigated acreage on Farm No. 53 was 141.4 acres. LAWMA's acquisition of the Farm No. 53 Shares will include a covenant requiring ARF to dry up 143.5 acres historically irrigated with the Farm No. 53 Shares ("Farm No. 53 Dry-Up"). LAWMA's acquisition of the Farm No. 53 Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 53 Dry-Up.

The Farm No. 53 Dry-Up is generally located in the E ½ of the SE ¼ of Section 27 and the NW ¼ of Section 34, Township 22 South, Range 48 West in Bent County, Colorado, as shown in **Figure 21**. Farm No. 53's location is within H-I Model Reach 12 and is below John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 53 Dry-Up are represented by Share Certificate No. 10498 and were delivered in the Fort Lyon Company's Limestone Division.

A summary of our annual HCU analysis for Farm No. 53 is shown in **Table 37**. Water is delivered to the farm via a shared lateral from headgate 181 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 181 ac-ft, as shown in Column 19 of Table 37. LAWMA's pro rata portion of the average annual HCU is 181 ac-ft (181 x 170 / 170). Groundwater return flows will be lagged back to Graveyard Creek, which is the closest live stream to the farm. Consumptive use credits and return flows will be delivered to the Arkansas River via the Arbor Lateral augmentation station. Background information including a copy of the FLCC certificate, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 21.**

v. ARF – Farm No. 54B

On Farm No. 54B, ARF owns the land historically irrigated by 80 of the Trade Shares ("Farm No. 54B Shares"). ARF will exchange and convey to LAWMA all 80 of the Farm No. 54B

Shares. The average annual irrigated acreage on Farm No. 54B for the 1950 to 2014 study period was 153.7 acres as shown in **Table 16**. The 1985 irrigated acreage on Farm No. 54B was 159.2 acres, and the 2013 irrigated acreage on Farm No. 54B was 142.5 acres. LAWMA's acquisition of the Farm No. 54B Shares will include a covenant requiring ARF to dry up 159.2 acres historically irrigated with the Farm No. 54B Shares ("Farm No. 54B Dry-Up"). LAWMA's acquisition of the Farm No. 54B Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 54B Dry-Up.

The Farm No. 54B Dry-Up is generally located in the SE ¼ of Section 19, Township 22 South, Range 49 West, in Bent County, Colorado, as shown in **Figure 22**. Farm No. 54B's location is within H-I Model Reach 10 and is above John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 54B Dry-Up are represented by Share Certificate No. 10471, and were delivered in the Fort Lyon Company's Las Animas Division.

A summary of our annual HCU analysis for Farm No. 54B is shown in **Table 38**. Water is delivered to the farm via a lateral from headgate 148 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 85 ac-ft, as shown in Column 19 of Table 38. LAWMA's pro rata portion of the average annual HCU is 85 ac-ft (85 x 80 / 80). Groundwater return flows will be lagged back to Prowers Arroyo, which is the closest live stream to the farm. The consumptive use credits will be delivered to Arkansas River via the Recharge Site on Farm 132/133 and the return flow component will be delivered to the Lubers Drain via the Headgate 151E. Background information including a copy of the FLCC certificate, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 22**.

w. ARF – Farm No. 57

On Farm No. 57, ARF owns the land historically irrigated by 83 of the Trade Shares ("Farm No. 57 Shares"). ARF will exchange and convey to LAWMA all 83 of the Farm No. 57 Shares. The average annual irrigated acreage on Farm No. 57 for the 1950 to 2014 study period was 66.6 acres as shown in **Table 16**. The 1985 irrigated acreage on Farm No. 57 was 63.9 acres, and the 2013 irrigated acreage on Farm No. 57 was 62.4 acres. LAWMA's acquisition of the Farm No. 57 Shares will include a covenant requiring ARF to dry up 63.9 acres historically irrigated with the Farm No. 57 Shares ("Farm No. 57 Dry-Up"). LAWMA's acquisition of the Farm No. 57 Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 57 Dry-Up.

The Farm No. 57 Dry-Up is generally located in the SW ¼ of Section 6, Township 23 South, Range 53 West, in Bent County, Colorado, as shown in **Figure 23**. Farm No. 57's location is within H-I Model Reach 8 and is above John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 57 Dry-Up are represented by Share Certificate No. 10531 and were delivered in the Fort Lyon Company's Horse Creek Division.

A summary of our annual HCU analysis for Farm No. 57 is shown in **Table 39**. Water is delivered to the farm via a shared lateral from headgate 34 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 91 ac-ft, as shown in Column 19 of Table 39. LAWMA's pro rata portion of the average annual HCU is 91 ac-ft (91 x 83 / 83). Groundwater return flows will be lagged back to the Arkansas River, which is the closest live stream to the farm. Consumptive use credits and return flows will be delivered to Arkansas River via a recharge site on Farm No. 60. Background information including a copy of the FLCC certificate, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 23**.

x. ARF – Farm No. 58

On Farm No. 58, ARF owns the land historically irrigated by 121 shares in the Fort Lyon Company ("Farm No. 58 Shares"), including 116 of the Trade Shares. ARF will exchange and convey to LAWMA 116 of the Farm No. 58 Shares. The average annual irrigated acreage on Farm No. 58 for the 1950 to 2014 study period was 126.6 acres as shown in **Table 16**. The 1985 irrigated acreage on Farm No. 58 was 144.2 acres, and the 2013 irrigated acreage on Farm No. 58 was 135 acres. LAWMA's acquisition of 116 of the Farm No. 58 Shares will include a covenant requiring ARF to dry up 144.2 acres historically irrigated with the Farm No. 58 Shares ("Farm No. 58 Dry-Up"). LAWMA's acquisition of the 116 of the Farm No. 58 Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 58 Dry-Up.

The Farm No. 58 Dry-Up is generally located in the S ½ of the NE ¼, and the SE ¼ of Section 18, Township 22 South, Range 49 West, in Bent County, Colorado, as shown in **Figure 24**. Farm No. 58's location is within H-I Model Reach 11 and is below John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 58 Dry-Up are represented by Share Certificate No. 10526 and were delivered in the Fort Lyon Company's Limestone Division.

A summary of our annual HCU analysis for Farm No. 58 is shown in **Table 40**. Water is delivered to the farm via a shared lateral from headgate 150 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 129 ac-ft, as shown in Column 19 of Table 40. LAWMA's pro rata portion of the average annual HCU is 123 ac-ft (129 x 116 / 121). Groundwater return flows will be lagged back to Prowers Arroyo, which is the closest live stream to the farm. The consumptive use credits will be delivered to Arkansas River via the Recharge Site on Farm 132/133 and the return flow component will be delivered to the Lubers Drain via the Headgate 151E. Background information including a copy of the FLCC certificate, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 24**.

y. ARF – Farm No. 59

On Farm No. 59, ARF owns the land historically irrigated by 144 of the Trade Shares ("Farm No. 59 Shares"). ARF will exchange and convey to LAWMA all 144 of the Farm No. 59 Shares. The average annual irrigated acreage on Farm No. 59 for the 1950 to 2014 study period was 67.1 acres as shown in **Table 16**. The 1985 irrigated acreage on Farm No. 59 was 64.5 acres, and the 2013 irrigated acreage on Farm No. 59 was 62.8 acres. LAWMA's acquisition of the Farm No. 59 Shares will include a covenant requiring ARF to dry up 64.5 acres historically irrigated with the Farm No. 59 Shares ("Farm No. 59 Dry-Up"). LAWMA's acquisition of the Farm No. 59 Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 59 Dry-Up.

The Farm No. 59 Dry-Up is generally located in the SW ¼ of Section 28, Township 22 South, Range 51 West, in Bent County, Colorado, as shown in **Figure 25**. Farm No. 59's location is within H-I Model Reach 10 and is above John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 59 Dry-Up are represented by Share Certificate No. 10489 and were delivered in the Fort Lyon Company's Las Animas Division.

A summary of our annual HCU analysis for Farm No. 59 is shown in **Table 41**. Water is delivered to the farm via a shared lateral from headgate 112 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 134 ac-ft, as shown in Column 19 of Table 41. LAWMA's pro rata portion of the average annual HCU is 134 ac-ft (134 x 144 / 144). Groundwater return flows will be lagged back to the Arkansas River, which is the closest live stream to the farm.

Consumptive use credits and return flows will be delivered to the Arkansas River via the DiRezza Farm Horse Creek augmentation station. Background information including a copy of the FLCC certificate, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 25**.

z. ARF – Farm No. 60A

On Farm No. 60A, ARF owns the land historically irrigated by 133 of the Trade Shares ("Farm No. 60A Shares"). ARF will exchange and convey to LAWMA all 133 of the Farm No. 60A Shares. The average annual irrigated acreage on Farm No. 60A for the 1950 to 2014 study period was 114.3 acres as shown in **Table 16**. The 1985 irrigated acreage on Farm No. 60A was 100.1 acres, and the 2013 irrigated acreage on Farm No. 60A was 112.5 acres. LAWMA's acquisition of the Farm No. 60A Shares will include a covenant requiring ARF to dry up 112.5 acres historically irrigated with the Farm No. 60A Shares ("Farm No. 60A Dry-Up"). LAWMA's acquisition of the Farm No. 60A Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 60A Dry-Up.

The Farm No. 60A Dry-Up is generally located in the SW ¼ of the SW ¼ of Section 11, Township 23 South, Range 54 West, and in the W ½ of Section 14, Township 23 South, Range 54 West, in Otero County, Colorado, as shown in **Figure 26**. Farm No. 60A's location is within H-I Model Reach 8 and is above John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 60A Dry-Up are represented by Share Certificate Nos. 10453, 10454, 10455, 10456, and 10457 and were delivered in the Fort Lyon Company's Horse Creek Division.

A summary of our annual HCU analysis for Farm No. 60A is shown in **Table 42**. Water is delivered to the farm via a lateral from headgate 27 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 146 ac-ft, as shown in Column 19 of Table 42. LAWMA's pro rata portion of the average annual HCU is 146 ac-ft (146 x 133 / 133). Groundwater return flows will be lagged back to the Arkansas River, which is the closest live stream to the farm. Consumptive use credits and return flows will be delivered to Arkansas River via a recharge site on Farm No. 60. Background information including a copy of the FLCC certificates, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 26**.

aa. ARF – Farm No. 61

Farm No. 61 historically was irrigated by 400 shares in the Fort Lyon Company ("Farm No. 61 Shares"), including 399 of the Trade Shares. ARF will exchange and convey to LAWMA 399 of the Farm No. 61 Shares. The average annual irrigated acreage on Farm No. 61 for the 1950 to 2014 study period was 212.9 acres as shown in **Table 16**. The 1985 irrigated acreage on Farm No. 61 was 179.1 acres, and the 2013 irrigated acreage on Farm No. 61 was 165.8 acres. LAWMA's acquisition of 399 of the Farm No. 61 Shares will include assignment of ARF's covenant requiring the dry-up of 179.1 acres historically irrigated with the Farm No. 61 Shares ("Farm No. 61 Dry-Up"). LAWMA's acquisition of 399 of the Farm No. 61 Shares also will include assignment of ARF's covenant requiring the revegetation or dry-land farming of the Farm No. 61 Dry-Up.

The Farm No. 61 Dry-Up is generally located in the W ½ of Section 23 and the NW ¼ of Section 26, Township 22 South, Range 53 West, in Bent County, Colorado, as shown in **Figure 27**. Farm No. 61's location is within H-I Model Reach 9 and is above John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 61 Dry-Up are represented by Share Certificate No. 10538 and were delivered in the Fort Lyon Company's Horse Creek Division.

A summary of our annual HCU analysis for Farm No. 61 is shown in **Table 43**. Water is delivered to the farm via a shared lateral from headgates 57, 57B, and 57D on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 383 ac-ft, as shown in Column 19 of Table 43. LAWMA's pro rata portion of the average annual HCU is 382 ac-ft (383 x 399 / 400). Groundwater return flows will be lagged back to Adobe Creek, which is the closest live stream to the farm. Consumptive use credits and return flows will be delivered to the Arkansas River via the DiRezza Farm augmentation station on Horse Creek. Background information including a copy of the FLCC certificate, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 27**.

bb. ARF – Farm No. 62A & 62B

On Farm No. 62A, ARF owns the land historically irrigated by 207 of the Trade Shares ("Farm No. 62A Shares"). ARF will exchange and convey to LAWMA all 207 of the Farm No. 62A Shares. Farm No. 62B historically was irrigated by 30 of the Trade Shares ("Farm No. 62B Shares"). ARF will exchange and convey to LAWMA all 30 of the Farm No. 62B Shares. The average annual irrigated acreage on Farm No. 62A & B for the 1950 to 2014 study period was 203.1 acres as shown in **Table 16**. The 1985 irrigated acreage on Farm No. 62A was 162.6 acres, and the 2013 irrigated acreage on Farm No. 62A was 173.4 acres. LAWMA's acquisition of the Farm No. 62A Shares will include a covenant requiring ARF to dry up 173.4 acres historically irrigated with the Farm No. 62A Shares ("Farm No. 62A Dry-Up"). LAWMA's acquisition of the Farm No. 62A Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 62A Dry-Up. The 1985 irrigated acreage on Farm No. 62B was 26.9 acres, and the 2013 irrigated acreage on Farm No. 62B was 26.6 acres. LAWMA's acquisition of the Farm No. 62B Shares will include assignment of ARF's covenant requiring the dry-up of 26.9 acres historically irrigated with the Farm No. 62B Shares ("Farm No. 62B Dry-Up"). LAWMA's acquisition of the Farm No. 62B Shares also will include assignment of ARF's covenant requiring the revegetation or dry-land farming of the Farm No. 62B Dry-Up.

The Farm No. 62A Dry-Up is generally located in the SE ¼ of the SW ¼ and in the S ½ of the SE ¼ of Section 17, Township 22 South, Range 46 West, in Prowers County, Colorado, as shown in **Figure 28**. The Trade Shares historically used to irrigate the Farm No. 62A Dry-Up are represented by Share Certificate No. 10448 and were delivered in the Fort Lyon Company's Lamar Division. The Farm No. 62B Dry-Up is generally located in the SE ¼ and the E ½ of the SW ¼ of Section 17, Township 22 South, Range 46 West, in Prowers County, Colorado, as shown in **Figure 28**. The Trade Shares historically used to irrigate the Farm No. 62B Dry-Up are represented by Share Certificate No. 10447 and were delivered in the Fort Lyon Company's Lamar Division. Farm No. 62A & B's location is within H-I Model Reach 14 and is below John Martin Dam.

A summary of our annual HCU analysis for Farm No. 62A&B is shown in **Table 44**. Water is delivered to the farm via a shared lateral from headgate 259 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 252 ac-ft, as shown in Column 19 of Table 44. LAWMA's pro rata portion of the average annual HCU is 252 ac-ft (252 x 237 / 237). Groundwater return flows will be lagged back to May Valley Drain, which is the closest live stream to the farm. Consumptive use credits and return flows will be delivered to the Arkansas River via the Wheatridge Lateral augmentation station. Background information including a copy of the FLCC certificates, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 28**.

cc. ARF – Farm No. 63

Farm No. 63 historically was irrigated by 623 of the Trade Shares ("Farm No. 63 Shares"). ARF will exchange and convey to LAWMA all 623 of the Farm No. 63 Shares. The average annual irrigated acreage on Farm No. 63 for the 1950 to 2014 study period was 785.8 acres as shown in **Table 16**. The 1985 irrigated acreage on Farm No. 63 was 758.4 acres, and the 2013 irrigated acreage on Farm No. 63 was 776.4 acres. LAWMA's acquisition of the Farm No. 63 Shares will include assignment of ARF's covenant requiring the dry-up of 776.4 acres historically irrigated with the Farm No. 63 Shares ("Farm No. 63 Dry-Up"). LAWMA's acquisition of the Farm No. 63 Shares also will include assignment of ARF's covenant requiring the revegetation or dry-land farming of the Farm No. 63 Dry-Up.

The Farm No. 63 Dry-Up is generally located in the W ½ of Section 33, Township 21 South, Range 47 West; and in the NW ¼ of Section 3 and the NW ¼, the SW ¼ of the NE ¼, and the S ½ of Section 10 in Township 22 South, Range 47 West, all in Prowers County, Colorado, as shown in **Figure 29**. Farm No. 63's location is within H-I Model Reach 13 and is below John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 63 Dry-Up are represented by Share Certificate Nos. 10494, 10495, 10496, and 10497 and were delivered in the Fort Lyon Company's Lamar Division.

A summary of our annual HCU analysis for Farm No. 63 is shown in **Table 45**. Water is delivered to the farm via shared laterals from headgates 223D, 230, and 230G on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 662 ac-ft, as shown in Column 19 of Table 45. LAWMA's pro rata portion of the average annual HCU is 662 ac-ft (662 x 623 / 623). Groundwater return flows will be lagged back to the Wiley Drain and the Pleasant Valley Drain, which are the closest live streams to the farm. The percentage of groundwater return flows lagged to each drain will be based on the acreage of the farm and the closest drain. Consumptive use credits and return flows will be delivered to Arkansas River via recharge sites on Farm Nos. 63 and 110. Background information including a copy of the FLCC certificates, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 29**.

dd. ARF – Farm No. 64

On Farm No. 64, ARF owns the land historically irrigated by 224 of the Trade Shares ("Farm No. 64 Shares"). ARF will exchange and convey to LAWMA all 224 of the Farm No. 64 Shares. The average annual irrigated acreage on Farm No. 64 for the 1950 to 2014 study period was 203.4 acres as shown in **Table 16**. The 1985 irrigated acreage on Farm No. 64 was 160 acres, and the 2013 irrigated acreage on Farm No. 64 was 198.1 acres. LAWMA's acquisition of the Farm No. 64 Shares will include a covenant requiring ARF to dry up 198.1 acres historically irrigated with the Farm No. 64 Shares ("Farm No. 64 Dry-Up"). LAWMA's acquisition of the Farm No. 64 Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 64 Dry-Up.

The Farm No. 64 Dry-Up is generally located in the N ½ of Section 32 and the NW ¼ of Section 33, Township 22 South, Range 48 West, in Bent County, Colorado, as shown in **Figure 30**. Farm No. 64's location is within H-I Model Reach 12 and is below John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 64 Dry-Up are represented by Share Certificate No. 10442 and were delivered in the Fort Lyon Company's Limestone Division.

A summary of our annual HCU analysis for Farm No. 64 is shown in **Table 46**. Water is delivered to the farm via a shared lateral from headgate 166 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 238 ac-ft, as shown in Column 19 of Table 46. LAWMA's pro rata portion of the average annual HCU is 238 ac-ft (238 x 224 / 224). Groundwater return flows will be lagged back to McClave Drain, which is the closest live stream to the farm. Consumptive use credits and return flows will be delivered to the Arkansas River via the McClave Drain augmentation station. Background information including a copy of the FLCC certificate, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 30**.

ee. ARF – Farm No. 65

On Farm No. 65, ARF owns the land historically irrigated by 144 of the Trade Shares ("Farm No. 65 Shares"). ARF will exchange and convey to LAWMA all 144 of the Farm No. 65 Shares. The average annual irrigated acreage on Farm No. 65 for the 1950 to 2014 study period was 150.2 acres as shown in **Table 16**. The 1985 irrigated acreage on Farm No. 65 was 155.7 acres, and the 2013 irrigated acreage on Farm No. 65 was 145.3 acres. LAWMA's acquisition of the Farm No. 65 Shares will include a covenant requiring ARF to dry up 155.7 acres historically irrigated with the Farm No. 65 Shares ("Farm No. 65 Dry-Up"). LAWMA's acquisition of the Farm No. 65 Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 65 Dry-Up.

The Farm No. 65 Dry-Up is generally located in the SE ¼ of Section 25, Township 22 South, Range 49 West, in Bent County, Colorado, as shown in **Figure 31**. Farm No. 65's location is within H-I Model Reach 11 and is below John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 65 Dry-Up are represented by Share Certificate No. 10458 and were delivered in the Fort Lyon Company's Limestone Division.

A summary of our annual HCU analysis for Farm No. 65 is shown in **Table 47**. Water is delivered to the farm via a shared lateral from headgate 162 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 153 ac-ft, as shown in Column 19 of Table 47. LAWMA's pro rata portion of the average annual HCU is 153 ac-ft (153 x 137 / 144). Groundwater return flows will be lagged back to the Arkansas River, which is the closest live stream to the farm. Consumptive use credits and return flows will be delivered to Arkansas River via a recharge site on Farm No. 65. Background information including a copy of the FLCC certificate, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 31**.

ff. ARF – Farm No. 85

Farm No. 85 historically was irrigated by 144 shares in the Fort Lyon Company ("Farm No. 85 Shares"), including 141 of the Trade Shares. ARF will exchange and convey to LAWMA 141 of the Farm No. 85 Shares. The average annual irrigated acreage on Farm No. 85 for the 1950 to 2014 study period was 151.7 acres as shown in **Table 16**. The 1985 irrigated acreage on Farm No. 85 was 149 acres, and the 2013 irrigated acreage on Farm No. 85 was 141.4 acres. LAWMA's acquisition of 141 of the Farm No. 85 Shares will include assignment of ARF's covenant requiring the dry-up of 149 acres historically irrigated with the Farm No. 85 Shares ("Farm No. 85 Dry-Up"). LAWMA's acquisition of 141 of the Farm No. 85 Shares also will include assignment of ARF's covenant requiring the revegetation or dry-land farming of the Farm No. 85 Dry-Up.

The Farm No. 85 Dry-Up is generally located in the SE ¼ of Section 26, Township 21 South, Range 48 West in Bent County, Colorado, as shown in **Figure 32**. Farm No. 85's location is within H-I Model Reach 13 and is below John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 85 Dry-Up are represented by Share Certificate No. 10561 and were delivered in the Fort Lyon Company's Limestone Division.

A summary of our annual HCU analysis for Farm No. 85 is shown in **Table 48**. Water is delivered to the farm via a shared lateral from headgate 193D on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 153 ac-ft, as shown in Column 19 of Table 48. LAWMA's pro rata portion of the average annual HCU is 150 ac-ft (153 x 141 / 144). Groundwater return flows will be lagged back to the Wiley Drain, which is the closest live stream to the farm. Consumptive use credits and return flows will be delivered to Arkansas River via a recharge site on Farm No. 110. Background information including a copy of the FLCC certificate, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 32**.

gg. ARF – Farm No. 110

Farm No. 110 historically was irrigated by 152 of the Trade Shares ("Farm No. 110 Shares"). ARF will exchange and convey to LAWMA all 152 of the Farm No. 110 Shares. The average annual irrigated acreage on Farm No. 110 for the 1950 to 2014 study period was 227.0 acres as shown in **Table 16**. The 1985 irrigated acreage on Farm No. 110 was 218.5 acres, and the 2013 irrigated acreage on Farm No. 110 was 214.3 acres. LAWMA's acquisition of the Farm No. 110 Shares will include assignment of ARF's covenant requiring the dry-up of 218.5 acres historically irrigated with the Farm No. 110 Shares ("Farm No. 110 Dry-Up"). LAWMA's acquisition of the Farm No. 110 Shares also will include assignment of ARF's covenant requiring the revegetation or dry-land farming of the Farm No. 110 Dry-Up.

The Farm No. 110 Dry-Up is generally located in the S ½ of the SW ¼ and in the SE ¼ of Section 11, Township 21 South, Range 48 West, in Bent County, Colorado, as shown in **Figure 33**. Farm No. 110's location is within H-I Model Reach 13 and is below John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 110 Dry-Up are represented by Share Certificate Nos. 10460 and 10461 and were delivered in the Fort Lyon Company's Limestone Division.

A summary of our annual HCU analysis for Farm No. 110 is shown in **Table 49**. Water is delivered to the farm via a lateral from headgate 201E on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 162 ac-ft, as shown in Column 19 of Table 49. LAWMA's pro rata portion of the average annual HCU is 162 ac-ft (162 x 152 / 152). Groundwater return flows will be lagged back to the Wiley Drain, which is the closest live stream to the farm. Consumptive use credits and return flows will be delivered to Arkansas River via a recharge site on Farm No. 110. Background information including a copy of the FLCC certificates, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 33**.

hh. ARF – Farm No. 114

On Farm No. 114, ARF owns the land historically irrigated by 144 of the Trade Shares ("Farm No. 114 Shares"). ARF will exchange and convey to LAWMA all 144 of the Farm No. 114 Shares. The average annual irrigated acreage on Farm No. 114 for the 1950 to 2014 study period was 224.6 acres as shown in **Table 16**. The 1985 irrigated acreage on Farm No. 114 was 225.5 acres, and the 2013 irrigated acreage on Farm No. 114 was 209.5 acres. LAWMA's acquisition of the Farm No. 114 Shares will include a covenant requiring ARF to dry up 225.5 acres historically irrigated with the Farm No. 114 Shares ("Farm No. 114 Dry-Up"). LAWMA's acquisition of the Farm No. 114 Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 114 Dry-Up.

The Farm No. 114 Dry-Up is generally located in the N ½ of Section 11, Township 21 South, Range 48 West in Bent County, Colorado, as shown in **Figure 34**. Farm No. 114's location is within H-I Model Reach 13 and is below John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 114 Dry-Up are represented by Share Certificate No. 10415 and were delivered in the Fort Lyon Company's Limestone Division.

A summary of our annual HCU analysis for Farm No. 114 is shown in **Table 50**. Water is delivered to the farm via a lateral from headgate 201E on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 153 ac-ft, as shown in Column 19 of Table 50. LAWMA's pro rata portion of the average annual HCU is 153 ac-ft (153 x 144 / 144). Groundwater return flows will be lagged back to the Wiley Drain, which is the closest live stream to the farm. Consumptive use credits and return flows will be delivered to Arkansas River via a recharge site on Farm No. 110. Background information including a copy of the FLCC certificate, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 34**.

ii. ARF – Farm No. 118

On Farm No. 118, ARF owns the land historically irrigated by 230 of the Trade Shares ("Farm No. 118 Shares"). ARF will exchange and convey to LAWMA all 230 of the Farm No. 118 Shares. The average annual irrigated acreage on Farm No. 118 for the 1950 to 2014 study period was 180.5 acres as shown in **Table 16**. The 1985 irrigated acreage on Farm No. 118 was 170.5 acres, and the 2013 irrigated acreage on Farm No. 118 was 176 acres. LAWMA's acquisition of the Farm No. 118 Shares will include a covenant requiring ARF to dry up 176 acres historically irrigated with the Farm No. 118 Shares ("Farm No. 118 Dry-Up"). LAWMA's acquisition of the Farm No. 118 Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 118 Dry-Up.

The Farm No. 118 Dry-Up is generally located in the NW ¼ of Section 16, Township 22 South, Range 46 West in Prowers County, Colorado, as shown in **Figure 35**. Farm No. 118's location is within H-I Model Reach 14 and is below John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 118 Dry-Up are represented by Share Certificate No. 10445 and were delivered in the Fort Lyon Company's Lamar Division.

A summary of our annual HCU analysis for Farm No. 118 is shown in **Table 51**. Water is delivered to the farm via a shared lateral from headgate 259 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 243 ac-ft, as shown in Column 19 of Table 51. LAWMA's pro rata portion of the average annual HCU is 243 ac-ft (243 x 230 / 230). Groundwater return flows will be lagged back to the Arkansas River, which is the closest live stream to the farm. Consumptive use credits and return flows will be delivered to the Arkansas River via the Wheatridge Lateral augmentation station. Background information including a copy of the FLCC certificate, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 35**.

jj. ARF – Farm No. 127

On Farm No. 127, ARF owns the land historically irrigated by 72 of the Trade Shares ("Farm No. 127 Shares"). ARF will exchange and convey to LAWMA all 72 of the Farm No. 127 Shares. The average annual irrigated acreage on Farm No. 127 for the 1950 to 2014 study period was 90.2 acres as shown in **Table 16**. The 1985 irrigated acreage on Farm No. 127 was 95.2 acres, and the 2013 irrigated acreage on Farm No. 127 was 87.5 acres. LAWMA's acquisition of the Farm No. 127 Shares will include a covenant requiring ARF to dry up 95.2 acres historically irrigated with the Farm No. 127 Shares ("Farm No. 127 Dry-Up"). LAWMA's acquisition of the Farm No. 127 Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 127 Dry-Up.

The Farm No. 127 Dry-Up is generally located in the W ½ of the SW ¼ of Section 19, Township 22 South, Range 48 West in Bent County, Colorado, as shown in **Figure 36**. Farm No. 27's location is within H-I Model Reach 12 and is below John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 127 Dry-Up are represented by Share Certificate No. 10492 and were delivered in the Fort Lyon Company's Limestone Division.

A summary of our annual HCU analysis for Farm No. 127 is shown in **Table 52**. Water is delivered to the farm via a shared lateral from headgate 162 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 77 ac-ft, as shown in Column 19 of Table 52. LAWMA's pro rata portion of the average annual HCU is 77 ac-ft (77 x 72 / 72). Groundwater return flows will be lagged back to the McClave Drain, which is the closest live stream to the farm. Consumptive use credits and return flows will be delivered to Arkansas River via a recharge site on Farm No. 65. Background information including a copy of the FLCC certificate, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 36**.

kk. ARF – Farm No. 132 & 133

Farm Nos. 132 and 133 (collectively, "Farm No. 132/133") historically were irrigated by 265 of the Trade Shares ("Farm No. 132/133 Shares"). ARF will exchange and convey to LAWMA all 265 of the Farm No. 132/133 Shares. The average annual irrigated acreage on Farm No. 132/133 for the 1950 to 2014 study period was 168.5 acres as shown in **Table 16**. The 1985 irrigated acreage on Farm No. 132/133 was 194.4 acres, and the 2013 irrigated acreage on Farm No. 132/133 was 181.5 acres. LAWMA's acquisition of the Farm No. 132/133 Shares will include assignment of ARF's covenant requiring the dry-up of 194.4 acres historically irrigated with the Farm No. 132/133 Shares ("Farm No. 132/133 Dry-Up"). LAWMA's acquisition of the Farm No. 132/133 Shares also will include assignment of ARF's covenant requiring the revegetation or dry-land farming of the Farm No. 132/133 Dry-Up.

The Farm No. 132/133 Dry-Up is generally located in the S ½ of the NE ¼ and in the SE ¼ of Section 36, Township 22 South, Range 50 West, in Bent County, Colorado, as shown in **Figure 37**. Farm No. 132/133's location is within H-I Model Reach 10 and is above John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 132/133 Dry-Up are represented by Share Certificate Nos. 10463 and 9904 and were delivered in the Fort Lyon Company's Las Animas Division.

A summary of our annual HCU analysis for Farm No. 132/133 is shown in **Table 53**. Water is delivered to the farm via a shared lateral from headgate 145 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 288 ac-ft, as shown in Column 19 of Table 53. LAWMA's pro rata portion of the average annual HCU is 288 ac-ft (288 x 265 / 265). Groundwater return flows will be lagged back to the Arkansas River, which is the closest live stream to the farm. The consumptive use credits will be delivered to Arkansas River via the Recharge Site on Farm 132/133 and the return flow component will be delivered to the Lubers Drain via the Headgate 151E. Background information including a copy of the FLCC certificates, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 37**.

II. ARF – Farm No. 141

On Farm No. 141, ARF owns the land historically irrigated by 224 of the Trade Shares ("Farm No. 141 Shares"). ARF will exchange and convey to LAWMA all 224 of the Farm No. 141 Shares. The average annual irrigated acreage on Farm No. 141 for the 1950 to 2014 study period was 220.4 acres as shown in **Table 16**. The 1985 irrigated acreage on Farm No. 141 was 209.2 acres, and the 2013 irrigated acreage on Farm No. 141 was 219.8 acres. LAWMA's acquisition of the Farm No. 141 Shares will include a covenant requiring ARF to dry up 219.8 acres historically irrigated with the Farm No. 141 Shares ("Farm No. 141 Dry-Up"). LAWMA's acquisition of the Farm No. 141 Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Farm No. 141 Dry-Up.

The Farm No. 141 Dry-Up is generally located in the NE ¼ and portions of the NW ¼ of Section 17, Township 22 South, Range 46 West in Prowers County, Colorado, as shown in **Figure 38**. Farm No. 141's location is within H-I Model Reach 14 and is below John Martin Dam. The Trade Shares historically used to irrigate the Farm No. 141 Dry-Up are represented by Share Certificate No. 10446 and were delivered in the Fort Lyon Company's Lamar Division.

A summary of our annual HCU analysis for Farm No. 141 is shown in **Table 54**. Water is delivered to the farm via a shared lateral from headgate 259 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 238 ac-ft, as shown in Column 19 of Table 54. LAWMA's pro rata portion of the average annual HCU is 238 ac-ft (238 x 224 / 224). Groundwater return flows will be lagged back to the May Valley Drain, which is the closest live stream to the farm. Consumptive use credits and return flows will be delivered to the Arkansas River via the Wheatridge Lateral augmentation station. Background information including a copy of the FLCC certificate, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 38**.

mm. ARF – Coen Farm

On the Coen Farm, ARF owns the land historically irrigated by 144 of the Trade Shares ("Coen Farm Shares"). ARF will exchange and convey to LAWMA all 144 of the Coen Farm Shares. The average annual irrigated acreage on the Coen Farm for the 1950 to 2014 study period was 135.9 acres as shown in **Table 16**. The 1985 irrigated acreage on the Coen Farm was 152.8 acres, and the 2013 irrigated acreage on the Coen Farm was 135.8 acres. LAWMA's acquisition of the Coen Farm Shares will include a covenant requiring ARF to dry up 152.8 acres historically irrigated with the Coen Farm Shares ("Coen Farm Dry-Up"). LAWMA's acquisition of the Coen Farm Shares also will include a covenant requiring ARF to revegetate or dry-land farm the Coen Farm Dry-Up.

The Coen Farm Dry-Up is generally located in the SW ¼ of Section 26 and the E ½ of Section 27, Township 22 South, Range 48 West in Bent County, Colorado, as shown in **Figure 39**. The Coen Farm's location is within H-I Model Reach 12 and is below John Martin Dam. The Trade Shares historically used to irrigate the Coen Farm Dry-Up are represented by Share Certificate No. 9483 and were delivered in the Fort Lyon Company's Limestone Division.

A summary of our annual HCU analysis for the Coen Farm is shown in **Table 55**. Water is delivered to the farm via a shared lateral from headgate 181 on the Main Canal. Therefore, the only SEV credits will be from on-farm lateral losses and tailwater. The average annual consumptive use for the farm from 1979 to 2014 is 153 ac-ft, as shown in Column 19 of Table 55. LAWMA's pro rata portion of the average annual HCU is 153 ac-ft (153 x 144 / 144). Groundwater return flows will be lagged back to the Arkansas River, which is the closest live stream to the farm. Consumptive use credits and return flows will be delivered to the Arkansas River via the Arbor Lateral augmentation station. Background information including a copy of the FLCC certificate, a more detailed monthly HCU analysis, the farm water budget, and the methodology used to determine the URF for the farm is shown in **Appendix 39**.

5. Proposed Monthly Consumptive Use Factors

There are 13 proposed augmentation stations and recharge sites. Eight sites are augmentation stations only, 4 are recharge sites only and 1 site is split between an augmentation station and recharge site. The following table is the list of the 8 augmentation stations and the 1 augmentation station that splits deliveries to a recharge site:

Augmentation Stations		
STATION ID	**STATION NAME**	**COMMENT**
(1)	(2)	(3)
ARF049CO	ARF HEADGATE 49 (HORSE CREEK)	
ARF125CO	ARF HEADGATE 125 (GAGEBY)	

ARF126CO	ARKANSAS RIVER FARMS AUG AT 126	
ARF145CO	ARF HEADGATE 145 (HASTY)	Split with recharge site
ARF160CO	ARF HEADGATE 160 (LIMESTONE)	
ARF166CO	ARF HEADGATE 166 (MCCLAVE)	
ARF181CO	ARF HEADGATE 181 (GRAVEYARD)	
ARF182CO	ARF HEADGATE 182 (RIVER VIEW)	
N/A	ARF HEADGATE 259 (WHEATRIDGE LATERAL)	Not yet built

As the table above shows, all but one of the augmentation stations has been built and it is expected that this augmentation station (the Wheatridge Lateral augmentation station) will be available at some point during the 2017 irrigation season.

There are 4 dedicated recharge sites and 1 recharge site that splits deliveries with an augmentation station. The following table is the list of the recharge sites:

Recharge Sites		
STATION ID	**STATION NAME**	**COMMENT**
(1)	(2)	(3)
FARM 60	ARF RECHARGE SITE ON FARM NO. 60	
FARM 63	ARF RECHARGE SITE ON FARM NO. 63	
FARM 65	ARF RECHARGE SITE ON FARM NO. 65	
FARM 110	ARF RECHARGE SITE ON FARM NO. 110	
FARM 132/133	ARF RECHARGE SITE ON FARM NO. 132/133	Split with augmentation station.

All of the recharge sites must be tested and approved per an agreement between Arkansas River Farms and LAWMA. Once the sites have been tested and approved, water will be delivered to the sites for delivery of the CU credits and return flow obligations. LAWMA will also claim CU credit for water delivered to the recharge sites during the testing and approval procedures.

We developed monthly CU factors for each of the 13 augmentation and recharge sites based on the number of shares historically used to irrigate each farm associated with a particular facility. The individual farm totals were summed as part of the overall water budgets for each facility. These water budgets are shown in **Tables 56** through **68**. Although the water budgets initially account for all of the FLCC shares historically delivered to the farms associated with the particular structure, LAWMA will only take credit for the Trade Shares that will be delivered to the river. The remaining shares (owned by ARF) will be left in shared laterals to protect the remaining shareholders on those laterals. LAWMA's winter return flows obligation will be calculated as the annual farm delivery of water to the Trade Shares multiplied by the winter return flow factors. The return flows will be delivered to the river as lagged accretions from the recharge sites. If winter return flows are owed in addition to the recharge accretions, LAWMA will deliver those additional return flows to the river at the beginning of the next irrigation season of the FLCC, which is typically March 15th through one or more of the installed augmentation stations.

The following tables are a summary of the monthly CU factors taken from the water budgets for each facility (i.e., each augmentation station and recharge site):

FOR FARMS USING THE FARM NO. 60 RECHARGE SITE

(Farm Nos. 3, 40, 57 and 60 - 365 of 366 Total FLCC Shares)

Item	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
Monthly CU Factor	47.8%	Total Winter Depls=		-32.2	52.9%	78.7%	81.0%	82.7%	80.1%	76.5%	67.7%	59.3%	68.0%
Monthly Winter Return Flow Factor		-2.2%	-1.9%	-1.8%									-5.9%

FOR FARMS USING THE DiREZZA FARM HORSE CREEK AUGMENTATION STATION (ARF049CO)

(Farm Nos. 13, 19, 21, 22, 23, 59, and 61 - 1,527 of 1,569 Total FLCC Shares)

Item	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
Monthly CU Factor	37.3%	Total Winter Depls=		-165.4	43.0%	74.4%	77.2%	79.6%	76.7%	72.6%	62.3%	51.8%	61.9%
Monthly Winter Return Flow Factor		-2.7%	-2.4%	-2.2%									-7.3%

FOR FARMS USING THE FARM NO. 27 AUGMENTATION STATION (ARF126CO)

(Farm Nos. 1, 2, 27 - 1,008 OF 1,008 Total FLCC Shares)

Item	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
Monthly CU Factor	41.7%	Total Winter Depls=		-104.8	42.3%	74.0%	77.2%	79.9%	77.4%	73.9%	64.6%	55.1%	63.2%
Monthly Winter Return Flow Factor		-2.6%	-2.2%	-2.2%									-7.0%

FOR FARMS USING THE FARM NO. 36 - LATERAL 125 AUGMENTATION STATION (ARF125CO)

(Farm Nos. 33 and 36 - 316 of 320 Total FLCC Shares)

Item	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
Monthly CU Factor	48.4%	Total Winter Depls=		-28.6	50.7%	78.2%	80.9%	82.9%	80.5%	77.0%	68.5%	60.1%	68.0%
Monthly Winter Return Flow Factor		-2.2%	-2.0%	-1.9%									-6.1%

FOR FARMS USING THE FARM NO. 132/133 AUGMENTATION (ARF145CO) & RECHARGE SITES

(Farm Nos. 14, 15, 37, 41, 54B*, 58, 132/133 - 1,021 of 1,027 Total FLCC Shares)

Item	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
Monthly CU Factor	47.6%	Total Winter Depls=		-88.6	52.9%	78.2%	80.3%	82.0%	79.2%	75.7%	67.0%	58.9%	67.5%
Monthly Winter Return Flow Factor		-2.2%	-1.9%	-1.8%									-5.8%

FOR FARMS USING THE LIMESTONE CREEK AUGMENTATION STATION (ARF160CO)

(Farm No. 39 - 191 of 200 Total FLCC Shares)

Item	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
Monthly CU Factor	46.6%	Total Winter Depls=		-16.1	53.9%	77.6%	79.1%	80.6%	77.6%	73.9%	65.2%	58.2%	62.8%
Monthly Winter Return Flow Factor		-2.2%	-1.8%	-1.7%									-5.7%

FOR FARMS USING THE FARM NO. 65 RECHARGE SITES

(Farm Nos. 65 and 127 - 216 of 216 Total FLCC Shares)

Item	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
Monthly CU Factor	46.6%	Total Winter Depls=		-18.6	52.7%	77.4%	79.2%	80.8%	77.9%	74.3%	65.6%	57.6%	66.4%
Monthly Winter Return Flow Factor		-2.2%	-1.8%	-1.7%									-5.8%

FOR FARMS USING THE McCLAVE LATERAL AUGMENTATION STATION (ARF166CO)

(Farm Nos. 42 and 64 - 390 of 390 Total FLCC Shares)

Item	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
Monthly CU Factor	46.2%	Total Winter Depls=		-34.3	51.7%	77.2%	79.1%	80.9%	78.1%	74.5%	65.7%	57.5%	66.2%
Monthly Winter Return Flow Factor		-2.2%	-1.9%	-1.8%									-5.9%

FOR FARMS USING THE GRAVEYARD CREEK AUGMENTATION STATION (ARF181CO)

(Farm No. 53 and Coen - 314 of 314 Total FLCC Shares)

Item	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
Monthly CU Factor	45.9%	Total Winter Depls=		-28.6	50.8%	77.4%	79.7%	81.5%	78.7%	75.0%	66.0%	57.6%	66.4%
Monthly Winter Return Flow Factor		-2.3%	-2.0%	-1.9%									-6.1%

FOR FARMS USING THE RIVERVIEW DRAIN AUGMENTATION STATION (ARF182CO)

(Farm No. 25 - 322 of 322 Total FLCC Shares)

Item	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
Monthly CU Factor	46.7%	Total Winter Depls=		-28.9	50.5%	77.1%	79.3%	81.2%	78.5%	75.0%	66.3%	58.9%	66.4%
Monthly Winter Return Flow Factor		-2.3%	-1.9%	-1.9%									-6.0%

FOR FARMS USING THE FARM NO 110 RECHARGE SITE

(Farm Nos. 30N, portion 63, 85, 110, 114 - 738 of 741 Total FLCC Shares)

Item	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
Monthly CU Factor	46.5%	Total Winter Depls=		-65.1	51.7%	77.4%	79.3%	81.1%	78.2%	74.6%	65.9%	57.7%	66.4%
Monthly Winter Return Flow Factor		-2.2%	-1.9%	-1.8%									-5.9%

FOR FARMS USING THE FARM NO. 63B RECHARGE SITE

(Farm No. portion 63 - 410 of 410 Total FLCC Shares)

Item	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
Monthly CU Factor	46.2%	Total Winter Depls=		-35.5	53.0%	77.7%	79.4%	80.9%	77.9%	74.3%	64.9%	57.3%	66.3%
Monthly Winter Return Flow Factor		-2.2%	-1.8%	-1.8%									-5.8%

FOR FARMS USING THE WHEATRIDGE AUGMENTATION STATION

(Farm Nos. 62, 118, 141 - 691 OF 691 Total FLCC Shares)

Item	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
Monthly CU Factor	45.8%	Total Winter Depls=		-60.8	52.7%	77.8%	79.6%	81.2%	78.2%	74.4%	65.4%	57.2%	66.4%
Monthly Winter Return Flow Factor		-2.3%	-1.9%	-1.8%									-5.9%

6. Monthly, Annual, and 20-year Volumetric Limits

As part of the case that LAWMA will file in the Division 2 Water Court to change the decreed use of the water rights associated with the Trade Shares to include augmentation and replacement purposes, we will develop farm headgate volumetric limits in a manner that is consistent with LAWMA's other decrees. Our methodology for developing the volumetric limits will look at the annual farm headgate deliveries for the Study Period (i.e., the period from 1950 to the last year when the Trade Shares were used for irrigation of lands under the Fort Lyon Canal). We will propose an annual maximum as well as a running 20-year total to limit deliveries to the Trade Shares to the maximum amount delivered to the farm headgates during 20 consecutive years within the Study Period. The monthly maximum volumetric limit will be based on the maximum monthly volume of water delivered to the Trade Shares for each month of the March 15th to November 15th irrigation season within the Study Period.

LAWMA has not yet filed a water court application seeking a change of use of the Trade Shares for augmentation and replacement purposes. For the purposes of this Rule 14 plan, LAWMA is proposing that volumetric limits on its use of the Trade Shares be based on the monthly maximum, annual maximum, and 10-year cumulative maximum of farm headgate deliveries to the Trade Shares during the Study Period. We chose the 10-year cumulative maximum volumetric limit to correspond with the Compact 10-year accounting. **Table 69** shows the farm headgate deliveries for all 7,509 FLCC shares. The maximum monthly and maximum annual deliveries occurred after initiation of the Winter Water Storage Program.

The following table summarizes the information within Table 69 upon which we are basing LAWMA's proposed volumetric limits on use of the Trade Shares within this Rule 14 plan. The proposed volumetric limits are highlighted in yellow, and appear in the row designated "Maximum."

Maximum Farm Turnout Limits for 7,509 Trade Shares (1950-2014 Study Period)
(values in acre-feet)

Year	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Mar-Nov Annual	Mar-Nov 10-Yr Cumulative
Average	561	1,009	1,380	1,923	1,692	1,425	938	717	669	10,305	105,848
Maximum	1,597	2,156	2,868	3,561	3,854	3,909	2,588	2,095	1,652	20,029	140,234
2nd Largest	1,277	2,129	2,475	3,014	3,524	3,629	2,565	1,966	1,585	18,356	138,972
3rd Largest	1,266	2,128	2,449	2,920	3,219	3,527	2,106	1,535	1,377	17,904	137,870
Average per share	0.07	0.13	0.18	0.26	0.23	0.19	0.12	0.10	0.09	1.37	14.10
Maximum per Share	0.21	0.29	0.38	0.47	0.51	0.52	0.34	0.28	0.22	2.67	18.68
2nd Largest per share	0.17	0.28	0.33	0.40	0.47	0.48	0.34	0.26	0.21	2.44	18.51

3rd Largest per share	0.17	0.28	0.33	0.39	0.43	0.47	0.28	0.20	0.18	2.38	18.36

7. Proposed Future Operation

LAWMA will take delivery of the Trade Shares in the same manner as other FLCC shareholders take delivery of their shares. LAWMA will deliver the Trade Shares to the river via augmentation stations and recharge sites. The irrigation season for the FLCC is from March 15th through November 15th. LAWMA will deliver CU credits to the river from April 1st to November 15th and also from March 15th through March 31st of the following year for augmentation of stream depletions within this Rule 14 plan, with any carry-over credits carried forward one month.

If John Martin Reservoir is in Conservation Storage mode, then deliveries of the Trade Shares above the John Martin Dam will be made to the Offset Account or any future storage account in John Martin Reservoir available to LAWMA. Currently all deliveries in March and November above John Martin Dam will be made to the Offset Account, to the Conservation Storage Pool for any necessary replacement of stream depletions from wells in LAWMA's Rule 14 plan during the Winter, or to any future storage account in John Martin Reservoir available to LAWMA. LAWMA will develop an additional worksheet within its regular monthly accounting to show the amount of water delivered through the augmentation station facilities and recharge facilities, along with the CU credits and return flows delivered to the stream through each such facility. All of the augmentation stations will have continuous recorder and satellite-monitoring equipment upon completion of construction. Eight of the stations are currently on-line with one remaining station to be completed.

8. Conclusions

1. The FLCC historically diverted water from the Arkansas River under three direct-flow water rights totaling 933.0 cfs for irrigation purposes. The Trade Shares' pro rata portion of those water rights is 74.54 cfs as shown in Table 2.
2. The FLCC also historically diverted water from the Arkansas River, Horse Creek, and Adobe Creek to storage in Horse Creek, Adobe Creek and Thurston Reservoirs. The available amount of storage is decreed at 116,515 ac-ft. The Trade Shares' pro rata share of the storage is 9,970.6 ac-ft. LAWMA is not seeking to have this storage as a dedicated space for its independent use and operation, but instead recognizes that if the reservoirs were full and releases were made to the Main Canal for all of the Fort Lyon shareholders, the 9,970.6 ac-ft of storage water would be the Trade Shares' pro rata amount.
3. The Trade Shares' annual pro rata share of the historical river headgate diversions is summarized for each farm beginning with Table 17.

4. The irrigated acreage on the ARF farms was identified from various aerial photographs as part of the HCU analysis. The cropping pattern used in the HCU analysis is consistent with the crop mix used in the H-I Model for the Fort Lyon Canal.
5. The historical crop consumptive use, SEV consumptive use, and stream depletions associated with the Trade Shares are shown in the annual HCU tables for each farm.
6. LAWMA's use of the Trade Shares for augmentation and replacement purposes will not cause injury to the Fort Lyon Canal's water rights if that use is constrained by the volumetric limits proposed above and if the historical return flows for the Trade Shares are maintained so that senior water rights that divert from the mainstem of the Arkansas River downstream of the Fort Lyon Canal do not increase their call against the Fort Lyon Canal's water rights.
7. LAWMA's use of the Trade Shares for augmentation and replacement purposes will not cause injury to senior water rights and will not cause a violation of the Compact if that use is according to the terms and conditions proposed in this report.

9. Proposed Terms and Conditions

1. Daily accounting will be maintained and submitted to the Division Engineer's Office by the 10th of the following month as part of LAWMA's monthly accounting submittals. The daily accounting will show the water attributable to the Trade Shares delivered through the augmentation stations and delivered to the recharge sites.
2. Water delivered to the recharge sites for recharge will be based on a water balance approach using the basic analysis for recharge as follows: (recharge = inflows – outflows – evaporation). Evaporation losses will be assumed to be from CU water only. Area capacity tables will be used to determine the surface areas of the ponds on a daily basis with the evaporation rate determined by LAWMA's 02CW181 decree.
3. Before including in the Rule 14 Plan the Trade Shares associated with the recharge sites, LAWMA will provide additional engineering analyses for the recharge sites in amendments to the Rule 14 Plan.
4. LAWMA will use the same methodology to project the amount of CU credits available to the FLCC shares as it does with all of its other direct-flow water rights.
5. Transit losses will be assigned to the deliveries from the augmentation stations to the Arkansas River as determined by the Division Engineer's Office.
6. Until LAWMA files a water court application to change the use of the Trade Shares to include augmentation and replacement, the use of the Trade Shares will be restricted to replacement of stream depletions within LAWMA's Rule 14 Plan. After filing a water court application, LAWMA may continue to limit the use of the FLCC

shares to its Rule 14 Plan until a decree has been entered in the water court case, or LAWMA may file a substitute water supply plan to allow temporary use of the Trade Shares in LAWMA's plan for augmentation and substitute water supply plans while a decree is pending in that case.

Table 1
Individual Farm Information
Arkansas River Farms

Farm No.	Legal	FLCC Trade Shares	Total FLCC Shares	Certificate Nos.	Division	H-I Model Reach	Above / Below John Martin Dam	River Reach	Augmentation Station	Recharge Site	Lagged to
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1	NW ¼ of Sec. 25 and NE ¼ of Sec. 26, T22S, R51W	204.0	204.0	10475	Las Animas	10	Above	LACC to JMD	Arkansas River Farms AUG at 126		Gageby Creek
2	SE ¼ of Sec. 23, T22S, R51W	144.0	144.0	10476	Las Animas	10	Above	LACC to JMD	Arkansas River Farms AUG at 126		Gageby Creek
3	SE ¼, SE ¼, NE ¼, and SW ¼, NE ¼ Sec. 30, T23S, R54W	82.0	83.0	10488	La Junta	8	Above	Above LACC		Farm 60	Arkansas River
13	SW ¼ of Sec. 29, T22S, R52W	188.0	188.0	10516	Horse Creek	9	Above	LACC to JMD	ARF Headgate 49 (Horse Creek)		Arkansas River
14	S ½, NW ¼, and SW ¼ of Sec. 19, T22S, R49W	118.0	118.0	10451	Las Animas	10	Above	JMD to Amity	ARF Headgate 145 (HASTY) / Lubers Drain	Farm 132/133	Prowers Arroyo
15	W ½ and NE ¼ of Sec. 31, T22S, R49W	219.0	219.0	10562	Las Animas	10	Above	JMD to Amity	ARF Headgate 145 (HASTY) / Lubers Drain	Farm 132/133	John Martin Reservoir
19	E ½ of Sec. 17, T22S, R51W	288.0	288.0	10506, 10507	Las Animas	10	Above	LACC to JMD	ARF Headgate 49 (Horse Creek)		John Martin Reservoir
21	N ½, SE ¼ of Sec. 20, T22S, R51W	176.0	196.0	10438	Las Animas	10	Above	LACC to JMD	ARF Headgate 49 (Horse Creek)		John Martin Reservoir
22	N ½, SE ¼ and NE ¼, SW ¼ of Sec. 31, T22S, R51W	101.0	108.0	10477	Las Animas	10	Above	LACC to JMD	ARF Headgate 49 (Horse Creek)		Arkansas River
23	S ½, S ½ of Sec. 31, T22S, R51W	245.0	245.0	10483	Las Animas	10	Above	LACC to JMD	ARF Headgate 49 (Horse Creek)		Arkansas River
25	NW ¼, W ½, NE ¼, and S ½ of Sec. 11; and S ½ of Sec. 2, T22S, R48W	322.0	322.0	10505	Limestone	13	Below	Amity to Lamar	ARF Headgate 182 (Riverview)		Arkansas River
27	W ½ of Sec. 26 and NE ¼ of Sec. 35, T22S, R51W	660.0	660.0	10519, 10522, 10520, 10521	Las Animas	13	Below	LACC to JMD	Arkansas River Farms AUG at 126		John Martin Reservoir
30N	NW ¼ of Sec. 1, T22S, R48W	88.0	88.0	Portion of 10539	Limestone	13	Below	Wiley Drain		Farm 110	Wiley Drain
33	E ½ of Sec. 27; and N ½, NE ¼ of Sec. 34, T22S, R51W	104.0	108.0	10474, 10473	Las Animas	10	Above	LACC to JMD	ARF Headgate 125 (Gageby)		John Martin Reservoir
36	SW ¼ of Sec. 14, T22S, R51W	212.0	212.0	10469, 14070	Las Animas	10	Above	LACC to JMD	ARF Headgate 125 (Gageby)		Gageby Creek
37	E ½ of Sec. 10, T22S, R48W	144.0	144.0	10537	Limestone	12	Below	JMD to Amity	ARF Headgate 145 (HASTY) / Lubers Drain	Farm 132/133	Arkansas River
39N	portions of Sec. 12 and 24, T22S, R49W	191.0	200.0	10534	Limestone	12	Below	JMD to Amity	ARF Headgate 160 (Limestone)		Limestone Creek
40	E ½ of Sec. 29 and W ½ of Sec. 30, T23S, R54W	67.0	67.0	10486	La Junta	8	Above	Above LACC		Farm 60	Arkansas River
41	SE ¼ of Sec. 24, T22 S, R50 W	79.0	80.0	10452	Las Animas	10	Above	JMD to Amity	ARF Headgate 145 (HASTY) / Lubers Drain	Farm 132/133	Prowers Arroyo
42	W ½ of Sec. 28, T22 S, R48 W	166.0	166.0	10528	Limestone	12	Below	JMD to Amity	ARF Headgate 166 (McClave)		Arkansas River
53	E ½, SE ¼ of Sec. 27 and NW ¼ of Sec. 34, T22 S, R48 W	170.0	170.0	10498	Limestone	12	Below	JMD to Amity	ARF Headgate181 (Graveyard)		Arkansas River
54B	SE ¼ of Sec. 19, T22 S, R49 W	80.0	80.0	10471	Las Animas	10	Below	JMD to Amity	ARF Headgate 145 (HASTY) / Lubers Drain	Farm 132/133	Prowers Arroyo
57	SW ¼ of Sec. 6, T23 S, R53 W	83.0	83.0	10531	Horse Creek	8	Above	Above LACC		Farm 60	Arkansas River
58	S ½, NE ¼, and SE ¼ of Sec. 18, T22 S, R49 W	116.0	121.0	10526	Limestone	11	Below	JMD to Amity	ARF Headgate 145 (HASTY) / Lubers Drain	Farm 132/133	Prowers Arroyo
59	SW ¼ of Sec. 28, T22 S, R51 W	130.0	144.0	10489	Las Animas	10	Above	LACC to JMD	ARF Headgate 49 (Horse Creek)		Arkansas River
60a	SW ¼, SW ¼ of Sec. 11, T23 S, R54 W, and W ½ of Sec. 14, T23 S, R54 W	133.0	133.0	10453, 10454, 10455, 10456, 10457	Horse Creek	8	Above	Above LACC		Farm 60	Arkansas River
61	W ½ of Sec. 23 and NW ¼ of Sec. 26, T22 S, R53 W	399.0	400.0	10538	Horse Creek	9	Above	LACC to JMD	ARF Headgate 49 (Horse Creek)		Horse Creek
62	SE ¼, SW ¼ and S ½, SE ¼ of Sec. 17, T22 S, R46 W	237.0	237.0	10447, 10448	Lamar	14	Below	Below Lamar	ARF Headgate 259 (Wheatridge)		Arkansas River
63	W ½ of Sec. 33, T21 S, R47 W; and NW ¼ of Sec. 3 and NW ¼, the SW ¼, NE ¼, and S ½ of Sec. 10 in T22 S, R47 W	623.0	623.0	10494, 10495, 10496, 10497	Lamar	13	Below	Amity to Lamar		Farm 63 / Farm 110	Wiley Drain
64	N ½ of Sec. 32 and NW ¼ of Sec. 33, T22 S, R48 W	224.0	224.0	10442	Limestone	12	Below	JMD to Amity	ARF Headgate 166 (McClave)		Arkansas River
65	SE ¼ of Sec. 25, T22 S, R49 W	144.0	144.0	10458	Limestone	11	Below	JMD to Amity		Farm 65	Arkansas River
85	SE ¼ of Sec. 26, T21 S, R48 W	141.0	144.0	10561	Limestone	13	Below	JMD to Amity		Farm 110	Wiley Drain
110	S ½, SW ¼ and SE ¼ of Sec. 11, T21 S, R48 W	152.0	152.0	10460, 10461	Limestone	13	Below	Wiley Drain		Farm 110	Wiley Drain
114	N ½ of Sec. 11, T21 S, R48 W	144.0	144.0	10552	Limestone	13	Below	Wiley Drain		Farm 110	Wiley Drain
118	NW ¼ of Sec. 16, T22 S, R46 W	230.0	230.0	10445	Lamar	14	Below	Below Lamar	ARF Headgate 259 (Wheatridge)		Arkansas River
127	W ½, SW ¼ of Sec. 19, T22 S, R48 W	72.0	72.0	10492	Limestone	12	Below	JMD to Amity		Farm 65	Limestone Creek
132/133	S ½,NE ¼ and SE ¼ of Sec. 36, T22 S, R50 W	265.0	265.0	10463, 10560	Las Animas	10	Above	JMD to Amity	ARF Headgate 145 (HASTY) / Lubers Drain	Farm 132/133	John Martin Reservoir
141	NE ¼ and portions of NW ¼ of Sec. 17, T22 S, R46 W	224.0	224.0	10446	Lamar	14	Below	Below Lamar	ARF Headgate 259 (Wheatridge)		Arkansas River
Coen	SW ¼ of Sec. 26 and the E ½ of Sec. 27, T22 S, R48 W	144.0	144.0	9483 (will be revised)	Limestone	14	Below	JMD to Amity	ARF Headgate181 (Graveyard)		Arkansas River
		7,509.0	7,574.0								

Table 2
Direct Flow Water Rights
Fort Lyon Canal Company

Priority	Description	Case No.	Amount (cfs)	Appropriation Date	Decree Date	Pro-rata interest associated with the Trade Shares (cfs)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
4	Arkansas River Land, Reservoir, and Canal Co.	April 8, 1905	164.64	April 15, 1884	April 8, 1905	13.15
6	Arkansas River Land, Reservoir, and Canal Co.	April 8, 1905	597.16	March 1, 1887	April 8, 1905	47.71
25	Fort Lyon Canal Co.	April 8, 1905	171.20	August 31, 1893	April 8, 1905	13.68
	Total		933.00			74.54

Column Explanations:

1) Priority on the Arkansas River.
2) Owner of original adjudicated water right.
3) Case number, civil action number or decree date.
4) Amount of the original adjudicated water right.
5) Appropriation date for the water right.
6) Adjudication date of the water right.
7) LAWMA pro-rata interest in the direct flow water right calculated as Column 3 x 7,509 / 93,989.4166

Table 3
Storage Water Rights
Fort Lyon Canal Company

Storage Priority	Description	Case No.	Amount (cfs)	Volume (ac-ft)	Source	Appropriation Date	Decree Date	Pro-rata interest associated with the Trade Shares (cfs)	Pro-rata interest associated with the Trade Shares (af)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
10	Horse Creek Reservoir		2,000		Horse Creek	August 15, 1900	February 3, 1927	159.78	
27.5	Horse Creek Reservoir		840	11,400	Arkansas River	January 25, 1906	February 3, 1927	67.11	910.77
50	Horse Creek Reservoir		1,466		Arkansas River	March 1, 1910	February 3, 1927	117.12	
27.5	Horse Creek Reservoir 1st Enlargement		840		Arkansas River	January 25, 1906	February 3, 1927	67.11	
30.5	Horse Creek Reservoir 1st Enlargement		5,000	15,487	Horse Creek	December 20, 1907	February 3, 1927	399.46	1,237.29
50	Horse Creek Reservoir 1st Enlargement		1,466		Arkansas River	March 1, 1910	February 3, 1927	117.12	
37	Horse Creek Reservoir 2nd Enlargement		5,000		Horse Creek	June 12, 1908	February 3, 1927	399.46	
37	Horse Creek Reservoir 2nd Enlargement		840	1,113	Arkansas River	June 12, 1908	February 3, 1927	67.11	88.92
50	Horse Creek Reservoir 2nd Enlargement		1,466		Arkansas River	March 1, 1910	February 3, 1927	117.12	
27.5	Adobe Creek Reservoir		8,631		Adobe Creek	January 25, 1906	February 3, 1927	689.55	
27.5	Adobe Creek Reservoir		840	61,575	Arkansas River	January 25, 1906	February 3, 1927	67.11	4,919.35
50	Adobe Creek Reservoir		1,466		Arkansas River	March 1, 1910	February 3, 1927	117.12	
41	Adobe Creek Reservoir Enlargement		8,631		Adobe Creek	December 29, 1908	February 3, 1927	689.55	
41	Adobe Creek Reservoir Enlargement		840	25,425	Arkansas River	December 29, 1908	February 3, 1927	67.11	2,031.25
50	Adobe Creek Reservoir Enlargement		1,466		Arkansas River	March 1, 1910	February 3, 1927	117.12	
	Thurston Reservoir	W27 & 79CW85	355.2	1,515	Arkansas River	August 12, 1889		28.38	121.04
	Total		41,147	116,515				3,287.33	9,970.59

Column Explanations:

1) Reservoir Appropriation Priority per decree.
2) Water right structure.
3) Original water court case number.
4) Amount of the original adjudicated water right in cfs.
5) Volume of storage of the adjudicated water right in acre-feet.
6) Source of water for the water right.
7) Appropriation date for the water right.
8) Adjudication date of the water right.
9) LAWMA pro-rata interest in the direct flow water right calculated as Column 3 x 7,509 / 93,989.4166
10) LAWMA pro-rata interest in the direct flow water right calculated as Column 4 x 7,509 / 93,989.4166. This water would be delivered to the Main Canal as part of Fort Lyon Canal's normal operations.

Table 4
Other Water Rights
Fort Lyon Canal Company

Description	Case No.	Amount	Units	Source	Comment	Pro-rata interest associated with the Trade Shares (cfs)	Pro-rata interest associated with the Trade Shares (af)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Amity Mutual Irrigation Company - Queens Reservoir	80CW19 89CW76	5,483	af	Queen Reservoir Horse Creek Reservoir Adobe Creek Reservoir John Martin Reservoir			438.05
John Martin Reservoir Change	79CW160 79CW161 80CW51	5,000	af	Queen Reservoir Horse Creek Reservoir Adobe Creek Reservoir	Total cumulative amount		399.46
Change in Diversion Point	79CW178	933	cfs	Horse Creek Reservoir Adobe Creek Reservoir John Martin Reservoir		74.5	
Winter Water Storage Program	84CW179	38,160	af	Horse Creek Reservoir Adobe Creek Reservoir Thurston Reservoir	Of the fist 100,000 ac-ft and 38.16% of all water over 103,106 ac-ft		3,048.68
John Martin Reservoir Exchange	90CW47	544	cfs	John Martin Reservoir	Absolute, annual limit of 15,288.95 af	43.46	
John Martin Reservoir Exchange	90CW47	606	cfs	John Martin Reservoir	Conditional	48.41	
John Martin Reservoir 1980 Operating Plan	Arkansas River Compact Administration, 4/24/1980	20,000	af	John Martin Reservoir	Article III water		1,597.84
Fryingpan-Arkansas Project		Varies					
	Total					166.41	5,484.02

Column Explanations:

1) Description of water right or water source.
2) Water Court case number associated with the water right or water source.
3) Amount of water right or water source.
4) Units of Column 3.
5) Water source for associated water right or water source.
6) Additional comment relating to the water right.
7) LAWMA pro-rata interest in the direct flow water right calculated as Column 3 x 7,509 / 93,989.4166
8) LAWMA pro-rata interest in the direct flow water right calculated as Column 3 x 7,509 / 93,989.4166

Table 5
Annual Summary of Division of Water Resources Fort Lyon Canal Diversions
(units of ac-ft unless noted)

Irrigation Year	First Day	Last Day	Number of Days	Peak Day (cfs)	Average Day (cfs)	Annual (ac-ft)	Acres	Comments
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1950	1-Nov	31-Oct	362	1031.88	316.44	227,213		
1951	1-Nov	31-Oct	365	977.87	289.14	209,334		
1952	1-Nov	31-Oct	366	1103.00	310.26	225,237		
1953	1-Nov	31-Oct	365	1044.00	253.76	183,716		
1954	1-Nov	31-Oct	328	789.76	153.15	99,636		
1955	1-Nov	31-Oct	353	926.11	212.17	148,559		
1956	1-Nov	31-Oct	322	904.00	220.45	140,801		
1957	1-Nov	31-Oct	365	1122.59	388.59	281,333		
1958	1-Nov	31-Oct	292	1093.83	325.94	188,781		
1959	1-Nov	31-Oct	362	898.74	298.50	214,334		
1960	1-Nov	31-Oct	342	1002.16	273.43	185,485		
1961	1-Nov	31-Oct	364	1183.01	327.35	236,345		
1962	1-Nov	31-Oct	334	1115.11	387.27	256,559		
1963	1-Nov	31-Oct	364	1276.00	206.82	149,326		
1964	1-Nov	26-Oct	336	814.00	203.71	135,765		
1965	1-Nov	31-Oct	362	1224.56	360.49	258,840		
1966	1-Nov	31-Oct	337	1036.33	284.39	190,098		
1967	1-Nov	31-Oct	365	1117.42	324.04	234,599		
1968	3-Nov	31-Oct	364	963.33	322.05	232,517		
1969	1-Nov	6-Oct	340	1085.62	378.24	255,083		
1970	2-Nov	21-Oct	288	1211.00	463.17	264,584		
1971	1-Nov	31-Oct	365	901.26	316.79	229,346		
1972	1-Nov	31-Oct	328	1123.58	302.70	196,936		
1973	1-Nov	31-Oct	271	1284.06	444.91	239,153		
1974	1-Nov	31-Oct	312	948.76	240.16	148,621		
1975	1-Nov	31-Oct	365	1115.00	289.09	209,296		
1976	1-Nov	31-Oct	347	1181.03	208.41	143,444		
1977	1-Nov	31-Oct	336	1016.33	189.42	126,243		
1978	1-Nov	31-Oct	362	1483.34	220.60	158,399		
1979	1-Nov	31-Oct	288	1014.00	360.10	205,705		
1980	1-Nov	31-Oct	278	1644.03	452.36	249,436		
1981	1-Mar	31-Oct	245	978.44	338.08	164,294		
1982	1-Nov	31-Oct	269	1532.00	530.03	282,802		
1983	1-Nov	31-Oct	249	2033.81	735.64	363,329		
1984	1-Nov	31-Oct	250	1810.08	751.53	372,663		
1985	12-Nov	31-Oct	265	1972.13	741.46	389,731		
1986	1-Nov	31-Oct	255	1339.91	462.03	233,691		
1987	1-Nov	31-Oct	297	1302.88	578.28	340,664		
1988	1-Nov	31-Oct	335	1219.03	416.39	276,681		
1989	1-Nov	31-Oct	291	1050.87	332.65	192,004		
1990	1-Nov	31-Oct	275	1141.53	373.01	203,464		
1991	1-Nov	31-Oct	259	1008.18	400.30	205,645		
1992	1-Nov	31-Oct	242	1138.54	438.61	210,536		
1993	1-Nov	31-Oct	260	1091.12	503.84	259,835		
1994	1-Nov	31-Oct	275	1180.62	511.75	279,139		
1995	1-Nov	31-Oct	260	1586.44	723.71	373,225		
1996	1-Nov	31-Oct	323	1295.53	521.83	334,320		
1997	1-Nov	31-Oct	334	1605.74	574.49	380,594		
1998	3-Nov	31-Oct	351	1443.73	554.45	386,014		
1999	1-Nov	31-Oct	290	1461.65	697.90	401,443		
2000	1-Nov	31-Oct	359	1291.43	495.84	353,076		
2001	1-Nov	31-Oct	260	1055.62	389.94	201,097		
2002	1-Nov	31-Oct	197	510.74	201.23	78,631		
2003	1-Nov	31-Oct	248	1000.00	250.13	123,043		
2004	1-Nov	31-Oct	245	869.35	308.00	149,676		
2005	1-Nov	31-Oct	243	928.84	413.73	199,415		
2006	1-Nov	31-Oct	245	932.41	333.49	162,064		
2007	1-Nov	31-Oct	245	1018.19	583.27	283,444		
2008	1-Nov	31-Oct	324	974.62	373.28	239,893		
2009	1-Nov	31-Oct	245	960.50	445.24	216,368		
2010	1-Nov	31-Oct	244	1025.11	491.63	237,936		
2011	1-Nov	31-Oct	245	869.00	363.08	176,443		

Table 5
Annual Summary of Division of Water Resources Fort Lyon Canal Diversions
(units of ac-ft unless noted)

Irrigation Year	First Day	Last Day	Number of Days	Peak Day (cfs)	Average Day (cfs)	Annual (ac-ft)	Acres	Comments
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2012	1-Nov	31-Oct	178	694.00	232.32	82,023		
2013	1-Nov	31-Oct	245	928.00	280.59	136,353		
2014	1-Nov	31-Oct	245	940.00	418.66	203,449		
Avg	3-Nov	30-Oct	303	1138.78	385.50	226,785		
Max	1-Nov	31-Oct	366	2033.81	751.53	401,443		
Min	1-Mar	6-Oct	178	510.74	153.15	78,631		

Column Explanations
1) November 1 through October 31 Irrigation Year
2) First day water was diverted by ditch in the November 1 through October 31 Irrigation Year.
3) Last day water was diverted by ditch in the November 1 through October 31 Irrigation Year.
4) Number of days water was diverted by ditch.
5) Maximum rate of diversion.
6) Average daily diversion rate.
7) Annual diversions in acre-feet.
8) Reported acres that could be irrigated.
9) Comments from the Division of Water Resources diversion records.

Table 6
Fort Lyon Canal River Headgate Diversions
(values in ac-ft)

Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual	Apr-Oct Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1950	24,818	15,281	7,490	9,488	9,035	8,745	17,564	42,129	33,411	9,999	11,973	9,158	199,090	132,979
1951	9,987	12,203	10,261	10,501	10,878	8,513	23,266	28,238	37,218	22,572	8,422	9,910	191,969	138,139
1952	16,146	9,847	10,254	10,663	9,842	13,148	39,740	47,567	27,648	17,080	10,040	10,124	222,099	165,347
1953	11,388	15,187	11,824	11,631	9,315	9,729	13,153	43,127	26,358	21,960	4,356	5,631	183,659	124,314
1954	12,399	7,897	5,068	10,919	9,981	2,989	12,364	9,880	12,310	9,980	6	5,843	99,636	53,372
1955	6,857	9,904	10,699	8,571	7,720	1,327	5,940	35,237	13,532	28,410	8,632	8,061	144,890	101,139
1956	11,191	14,000	13,080	6,685	11,796	8,148	19,783	33,993	11,463	8,817	0	1,845	140,801	84,049
1957	8,604	10,457	9,779	10,626	7,541	24,300	29,410	30,837	53,724	53,157	27,356	10,369	276,160	229,153
1958	3,779	7,464	0	796	0	6,988	16,870	43,122	23,767	13,149	11,360	10,770	138,065	126,026
1959	16,095	23,113	4,051	3,685	14,207	16,572	17,909	42,715	13,688	5,724	1,053	30,344	189,156	128,005
1960	25,617	26,041	4,250	2,266	4,547	9,588	17,792	42,049	25,365	6,276	8,075	11,395	183,261	120,540
1961	17,159	17,717	3,716	7,393	21,757	15,196	17,903	39,728	17,828	28,709	27,049	18,792	232,947	165,205
1962	21,078	5,884	0	8,786	14,094	31,615	39,396	38,953	42,627	14,150	9,699	10,114	236,396	186,554
1963	17,215	20,638	6,284	20,185	17,175	5,695	7,621	12,732	5,778	11,584	15,904	5,951	146,762	65,265
1964	9,880	11,543	14,729	14,366	12,058	8,840	10,428	29,560	9,636	10,544	2,120	2,059	135,763	73,187
1965	8,868	15,489	15,699	16,751	16,402	8,799	16,015	22,454	42,638	32,244	27,167	20,529	243,055	169,846
1966	15,959	11,663	370	0	4,835	9,838	18,302	24,145	17,883	29,715	12,660	13,656	159,026	126,199
1967	13,018	17,563	17,410	13,704	9,007	5,397	12,341	29,984	40,832	16,919	16,737	11,135	204,047	133,345
1968	15,507	17,703	16,687	23,147	16,086	10,971	11,262	42,402	18,183	32,612	9,921	10,405	224,886	135,756
1969	21,757	16,968	16,257	14,942	9,869	9,820	35,077	38,819	44,798	22,713	14,013	2,775	247,808	168,015
1970	286	3,985	2,211	19,277	19,373	29,391	40,319	35,694	41,572	20,497	21,156	5,400	239,161	194,029
1971	15,095	19,863	8,188	10,380	15,449	10,108	11,137	38,426	39,400	13,170	9,822	10,548	201,586	132,611
1972	31,349	10,391	1,222	9,061	12,256	9,299	11,530	41,326	16,907	11,613	11,853	9,370	176,177	111,898
1973	13,479	205	682	1,117	22,785	11,830	34,520	43,514	48,080	19,185	10,832	11,429	217,658	179,390
1974	12,956	9,038	243	8,110	25,042	10,493	12,458	22,529	10,903	7,156	2,836	8,063	129,827	74,438
1975	12,290	20,136	12,419	16,378	12,185	8,977	7,496	37,492	44,110	18,673	9,701	9,439	209,296	135,888
1976	9,115	413	4,735	14,420	10,917	9,949	11,260	22,568	10,903	17,047	9,739	10,526	131,592	91,992
1977	21,775	9,432	3,848	9,287	10,717	7,275	8,398	9,080	7,291	18,732	3,392	5,486	114,713	59,654
1978	9,332	12,520	16,177	9,561	8,349	3,360	8,739	39,507	27,162	15,263	4,257	4,171	158,398	102,459
1979	9,116	4,021	0	0	10,850	9,731	17,895	49,738	41,505	18,972	9,763	10,870	182,461	158,474
1980	26,145	4,862	0	0	9,203	18,437	16,691	33,220	44,397	28,987	11,242	11,556	204,740	164,530
1981	0	0	0	0	5,298	6,472	8,111	11,546	10,342	35,560	12,647	10,029	100,005	94,707
1982	20,107	0	0	0	10,144	7,698	12,357	40,920	33,364	58,560	37,255	41,421	261,826	231,575
1983	23,290	0	0	0	5,512	24,518	48,858	57,661	55,861	56,379	20,353	10,205	302,637	273,835
1984	21,424	0	0	0	2,524	26,968	47,601	46,558	56,900	66,375	32,441	28,684	329,475	305,527
1985	1,575	0	0	1,214	31,587	42,094	47,728	51,595	55,844	43,201	20,456	17,577	312,871	278,495
1986	7,135	0	0	0	5,541	13,152	16,707	29,651	49,335	31,755	21,814	21,213	196,303	183,627
1987	3,367	0	4,236	4,050	3,335	39,707	45,509	47,382	37,590	26,322	32,677	25,556	269,731	254,743
1988	21,562	0	0	0	14,362	30,285	22,873	44,803	25,074	14,058	11,241	10,442	194,700	158,776
1989	12,340	0	0	0	13,556	10,387	23,614	37,939	12,467	12,228	9,395	10,387	142,313	116,417
1990	10,472	0	0	0	5,251	11,885	23,904	42,578	32,000	20,108	9,776	14,309	170,283	154,560
1991	20,223	0	0	0	8,802	9,426	14,607	36,117	15,382	27,802	10,044	10,067	152,470	123,445
1992	5,916	0	0	0	12,738	19,107	19,922	41,556	18,990	17,382	14,393	10,388	160,392	141,738
1993	15,240	0	0	0	10,662	23,686	31,491	42,218	41,144	13,330	11,367	15,942	205,080	179,178
1994	15,911	0	0	0	6,734	25,057	29,101	50,147	12,438	12,382	17,791	16,257	185,818	163,173
1995	15,956	0	0	0	7,596	27,104	36,936	25,294	48,900	48,731	44,404	38,870	293,791	270,239
1996	32,672	428	0	0	8,275	20,137	28,233	37,567	39,818	19,813	17,670	18,232	222,845	181,470
1997	10,241	0	0	0	14,423	21,300	45,646	52,065	45,411	27,099	33,630	20,539	270,354	245,690
1998	3,750	934	5,054	15	204	13,083	55,673	44,010	42,890	20,558	21,694	22,939	230,804	220,847
1999	5,106	0	3,144	1,866	7,332	18,685	15,955	54,944	53,926	53,928	37,519	21,756	274,161	256,713
2000	25,854	1,147	8,143	4,624	24,249	41,799	45,510	43,861	19,562	15,194	11,620	11,133	252,696	188,679
2001	11,072	0	0	0	7,761	11,963	37,643	28,840	15,297	10,517	9,616	10,169	142,878	124,045
2002	12,046	0	0	0	8,085	12,155	9,782	7,658	1,931	129	402	2,744	54,932	34,801
2003	4,864	0	0	0	5,697	20,852	26,300	39,068	9,724	3,487	7,618	5,435	123,045	112,484
2004	4,645	0	0	0	6,645	22,382	24,120	26,033	26,735	20,114	8,943	10,060	149,677	138,387
2005	8,423	0	0	0	10,896	34,934	35,303	40,658	34,134	19,514	6,105	9,446	199,413	180,094
2006	9,517	0	0	0	7,629	8,582	21,948	24,427	18,915	17,357	11,251	17,475	137,101	119,955
2007	15,901	0	0	0	10,282	30,563	48,434	48,878	23,782	32,497	9,953	10,325	230,615	204,432

Table 6
Fort Lyon Canal River Headgate Diversions
(values in ac-ft)

Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual	Apr-Oct Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
2008	10,488	0	0	0	16,223	19,177	18,580	45,384	33,055	24,822	10,043	15,523	193,295	166,584
2009	9,790	0	0	0	6,677	17,832	29,870	46,978	28,317	11,985	9,987	17,767	179,203	162,736
2010	16,720	0	0	0	12,215	42,630	29,931	43,407	13,901	23,425	8,065	9,908	200,202	171,267
2011	5,599	0	0	0	7,239	14,872	9,850	39,678	39,808	14,838	10,940	10,534	153,358	140,520
2012	12,335	0	0	0	7,004	13,218	12,039	7,023	1,380	1,396	480	2,975	57,850	38,511
2013	4,378	0	0	0	9,119	17,322	19,974	24,107	9,890	22,542	18,619	10,401	136,352	122,855
2014	6,119	0	0	0	5,659	18,355	24,816	46,547	40,275	27,582	10,048	12,835	192,236	180,458
Average	13,112	5,907	3,819	4,838	10,654	16,345	23,562	36,275	28,543	22,101	13,560	12,727	191,443	153,113
Maximum	32,672	26,041	17,410	23,147	31,587	42,630	55,673	57,661	56,900	66,375	44,404	41,421	329,475	305,527
Minimum	0	0	0	0	0	1,327	5,940	7,023	1,380	129	0	1,845	54,932	34,801
1979-2014														
Average	12,203	316	572	327	9,425	20,710	27,875	38,613	30,286	24,970	15,868	15,110	196,275	173,432
Maximum	32,672	4,862	8,143	4,624	31,587	42,630	55,673	57,661	56,900	66,375	44,404	41,421	329,475	305,527
Minimum	0	0	0	0	204	6,472	8,111	7,023	1,380	129	402	2,744	54,932	34,801

Note:

Table 7
Fort Lyon Canal Horse Creek Reservoir Releases for Irrigation
(values in ac-ft)

Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual	Apr-Oct Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1950	0	0	0	0	0	631	0	0	0	1,100	1,106	0	2,837	2,837
1951	0	0	0	0	0	0	0	50	0	2,790	3,590	0	6,430	6,430
1952	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	0	0	0	0	2,960	709	3,669	3,669
1956	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1957	0	0	0	0	0	0	0	0	0	0	0	991	991	991
1958	0	0	0	0	0	218	1,396	581	5,424	5,844	5,277	0	18,740	18,740
1959	0	0	0	0	0	325	2,659	0	0	0	0	0	2,984	2,984
1960	0	0	0	0	0	0	0	0	48	2,166	0	0	2,214	2,214
1961	0	0	0	0	0	0	0	0	56	391	0	0	447	447
1962	0	0	0	0	0	0	0	0	0	4,485	3,892	3,098	11,475	11,475
1963	0	0	0	0	0	1,677	0	0	0	0	0	0	1,677	1,677
1964	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	9,196	6,590	0	15,786	15,786
1966	0	0	0	0	0	1,496	3,317	1,847	1,699	0	205	0	8,564	8,564
1967	0	0	0	0	0	1,546	600	0	0	5,810	3,105	0	11,061	11,061
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	7,324	4,270	0	11,594	11,594
1971	0	0	0	0	0	0	0	0	0	4,294	0	0	4,294	4,294
1972	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	1,538	0	0	1,538	1,538
1974	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	5,600	6,250	0	0	0	0	11,850	11,850
1977	0	0	0	0	2,678	5,709	2,128	0	0	1,004	10	0	11,529	8,851
1978	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	8,666	7,279	0	0	4,813	2,487	0	23,245	23,245
1980	0	1,503	0	0	0	0	0	0	17,222	16,399	3,041	0	38,165	36,662
1981	0	0	0	0	0	8,644	9,456	2,762	0	0	0	308	21,170	21,170
1982	0	0	0	0	1,530	12,413	3,741	0	1,356	0	1,017	0	20,057	18,527
1983	0	0	0	0	0	0	0	0	0	2,323	14,451	6,500	23,274	23,274
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	669	5,224	11,103	5,476	12,350	0	34,822	34,822
1986	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	506	0	0	6,025	10,788	0	4,686	3,225	0	0	25,230	24,724
1989	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	2,955	3,933	0	6,888	6,888
1996	0	0	0	0	1,728	14,498	6,767	0	3,277	1,549	0	0	27,819	26,091
1997	0	0	0	0	0	0	0	0	7,313	0	951	0	8,264	8,264
1998	0	0	0	0	0	0	0	1,841	6,323	0	2,143	0	10,307	10,307
1999	0	0	0	0	2,751	7,041	0	0	1,006	105	0	0	10,903	8,152
2000	402	40	0	0	845	173	0	0	4,544	2,465	3,538	6,132	18,139	16,852
2001	354	0	0	0	0	0	0	0	0	0	0	0	354	0
2002	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 7
Fort Lyon Canal Horse Creek Reservoir Releases for Irrigation
(values in ac-ft)

Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual	Apr-Oct Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
2008	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average	12	24	8	0	147	1,062	837	285	985	1,312	1,153	273	6,097	5,907
Maximum	402	1,503	506	0	2,751	14,498	10,788	6,250	17,222	16,399	14,451	6,500	38,165	36,662
Minimum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979-2014														
Average	21	43	14	0	190	1,596	1,075	273	1,579	1,092	1,220	359	7,462	7,194
Maximum	402	1,503	506	0	2,751	14,498	10,788	5,224	17,222	16,399	14,451	6,500	38,165	36,662
Minimum	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note:

Table 8
Fort Lyon Canal Adobe Creek Reservoir Releases for Irrigation
(values in ac-ft)

Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual	Apr-Oct Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1950	0	0	0	0	0	6,252	2,913	0	0	6,718	3,784	2,980	22,647	22,647
1951	1,070	626	248	132	310	540	812	0	0	0	3,527	2,545	9,810	7,424
1952	0	0	0	0	0	756	0	0	300	408	720	266	2,450	2,450
1953	40	0	0	0	0	0	0	0	0	0	0	0	40	0
1954	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1956	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1957	0	0	0	0	0	0	0	0	0	0	0	546	546	546
1958	0	0	0	0	0	0	0	847	5,814	14,666	5,954	1,204	28,485	28,485
1959	0	0	0	0	0	0	1,788	0	7,890	8,959	214	0	18,851	18,851
1960	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0	1,084	524	0	0	1,608	1,608
1962	0	0	0	0	0	0	0	0	0	5,181	206	0	5,387	5,387
1963	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	9,196	6,590	0	15,786	15,786
1966	0	0	0	0	0	0	0	3,970	9,827	520	4,849	0	19,166	19,166
1967	0	0	0	0	1,332	6,178	6,800	0	0	2,020	0	0	16,330	14,998
1968	0	0	0	0	0	0	1,294	0	2,298	0	2,031	0	5,623	5,623
1969	0	0	0	0	0	0	0	0	0	2,172	3,478	0	5,650	5,650
1970	0	0	0	0	0	0	0	0	0	5,744	4,760	0	10,504	10,504
1971	0	0	0	0	0	6,174	3,934	0	0	9,964	0	0	20,072	20,072
1972	0	0	0	0	0	1,984	7,362	0	0	0	0	0	9,346	9,346
1973	0	0	0	0	0	0	0	0	0	7,296	9,466	0	16,762	16,762
1974	0	0	0	0	0	952	6,614	0	5,160	2,216	110	0	15,052	15,052
1975	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	181	9,043	10,008	2,615	21,847	21,847
1981	0	0	0	0	6,478	17,240	4,426	5,560	6,114	1,134	558	1,610	43,120	36,642
1982	0	0	0	0	0	0	0	0	0	0	1,900	0	1,900	1,900
1983	0	0	0	0	0	0	0	0	5,418	17,827	6,135	7,150	36,530	36,530
1984	0	0	0	0	0	0	0	23,272	6,583	5,251	6,780	1,302	43,188	43,188
1985	0	0	0	0	0	0	0	2,587	8,766	13,346	16,540	0	41,239	41,239
1986	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	301	0	65	0	0	3,113	5,285	0	7,973	11,799	16,500	2,839	47,875	47,509
1989	0	0	1	0	2,633	21,691	9,113	0	5,693	7,606	4,794	151	51,682	49,048
1990	471	0	0	0	0	0	2,739	1,274	5,413	15,689	5,984	0	31,570	31,099
1991	0	0	0	0	0	15,058	8,207	0	0	4,976	11,328	3,031	42,600	42,600
1992	0	0	0	0	0	11,969	18,319	0	1,945	3,841	557	0	36,631	36,631
1993	0	0	0	0	0	0	8,027	0	8,035	5,403	10,648	13,861	45,974	45,974
1994	0	0	0	0	3,960	7,724	6,036	339	20,732	19,556	4,055	1,333	63,735	59,775
1995	0	0	0	0	0	1,116	0	0	5,102	17,555	2,666	0	26,439	26,439
1996	0	0	0	2,395	39	3,705	8,802	6,582	8,720	2,548	4,165	6,217	43,173	40,739
1997	3,854	0	0	0	2,709	3,757	102	870	16,373	0	6,655	700	35,020	28,457
1998	0	0	0	0	0	0	0	9,835	9,070	1,474	11,852	1,429	33,660	33,660
1999	0	0	0	0	0	884	3,328	0	5,559	219	3,697	1,261	14,948	14,948
2000	945	0	0	0	0	0	0	6,021	10,619	7,489	6,806	1,857	33,737	32,792
2001	0	0	0	0	0	1,650	3,336	5,365	18,054	12,783	12,386	1,907	55,481	55,481
2002	0	0	0	0	0	7,869	9,576	4,360	1,895	0	0	0	23,700	23,700
2003	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	0	0	0	0	0	12,212	7,289	916	1,129	1,471	1,111	835	24,963	24,963
2007	0	0	0	0	0	0	0	0	12,716	14,914	15,967	9,232	52,829	52,829

Table 8
Fort Lyon Canal Adobe Creek Reservoir Releases for Irrigation
(values in ac-ft)

Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual	Apr-Oct Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
2008	121	149	201	58	108	12,365	17,315	685	3,677	7,070	3,505	1,343	46,597	45,960
2009	48	0	0	0	1,209	4,747	6,705	694	7,751	7,809	6,564	1,638	37,165	35,908
2010	0	0	0	0	0	0	0	2,049	15,257	9,246	9,810	1,371	37,733	37,733
2011	0	0	0	0	0	3,970	8,239	986	1,645	6,935	1,310	0	23,085	23,085
2012	0	0	0	0	0	4,082	10,794	8,260	639	396	0	0	24,171	24,171
2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	2,861	0	1,362	4,283	2,124	582	11,212	11,212
Average	105	12	8	40	289	2,400	2,646	1,300	3,520	4,388	3,540	1,074	19,322	18,868
Maximum	3,854	626	248	2,395	6,478	21,691	18,319	23,272	20,732	19,556	16,540	13,861	63,735	59,775
Minimum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979-2014														
Average	159	4	7	68	476	3,699	3,903	2,213	5,456	5,824	5,122	1,730	28,661	27,946
Maximum	3,854	149	201	2,395	6,478	21,691	18,319	23,272	20,732	19,556	16,540	13,861	63,735	59,775
Minimum	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note:

Table 9
Fort Lyon Canal Queens Reservoir Releases for Irrigation
(values in ac-ft)

Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual	Apr-Oct Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1950	0	0	0	0	0	330	120	112	82	347	873	776	2,640	2,640
1951	0	0	0	0	0	0	0	0	0	830	214	32	1,076	1,076
1952	0	0	0	0	0	0	0	0	398	234	55	0	687	687
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1956	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1957	0	0	0	0	0	97	371	346	836	1,034	738	213	3,635	3,635
1958	0	0	0	0	0	0	0	1,436	1,493	562	0	0	3,491	3,491
1959	0	0	0	0	0	182	369	52	729	912	1,049	0	3,293	3,293
1960	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	431	0	0	913	0	0	1,344	1,344
1962	0	0	0	0	0	235	0	0	314	1,135	768	848	3,300	3,300
1963	0	0	0	0	0	0	497	220	172	0	0	0	889	889
1964	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	943	371	1,530	0	498	0	3,342	3,342
1967	0	0	0	0	0	0	0	0	0	1,442	1,207	511	3,160	3,160
1968	0	0	0	0	0	0	0	0	270	205	1,214	317	2,006	2,006
1969	0	0	0	0	0	0	0	0	0	1,002	624	0	1,626	1,626
1970	0	0	0	0	0	0	0	0	0	1,871	1,454	0	3,325	3,325
1971	0	0	0	0	0	693	826	0	0	1,253	621	0	3,393	3,393
1972	0	0	0	0	0	717	1,030	10	8,890	687	77	0	11,411	11,411
1973	0	0	0	0	0	0	0	0	0	1,315	1,018	864	3,197	3,197
1974	0	0	0	0	0	0	1,488	512	1,703	38	0	0	3,741	3,741
1975	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	24	90	84	204	253	180	52	887	887
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	200	600	0	800	800
1986	0	0	0	0	0	0	643	0	0	0	0	0	643	643
1987	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	328	0	423	0	0	0	751	751
1989	0	0	0	0	0	0	434	0	0	0	0	0	434	434
1990	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	1,014	0	0	0	0	0	1,014	1,014
1999	0	0	0	0	0	319	0	407	1,139	105	0	0	1,970	1,970
2000	0	0	0	0	0	0	0	942	1,108	0	0	0	2,050	2,050
2001	0	0	0	0	0	511	460	1,413	0	0	0	0	2,384	2,384
2002	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9
Fort Lyon Canal Queens Reservoir Releases for Irrigation
(values in ac-ft)

Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual	Apr-Oct Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
2008	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average	0	0	0	0	0	48	139	91	297	221	172	56	1,023	1,023
Maximum	0	0	0	0	0	717	1,488	1,436	8,890	1,871	1,454	864	11,411	11,411
Minimum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979-2014														
Average	0	0	0	0	0	24	82	79	80	16	22	1	304	304
Maximum	0	0	0	0	0	511	1,014	1,413	1,139	253	600	52	2,384	2,384
Minimum	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note:

Table 10
Fort Lyon Canal Thurston Reservoir Releases for Irrigation
(values in ac-ft)

Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual	Apr-Oct Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1950	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1952	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1956	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1957	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1958	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	151	0	0	0	0	0	151	151
1985	0	0	0	0	0	0	0	0	0	23	45	6	74	74
1986	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	25	0	0	0	0	0	0	25	25
1996	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0	228	159	25	412	412
1998	0	59	603	0	0	0	0	0	40	179	0	0	881	219
1999	0	0	0	0	0	416	738	524	0	0	0	285	1,963	1,963
2000	0	0	0	0	139	95	302	0	0	0	0	0	536	397
2001	0	0	0	0	0	0	16	1,031	0	0	0	0	1,047	1,047
2002	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 10
Fort Lyon Canal Thurston Reservoir Releases for Irrigation
(values in ac-ft)

Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual	Apr-Oct Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
2008	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average	0	1	9	0	2	8	19	24	1	7	3	5	78	66
Maximum	0	59	603	0	139	416	738	1,031	40	228	159	285	1,963	1,963
Minimum	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979-2014														
Average	0	2	17	0	4	15	34	43	1	12	6	9	141	119
Maximum	0	59	603	0	139	416	738	1,031	40	228	159	285	1,963	1,963
Minimum	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note:

Table 11
National Agricultural Statistics Service Crop Mix for the Fort Lyon Canal

Year	Alfalfa	Corn Grain	Corn Silage	Sorghum	Wheat	Dry Beans	Spring Grains	Sugar Beets	Vegetables	Pasture Grass	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1950	47.0%	7.0%	9.0%	13.0%	7.0%	0.0%	8.0%	4.0%	1.0%	4.0%	100.0%
1951	47.0%	7.0%	9.0%	13.0%	7.0%	0.0%	8.0%	4.0%	1.0%	4.0%	100.0%
1952	47.0%	7.0%	9.0%	13.0%	7.0%	0.0%	8.0%	4.0%	1.0%	4.0%	100.0%
1953	47.0%	7.0%	9.0%	13.0%	7.0%	0.0%	8.0%	4.0%	1.0%	4.0%	100.0%
1954	47.0%	7.0%	9.0%	13.0%	7.0%	0.0%	8.0%	4.0%	1.0%	4.0%	100.0%
1955	47.0%	7.0%	9.0%	13.0%	7.0%	0.0%	8.0%	4.0%	1.0%	4.0%	100.0%
1956	47.0%	7.0%	9.0%	13.0%	7.0%	0.0%	8.0%	4.0%	1.0%	4.0%	100.0%
1957	47.0%	7.0%	9.0%	13.0%	7.0%	0.0%	8.0%	4.0%	1.0%	4.0%	100.0%
1958	47.0%	7.0%	9.0%	13.0%	7.0%	0.0%	8.0%	4.0%	1.0%	4.0%	100.0%
1959	47.0%	7.0%	9.0%	13.0%	7.0%	0.0%	8.0%	4.0%	1.0%	4.0%	100.0%
1960	47.0%	7.0%	9.0%	13.0%	7.0%	0.0%	8.0%	4.0%	1.0%	4.0%	100.0%
1961	38.0%	2.0%	10.0%	27.0%	13.0%	0.0%	1.0%	2.0%	2.0%	5.0%	100.0%
1962	38.0%	2.0%	10.0%	27.0%	13.0%	0.0%	1.0%	2.0%	2.0%	5.0%	100.0%
1963	38.0%	2.0%	10.0%	27.0%	13.0%	0.0%	1.0%	2.0%	2.0%	5.0%	100.0%
1964	38.0%	2.0%	10.0%	27.0%	13.0%	0.0%	1.0%	2.0%	2.0%	5.0%	100.0%
1965	38.0%	2.0%	10.0%	27.0%	13.0%	0.0%	1.0%	2.0%	2.0%	5.0%	100.0%
1966	38.0%	2.0%	10.0%	27.0%	13.0%	0.0%	1.0%	2.0%	2.0%	5.0%	100.0%
1967	38.0%	2.0%	10.0%	27.0%	13.0%	0.0%	1.0%	2.0%	2.0%	5.0%	100.0%
1968	38.0%	2.0%	10.0%	27.0%	13.0%	0.0%	1.0%	2.0%	2.0%	5.0%	100.0%
1969	38.0%	2.0%	10.0%	27.0%	13.0%	0.0%	1.0%	2.0%	2.0%	5.0%	100.0%
1970	38.0%	2.0%	10.0%	27.0%	13.0%	0.0%	1.0%	2.0%	2.0%	5.0%	100.0%
1971	45.0%	6.0%	6.0%	22.0%	11.0%	0.0%	2.0%	2.0%	1.0%	5.0%	100.0%
1972	45.0%	6.0%	6.0%	22.0%	11.0%	0.0%	2.0%	2.0%	1.0%	5.0%	100.0%
1973	45.0%	6.0%	6.0%	22.0%	11.0%	0.0%	2.0%	2.0%	1.0%	5.0%	100.0%
1974	45.0%	6.0%	6.0%	22.0%	11.0%	0.0%	2.0%	2.0%	1.0%	5.0%	100.0%
1975	45.0%	6.0%	6.0%	22.0%	11.0%	0.0%	2.0%	2.0%	1.0%	5.0%	100.0%
1976	45.0%	6.0%	6.0%	22.0%	11.0%	0.0%	2.0%	2.0%	1.0%	5.0%	100.0%
1977	45.0%	6.0%	6.0%	22.0%	11.0%	0.0%	2.0%	2.0%	1.0%	5.0%	100.0%
1978	45.0%	6.0%	6.0%	22.0%	11.0%	0.0%	2.0%	2.0%	1.0%	5.0%	100.0%
1979	47.0%	6.0%	5.0%	21.0%	12.0%	0.0%	4.0%	0.0%	0.0%	5.0%	100.0%
1980	47.0%	6.0%	5.0%	21.0%	12.0%	0.0%	4.0%	0.0%	0.0%	5.0%	100.0%
1981	47.0%	6.0%	5.0%	21.0%	12.0%	0.0%	4.0%	0.0%	0.0%	5.0%	100.0%
1982	47.0%	6.0%	5.0%	21.0%	12.0%	0.0%	4.0%	0.0%	0.0%	5.0%	100.0%
1983	47.0%	6.0%	5.0%	21.0%	12.0%	0.0%	4.0%	0.0%	0.0%	5.0%	100.0%
1984	47.0%	6.0%	5.0%	21.0%	12.0%	0.0%	4.0%	0.0%	0.0%	5.0%	100.0%
1985	47.0%	6.0%	5.0%	21.0%	12.0%	0.0%	4.0%	0.0%	0.0%	5.0%	100.0%
1986	47.0%	6.0%	5.0%	21.0%	12.0%	0.0%	4.0%	0.0%	0.0%	5.0%	100.0%
1987	57.2%	14.9%	5.9%	10.9%	6.7%	0.3%	1.0%	0.0%	0.6%	2.5%	100.0%
1988	57.2%	14.9%	5.9%	10.9%	6.7%	0.3%	1.0%	0.0%	0.6%	2.5%	100.0%
1989	57.2%	14.9%	5.9%	10.9%	6.7%	0.3%	1.0%	0.0%	0.6%	2.5%	100.0%
1990	57.2%	14.9%	5.9%	10.9%	6.7%	0.3%	1.0%	0.0%	0.6%	2.5%	100.0%
1991	57.2%	14.9%	5.9%	10.9%	6.7%	0.3%	1.0%	0.0%	0.6%	2.5%	100.0%
1992	57.2%	14.9%	5.9%	10.9%	6.7%	0.3%	1.0%	0.0%	0.6%	2.5%	100.0%
1993	57.2%	14.9%	5.9%	10.9%	6.7%	0.3%	1.0%	0.0%	0.6%	2.5%	100.0%
1994	57.2%	14.9%	5.9%	10.9%	6.7%	0.3%	1.0%	0.0%	0.6%	2.5%	100.0%
1995	62.3%	13.5%	5.0%	6.5%	8.2%	0.1%	0.8%	0.0%	0.6%	3.0%	100.0%
1996	62.3%	13.5%	5.0%	6.5%	8.2%	0.1%	0.8%	0.0%	0.6%	3.0%	100.0%
1997	56.3%	19.7%	3.2%	4.0%	9.1%	0.1%	0.2%	0.0%	1.0%	6.5%	100.0%
1998	57.5%	22.6%	2.4%	2.4%	8.1%	0.1%	0.3%	0.0%	1.1%	5.7%	100.0%
1999	54.3%	22.8%	2.1%	2.9%	10.3%	0.1%	0.2%	0.0%	1.0%	6.2%	100.0%
2000	52.7%	23.7%	4.6%	5.4%	8.3%	0.1%	0.2%	0.0%	1.0%	3.9%	100.0%
2001	58.1%	16.6%	1.5%	7.2%	9.1%	0.1%	0.4%	0.0%	1.0%	6.0%	100.0%
2002	65.4%	8.7%	10.3%	3.2%	7.4%	0.1%	0.2%	0.0%	1.0%	3.7%	100.0%
2003	70.5%	1.7%	2.6%	2.6%	11.8%	0.0%	0.1%	0.0%	1.2%	9.4%	100.0%
2004	84.0%	3.5%	1.1%	4.0%	6.1%	0.0%	0.0%	0.0%	1.4%	0.0%	100.0%

Table 11
National Agricultural Statistics Service Crop Mix for the Fort Lyon Canal

Year	Alfalfa	Corn Grain	Corn Silage	Sorghum	Wheat	Dry Beans	Spring Grains	Sugar Beets	Vegetables	Pasture Grass	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
2005	63.1%	14.5%	3.2%	4.5%	10.5%	0.1%	0.0%	0.0%	0.7%	3.4%	100.0%
2006	65.4%	4.2%	2.9%	3.8%	6.8%	0.0%	0.0%	0.0%	0.9%	16.1%	100.0%
2007	53.5%	16.5%	1.7%	6.8%	11.3%	0.0%	0.0%	0.0%	0.4%	9.9%	100.0%
2008	49.7%	17.5%	1.6%	6.6%	14.1%	0.0%	0.0%	0.0%	0.4%	10.1%	100.0%
2009	49.1%	16.3%	1.1%	6.2%	17.2%	0.0%	0.0%	0.0%	0.4%	9.6%	100.0%
2010	49.1%	16.3%	1.1%	6.2%	17.2%	0.0%	0.0%	0.0%	0.4%	9.6%	100.0%
2011	58.9%	12.5%	0.8%	7.0%	13.8%	0.0%	0.6%	0.0%	0.4%	6.1%	100.0%
2012	68.8%	6.9%	0.4%	4.9%	10.8%	0.0%	0.9%	0.0%	0.0%	7.3%	100.0%
2013	68.8%	0.1%	0.0%	3.0%	20.8%	0.0%	0.1%	0.0%	0.0%	7.3%	100.0%
2014	68.8%	0.1%	0.0%	3.0%	20.8%	0.0%	0.1%	0.0%	0.0%	7.3%	100.0%
Average	50.9%	8.7%	5.9%	14.5%	10.4%	0.1%	2.5%	1.2%	0.9%	5.0%	100.0%
Maximum	84.0%	23.7%	10.3%	27.0%	20.8%	0.3%	8.0%	4.0%	2.0%	16.1%	100.0%
Minimum	38.0%	0.1%	0.0%	2.4%	6.1%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%

Source of Rooting Depth is the "Colorado Irrigation Guide" & "National Engineering Handbook Part 652" Weighed Avg

Rooting Depth (ft)	6	4	4	4	4	3	3	4	3	3	4.9

Note:
a) Crop statistics are weighted for the Fort Lyon Canal as 6%, Otero County, 56% from Bent County and 38% from Prowers County

Table 12
Potential Evapotranspiration For Weighted Crop Mix
Fort Lyon Canal
(values in inches)

Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1950	0.50	0.41	0.41	0.54	0.79	3.25	4.78	7.36	6.86	5.34	3.18	1.44	34.86
1951	0.50	0.47	0.38	0.50	0.73	2.77	4.97	5.75	7.54	6.04	3.13	1.10	33.89
1952	0.49	0.41	0.47	0.49	0.74	3.17	4.86	8.56	7.76	6.37	3.60	1.14	38.06
1953	0.46	0.43	0.54	0.48	0.89	2.76	4.48	8.20	8.04	5.99	3.67	1.32	37.25
1954	0.56	0.40	0.41	0.60	0.78	4.04	4.66	8.05	8.42	6.08	4.00	1.25	39.25
1955	0.58	0.47	0.42	0.41	0.79	3.62	5.24	6.44	8.15	6.41	3.61	1.30	37.44
1956	0.50	0.43	0.44	0.40	0.80	2.99	5.64	8.35	7.48	5.68	3.68	1.43	37.82
1957	0.50	0.47	0.36	0.55	0.78	2.66	4.33	6.60	8.15	6.26	3.16	1.20	35.03
1958	0.50	0.50	0.42	0.48	0.61	2.84	5.69	7.44	7.15	6.30	3.80	1.24	36.98
1959	0.53	0.46	0.37	0.46	0.78	3.08	5.29	7.80	7.39	6.34	3.14	1.02	36.66
1960	0.49	0.48	0.35	0.30	0.70	3.73	4.87	7.16	7.33	6.41	3.59	1.25	36.66
1961	0.54	0.36	0.41	0.48	0.88	2.71	4.49	6.58	7.55	5.94	2.72	1.07	33.72
1962	0.47	0.37	0.29	0.52	0.82	3.43	5.16	6.22	7.34	6.20	3.10	1.25	35.16
1963	0.54	0.48	0.29	0.53	0.98	3.67	5.27	7.36	8.76	6.36	3.74	1.52	39.50
1964	0.55	0.35	0.44	0.41	0.76	2.87	4.80	6.50	8.66	5.99	3.10	1.13	35.56
1965	0.52	0.43	0.47	0.44	0.70	3.50	4.79	6.08	7.82	5.58	2.58	1.18	34.09
1966	0.59	0.43	0.30	0.37	0.97	2.88	4.70	6.88	8.52	5.47	3.06	1.06	35.23
1967	0.53	0.38	0.47	0.50	1.07	3.70	3.92	6.13	7.48	5.54	3.01	1.18	33.91
1968	0.53	0.40	0.44	0.49	0.95	2.84	3.88	7.06	7.43	5.60	3.12	1.22	33.96
1969	0.49	0.37	0.48	0.52	0.68	3.58	4.75	5.76	7.91	6.29	3.35	0.89	35.06
1970	0.53	0.46	0.43	0.54	0.73	2.78	4.97	6.50	7.72	6.44	3.00	0.91	35.02
1971	0.52	0.47	0.43	0.47	0.90	3.38	4.42	7.69	7.50	5.98	3.16	1.24	36.14
1972	0.54	0.46	0.41	0.53	1.06	3.80	4.82	7.28	7.49	5.94	3.50	1.22	37.06
1973	0.41	0.30	0.40	0.50	0.85	2.64	4.34	6.80	7.50	6.59	3.12	1.32	34.78
1974	0.52	0.43	0.35	0.52	1.01	3.77	5.60	7.09	8.50	5.65	3.10	1.36	37.88
1975	0.53	0.40	0.42	0.46	0.85	3.14	4.79	6.76	7.81	6.56	3.31	1.32	36.35
1976	0.48	0.48	0.43	0.58	0.90	3.79	4.60	6.92	8.09	6.25	3.48	1.04	37.04
1977	0.48	0.46	0.36	0.54	0.94	3.92	5.60	7.63	8.41	6.18	4.06	1.32	39.90
1978	0.53	0.47	0.34	0.36	0.97	3.92	4.48	7.00	8.54	5.93	3.78	1.30	37.61
1979	0.50	0.36	0.26	0.47	0.96	3.74	4.51	6.98	7.72	5.78	3.79	1.40	36.49
1980	0.47	0.46	0.35	0.48	0.80	3.07	4.45	7.67	8.60	6.44	3.71	1.22	37.73
1981	0.52	0.49	0.47	0.50	0.98	4.68	4.86	7.99	7.90	5.59	3.55	1.31	38.84
1982	0.58	0.44	0.42	0.40	0.95	3.58	5.06	6.23	7.51	6.35	3.54	1.26	36.31
1983	0.50	0.43	0.43	0.52	0.83	2.75	4.27	6.48	8.23	6.92	3.98	1.38	36.73
1984	0.53	0.26	0.35	0.49	0.80	2.78	5.45	7.31	7.74	6.22	3.23	1.08	36.24
1985	0.55	0.47	0.35	0.42	1.00	4.15	5.53	7.14	7.73	6.25	3.31	1.19	38.09
1986	0.46	0.38	0.56	0.53	1.10	4.22	5.32	7.24	7.82	5.80	3.44	1.24	38.11
1987	0.52	0.44	0.46	0.54	0.79	3.80	5.28	7.33	8.66	6.52	3.78	1.27	39.40
1988	0.54	0.40	0.30	0.47	0.78	3.44	5.12	7.80	8.24	6.98	3.84	1.28	39.20
1989	0.55	0.43	0.47	0.34	0.88	3.90	5.15	6.17	8.14	6.38	3.65	1.25	37.30
1990	0.54	0.35	0.42	0.46	0.82	3.84	4.58	8.10	7.87	6.49	4.46	1.37	39.30
1991	0.58	0.34	0.38	0.55	0.84	3.65	5.56	7.73	7.98	6.40	3.77	1.22	38.99
1992	0.43	0.43	0.44	0.53	0.88	3.80	4.86	5.82	7.08	5.46	3.98	1.24	34.96
1993	0.42	0.30	0.31	0.40	0.79	3.24	4.55	6.86	8.15	6.32	3.65	1.18	36.17
1994	0.43	0.46	0.43	0.43	0.85	3.28	5.04	7.63	7.96	7.00	4.25	1.25	39.00
1995	0.53	0.49	0.46	0.53	0.84	2.68	3.91	6.17	7.46	7.09	3.74	1.22	35.12
1996	0.55	0.44	0.40	0.47	0.78	3.86	5.75	6.94	7.21	6.16	3.74	1.27	37.57
1997	0.50	0.42	0.40	0.47	0.77	2.83	5.15	6.82	7.96	5.95	4.09	1.14	36.49
1998	0.50	0.38	0.46	0.53	0.66	3.32	5.95	6.91	7.91	6.30	4.81	1.31	39.05
1999	0.60	0.41	0.48	0.55	0.73	3.16	4.78	6.61	7.80	6.12	3.61	1.10	35.95
2000	0.62	0.44	0.46	0.54	0.73	3.59	5.09	6.80	7.79	6.97	4.38	1.08	38.50
2001	0.48	0.37	0.38	0.41	0.68	4.16	4.92	7.37	8.72	6.74	4.26	1.31	39.82
2002	0.60	0.43	0.43	0.46	0.65	4.80	6.01	9.05	8.82	7.10	4.25	1.12	43.72
2003	0.55	0.43	0.47	0.42	0.74	5.58	6.59	7.08	10.31	8.08	4.70	1.74	46.69
2004	0.54	0.46	0.43	0.46	0.82	4.55	7.85	7.78	7.27	6.46	5.62	1.38	43.60
2005	0.54	0.47	0.43	0.50	0.96	3.91	5.41	7.50	10.32	7.45	6.25	1.18	44.93

Table 12
Potential Evapotranspiration For Weighted Crop Mix
Fort Lyon Canal

(values in inches)

Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
2006	0.54	0.41	0.49	0.44	1.20	5.68	7.03	9.44	8.20	6.29	3.74	1.09	44.56
2007	0.54	0.38	0.19	0.32	1.02	2.89	4.87	6.16	7.58	7.09	5.02	1.30	37.37
2008	0.50	0.37	0.38	0.46	1.15	4.42	6.56	7.85	8.77	6.38	4.50	1.03	42.38
2009	0.52	0.41	0.46	0.52	1.39	3.78	5.58	5.95	7.32	6.73	4.04	0.86	37.56
2010	0.49	0.32	0.41	0.41	0.97	4.00	5.84	7.73	7.55	7.20	5.72	1.22	41.87
2011	0.48	0.46	0.38	0.41	1.28	5.29	7.16	8.95	9.12	7.79	4.82	1.50	47.65
2012	0.50	0.29	0.43	0.47	1.56	4.50	7.44	11.27	11.10	9.59	5.75	1.46	54.36
2013	0.55	0.40	0.41	0.44	1.08	5.34	8.64	10.90	9.62	7.74	5.87	1.55	52.54
2014	0.52	0.38	0.41	0.44	1.08	5.34	8.64	10.90	9.62	7.74	5.87	1.55	52.49
Average	0.52	0.42	0.41	0.47	0.89	3.64	5.28	7.33	8.08	6.42	3.87	1.24	38.57
Maximum	0.62	0.50	0.56	0.60	1.56	5.68	8.64	11.27	11.10	9.59	6.25	1.74	54.36
Minimum	0.41	0.26	0.19	0.30	0.61	2.64	3.88	5.75	6.86	5.34	2.58	0.86	33.72

Note:

a) Potential evapotranspiration calculated using the modified Blaney Criddle method calibrated to the Penman-Monteith method within the H-I Model.

Table 13
Monthly Precipitation
Fort Lyon Canal
(values in inches)

Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1950	0.52	0.38	0.32	0.28	0.37	0.31	0.84	1.70	4.66	3.53	1.72	0.06	14.69
1951	0.14	0.14	0.89	0.13	0.21	0.72	2.30	4.58	0.69	2.32	1.61	0.96	14.69
1952	0.73	0.17	0.30	0.34	0.94	1.44	0.78	0.09	0.22	2.43	1.54	0.00	8.98
1953	0.79	0.16	0.26	0.06	1.83	1.83	2.53	0.61	0.68	3.73	0.00	0.25	12.73
1954	1.56	0.96	0.45	0.11	0.47	0.13	2.05	0.14	2.42	1.32	0.46	1.72	11.79
1955	0.03	0.28	0.08	0.27	0.11	0.70	3.90	1.33	1.01	1.34	0.73	0.14	9.92
1956	0.14	0.18	0.50	0.45	0.39	0.91	1.69	1.31	2.83	3.70	0.00	0.07	12.17
1957	0.84	0.08	0.19	0.12	0.97	3.08	2.74	2.00	3.25	2.16	1.14	1.08	17.65
1958	0.83	0.03	0.68	0.25	1.48	0.88	3.83	2.57	4.43	0.84	0.50	0.28	16.60
1959	0.76	0.09	0.89	0.24	0.28	0.93	2.17	1.84	1.03	1.90	1.53	1.70	13.36
1960	0.24	0.05	1.37	1.95	0.37	1.96	1.52	0.64	2.41	0.25	0.91	2.08	13.75
1961	0.17	0.92	0.00	0.81	0.91	0.37	1.19	3.54	3.74	3.03	0.88	0.41	15.97
1962	0.99	0.21	0.73	0.09	0.40	0.59	2.34	1.75	3.93	0.46	0.51	0.39	12.39
1963	0.61	0.11	0.32	0.13	0.93	0.00	0.66	1.70	1.57	2.19	1.21	0.12	9.55
1964	0.32	0.35	0.03	0.60	0.15	1.05	6.00	0.51	0.54	0.64	0.81	0.15	11.15
1965	0.31	0.19	0.28	0.38	1.02	0.05	2.48	6.07	1.91	1.95	1.01	1.89	17.54
1966	0.04	1.34	1.04	0.53	0.00	1.49	0.05	0.73	3.53	3.73	1.61	0.53	14.62
1967	0.00	0.22	0.19	0.00	0.23	0.04	3.07	2.58	2.00	1.45	0.99	0.38	11.15
1968	0.40	0.43	0.07	0.23	0.48	0.70	3.78	1.91	2.04	1.74	0.59	0.27	12.64
1969	0.18	0.34	0.09	0.14	1.20	2.75	2.38	2.43	2.75	1.91	2.49	1.91	18.57
1970	0.23	0.21	0.00	0.00	1.19	0.95	1.25	0.75	5.11	1.30	1.29	1.03	13.31
1971	0.20	0.00	0.37	0.67	0.14	1.04	2.44	1.32	3.43	1.79	1.26	1.12	13.78
1972	0.93	0.19	0.29	0.05	0.31	1.59	1.35	2.32	1.22	3.08	1.42	0.66	13.41
1973	1.58	0.30	0.25	0.01	4.16	1.36	1.07	0.58	2.99	0.35	2.85	0.41	15.91
1974	0.66	0.88	0.11	0.20	0.86	0.49	1.84	1.47	2.23	0.16	0.04	1.60	10.54
1975	0.20	0.18	0.20	0.16	0.81	0.92	1.10	4.10	2.11	1.70	0.62	0.00	12.10
1976	1.66	0.03	0.33	0.26	0.37	1.50	2.26	1.70	1.43	0.68	2.12	1.48	13.82
1977	0.30	0.09	0.20	0.17	0.14	1.64	3.46	1.50	1.75	3.37	0.09	0.06	12.77
1978	0.41	0.23	0.34	0.48	0.10	1.23	3.19	4.49	1.63	2.63	0.42	0.42	15.57
1979	0.60	0.31	0.86	0.16	1.12	0.67	4.87	1.55	3.11	1.89	0.85	1.37	17.36
1980	0.99	1.13	0.79	0.41	2.09	4.49	2.62	0.54	0.90	1.24	0.51	0.01	15.72
1981	0.53	0.02	0.17	0.07	1.32	0.31	1.91	1.23	1.10	1.51	0.43	0.29	8.89
1982	0.40	0.39	0.03	0.68	0.49	0.40	3.25	3.47	2.46	0.87	2.59	0.15	15.18
1983	0.09	0.71	0.65	0.81	1.74	1.84	2.42	2.01	0.75	0.61	0.14	0.12	11.89
1984	0.42	0.42	0.59	0.87	1.95	1.86	1.25	0.37	2.41	0.83	0.59	2.30	13.86
1985	0.02	0.45	0.85	0.53	0.33	1.63	2.76	0.51	2.28	0.74	1.11	1.35	12.56
1986	0.52	0.22	0.15	0.19	0.07	0.25	0.50	2.54	2.77	4.93	1.49	1.85	15.48
1987	0.99	0.14	0.47	1.34	0.88	0.21	3.01	2.17	0.52	2.52	2.42	0.06	14.73
1988	1.08	0.80	0.47	0.14	0.30	1.44	2.08	1.27	1.98	0.52	2.88	0.07	13.03
1989	0.04	0.30	0.21	0.20	0.43	0.46	2.77	2.64	0.96	2.20	1.99	0.14	12.34
1990	0.01	0.29	1.03	1.51	0.82	0.82	2.46	2.09	2.95	0.58	2.15	0.49	15.20
1991	0.80	0.46	0.18	0.01	0.96	1.02	1.06	2.67	1.91	4.80	1.14	0.58	15.59
1992	1.73	0.49	0.27	0.71	0.59	0.04	1.93	2.77	3.85	4.12	0.06	0.35	16.91
1993	1.89	0.22	0.58	1.31	1.18	1.67	2.93	3.32	1.08	2.18	1.42	1.36	19.14
1994	0.77	0.01	0.35	0.02	0.70	1.91	1.48	2.34	1.98	2.44	1.05	0.76	13.81
1995	1.00	0.13	0.54	0.22	1.11	2.59	4.99	3.69	1.18	0.72	0.81	0.03	17.01
1996	0.00	0.04	0.08	0.28	1.16	0.47	3.93	4.70	3.61	3.51	1.78	0.29	19.85
1997	0.18	0.17	0.30	0.94	0.05	1.47	0.68	1.02	1.71	5.79	1.58	4.37	18.26
1998	0.26	1.12	0.01	0.29	1.81	0.73	1.10	0.73	7.66	3.61	0.71	1.46	19.49
1999	1.45	0.23	0.96	0.11	1.91	3.70	3.26	1.97	1.87	2.55	0.59	0.20	18.80
2000	0.16	0.04	0.27	0.21	1.57	2.33	0.58	0.56	3.02	0.27	0.74	1.27	11.02
2001	0.09	0.14	1.11	0.36	0.83	0.41	5.49	1.62	3.30	1.01	0.60	0.03	14.99
2002	0.32	0.43	0.47	0.02	0.04	0.31	0.41	1.33	0.34	2.58	1.65	1.30	9.20
2003	0.18	0.52	0.25	0.52	0.84	0.87	1.31	3.99	0.58	1.01	0.73	0.05	10.85
2004	0.20	0.07	0.13	0.39	0.38	4.58	0.14	3.83	3.72	2.77	2.88	0.63	19.72
2005	1.23	0.13	0.38	0.41	0.68	1.43	2.11	2.87	0.97	1.74	0.17	2.85	14.97

Table 13
Monthly Precipitation
Fort Lyon Canal
(values in inches)

Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
2006	0.12	0.13	0.48	0.00	1.04	0.26	1.67	2.10	4.34	4.05	3.08	3.12	20.39
2007	0.12	3.67	0.24	0.38	0.18	2.24	2.09	3.31	1.03	1.25	0.80	0.51	15.82
2008	0.05	0.45	0.23	0.22	0.33	0.66	0.41	1.04	1.93	4.28	0.68	2.40	12.68
2009	0.16	0.16	0.03	0.46	0.87	1.97	1.47	2.39	1.86	1.48	0.90	2.42	14.17
2010	0.37	0.40	0.64	0.53	1.80	0.94	0.86	0.75	4.01	2.00	0.57	0.03	12.90
2011	0.03	0.19	0.14	0.32	0.21	0.35	0.66	3.01	2.27	1.71	0.76	0.17	9.82
2012	0.85	1.33	0.04	0.15	0.48	1.88	0.30	0.82	0.42	0.89	1.35	0.47	8.98
2013	0.00	0.15	0.09	0.08	0.38	0.18	0.31	2.36	2.30	3.05	1.83	0.64	11.37
2014	0.28	0.03	0.24	0.29	0.63	1.37	0.98	2.19	2.17	2.24	1.27	1.28	12.98
Average	0.52	0.38	0.39	0.37	0.80	1.21	2.07	2.03	2.26	2.06	1.15	0.86	14.09
Maximum	1.89	3.67	1.37	1.95	4.16	4.58	6.00	6.07	7.66	5.79	3.08	4.37	20.39
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.09	0.22	0.16	0.00	0.00	8.89

Note:
a) Monthly precipitation data derived from the ISAM Model.

Table 14
Effective Precipitation
Fort Lyon Canal
(values in inches)

Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1950	0.49	0.36	0.30	0.27	0.35	0.29	0.80	1.58	3.62	3.02	1.60	0.06	12.74
1951	0.13	0.13	0.85	0.12	0.20	0.68	2.10	3.59	0.66	2.11	1.50	0.91	12.98
1952	0.69	0.16	0.29	0.32	0.89	1.35	0.74	0.09	0.21	2.20	1.44	0.00	8.38
1953	0.75	0.15	0.25	0.06	1.70	1.70	2.29	0.58	0.65	3.15	0.00	0.24	11.50
1954	1.45	0.91	0.43	0.10	0.45	0.12	1.89	0.13	2.20	1.24	0.44	1.60	10.96
1955	0.03	0.27	0.08	0.26	0.10	0.67	3.26	1.25	0.96	1.26	0.69	0.13	8.95
1956	0.13	0.17	0.48	0.43	0.37	0.86	1.57	1.23	2.53	3.13	0.00	0.07	10.97
1957	0.80	0.08	0.18	0.11	0.92	2.73	2.46	1.85	2.84	1.98	1.08	1.02	16.05
1958	0.79	0.03	0.65	0.24	1.38	0.84	3.21	2.32	3.52	0.80	0.48	0.27	14.51
1959	0.72	0.09	0.85	0.23	0.27	0.88	1.99	1.71	0.98	1.76	1.43	1.58	12.47
1960	0.23	0.05	1.28	1.81	0.35	1.81	1.42	0.61	2.19	0.24	0.86	1.92	12.76
1961	0.16	0.87	0.00	0.77	0.86	0.35	1.12	3.03	3.16	2.69	0.84	0.39	14.24
1962	0.94	0.20	0.69	0.09	0.38	0.56	2.13	1.63	3.28	0.44	0.48	0.37	11.19
1963	0.58	0.10	0.30	0.12	0.88	0.00	0.63	1.58	1.46	2.01	1.14	0.11	8.92
1964	0.30	0.33	0.03	0.57	0.14	1.00	4.03	0.48	0.51	0.61	0.77	0.14	8.92
1965	0.29	0.18	0.27	0.36	0.97	0.05	2.25	4.03	1.77	1.81	0.96	1.75	14.68
1966	0.04	1.26	0.99	0.50	0.00	1.39	0.05	0.69	3.02	3.15	1.50	0.50	13.09
1967	0.00	0.21	0.18	0.00	0.22	0.04	2.72	2.33	1.85	1.36	0.94	0.36	10.20
1968	0.38	0.41	0.07	0.22	0.46	0.67	3.18	1.77	1.88	1.62	0.56	0.26	11.46
1969	0.17	0.32	0.09	0.13	1.13	2.47	2.16	2.20	2.47	1.77	2.25	1.77	16.94
1970	0.22	0.20	0.00	0.00	1.12	0.90	1.18	0.71	3.80	1.22	1.21	0.98	11.54
1971	0.19	0.00	0.35	0.64	0.13	0.99	2.21	1.24	2.95	1.66	1.18	1.06	12.61
1972	0.88	0.18	0.28	0.05	0.29	1.48	1.27	2.11	1.15	2.73	1.33	0.63	12.37
1973	1.47	0.29	0.24	0.01	3.40	1.27	1.01	0.55	2.67	0.33	2.55	0.39	14.18
1974	0.63	0.84	0.10	0.19	0.82	0.47	1.71	1.37	2.04	0.15	0.04	1.49	9.84
1975	0.19	0.17	0.19	0.15	0.77	0.87	1.04	3.37	1.94	1.58	0.59	0.00	10.87
1976	1.54	0.03	0.31	0.25	0.35	1.40	2.06	1.58	1.34	0.65	1.95	1.38	12.84
1977	0.29	0.09	0.19	0.16	0.13	1.53	2.97	1.40	1.63	2.92	0.09	0.06	11.44
1978	0.39	0.22	0.32	0.46	0.10	1.16	2.80	3.55	1.52	2.37	0.40	0.40	13.67
1979	0.57	0.29	0.82	0.15	1.06	0.64	3.72	1.45	2.75	1.75	0.81	1.28	15.28
1980	0.94	1.07	0.75	0.39	1.92	3.55	2.36	0.51	0.86	1.17	0.48	0.01	14.01
1981	0.50	0.02	0.16	0.07	1.24	0.29	1.77	1.16	1.04	1.41	0.41	0.28	8.34
1982	0.38	0.37	0.03	0.65	0.47	0.38	2.84	2.98	2.23	0.83	2.34	0.14	13.62
1983	0.09	0.67	0.62	0.77	1.62	1.71	2.20	1.86	0.71	0.58	0.13	0.11	11.06
1984	0.40	0.40	0.56	0.83	1.81	1.72	1.18	0.35	2.19	0.79	0.56	2.10	12.88
1985	0.02	0.43	0.81	0.50	0.31	1.52	2.48	0.48	2.08	0.70	1.05	1.27	11.65
1986	0.49	0.21	0.14	0.18	0.07	0.24	0.48	2.30	2.49	3.74	1.39	1.72	13.44
1987	0.94	0.13	0.45	1.26	0.84	0.20	2.68	1.99	0.49	2.28	2.20	0.06	13.51
1988	1.02	0.76	0.45	0.13	0.29	1.35	1.92	1.19	1.83	0.49	2.58	0.07	12.07
1989	0.04	0.29	0.20	0.19	0.41	0.44	2.49	2.38	0.91	2.02	1.84	0.13	11.32
1990	0.01	0.28	0.98	1.41	0.78	0.78	2.23	1.92	2.63	0.55	1.97	0.47	14.01
1991	0.76	0.44	0.17	0.01	0.91	0.97	1.00	2.40	1.77	3.69	1.08	0.55	13.75
1992	1.61	0.47	0.26	0.67	0.56	0.04	1.79	2.49	3.23	3.38	0.06	0.33	14.87
1993	1.75	0.21	0.55	1.23	1.11	1.55	2.62	2.88	1.02	2.00	1.33	1.27	17.53
1994	0.73	0.01	0.33	0.02	0.67	1.77	1.38	2.13	1.83	2.21	1.00	0.72	12.80
1995	0.95	0.12	0.51	0.21	1.05	2.34	3.77	3.12	1.11	0.68	0.77	0.03	14.67
1996	0.00	0.04	0.08	0.27	1.09	0.45	3.28	3.64	3.07	3.01	1.65	0.28	16.85
1997	0.17	0.16	0.29	0.89	0.05	1.37	0.65	0.97	1.59	3.97	1.47	3.49	15.07
1998	0.25	1.06	0.01	0.28	1.68	0.69	1.04	0.69	4.11	3.07	0.67	1.36	14.91
1999	1.36	0.22	0.91	0.10	1.77	3.13	2.84	1.82	1.73	2.30	0.56	0.19	16.94
2000	0.15	0.04	0.26	0.20	1.46	2.12	0.55	0.53	2.69	0.26	0.70	1.19	10.15
2001	0.09	0.13	1.05	0.34	0.79	0.39	3.90	1.51	2.87	0.96	0.57	0.03	12.62
2002	0.30	0.41	0.45	0.02	0.04	0.29	0.39	1.25	0.32	2.33	1.54	1.22	8.55
2003	0.17	0.49	0.24	0.49	0.80	0.83	1.23	3.32	0.55	0.96	0.69	0.05	9.82
2004	0.19	0.07	0.12	0.37	0.36	3.59	0.13	3.21	3.14	2.49	2.58	0.60	16.85
2005	1.16	0.12	0.36	0.39	0.65	1.34	1.94	2.57	0.92	1.62	0.16	2.55	13.77

Table 14
Effective Precipitation
Fort Lyon Canal
(values in inches)

Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
2006	0.11	0.12	0.46	0.00	0.99	0.25	1.55	1.93	3.48	3.35	2.73	2.75	17.72
2007	0.11	3.11	0.23	0.36	0.17	2.05	1.92	2.88	0.98	1.18	0.76	0.48	14.23
2008	0.05	0.43	0.22	0.21	0.31	0.63	0.39	0.99	1.79	3.45	0.65	2.18	11.28
2009	0.15	0.15	0.03	0.44	0.83	1.82	1.37	2.17	1.72	1.38	0.86	2.20	13.12
2010	0.35	0.38	0.61	0.50	1.67	0.89	0.82	0.71	3.33	1.85	0.54	0.03	11.69
2011	0.03	0.18	0.13	0.30	0.20	0.33	0.63	2.68	2.07	1.59	0.72	0.16	9.03
2012	0.81	1.25	0.04	0.14	0.46	1.74	0.29	0.78	0.40	0.85	1.27	0.45	8.45
2013	0.00	0.14	0.09	0.08	0.36	0.17	0.29	2.15	2.10	2.71	1.70	0.61	10.39
2014	0.27	0.03	0.23	0.28	0.60	1.28	0.93	2.01	1.99	2.04	1.20	1.20	12.06
Average	0.49	0.35	0.37	0.35	0.75	1.10	1.80	1.78	1.95	1.81	1.07	0.79	12.61
Maximum	1.75	3.11	1.28	1.81	3.40	3.59	4.03	4.03	4.11	3.97	2.73	3.49	17.72
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.09	0.21	0.15	0.00	0.00	8.34

Note:
a) Calculated using the monthly precipitation values in Table 11 and the effective precipitation methodology in the H-I Model.
b) The following is the equation used for the calculation of effective precipitation.
First inch x 0.95 + second inch x 0.9 + third inch x 0.825 + fourth inch x 0.65 + fifth inch x 0.45 + sixth inch x 0.25 + seventh inch and greater x 0.05

Table 15
Crop Irrigation Requirement - All Crops
Fort Lyon Canal
(values in inches)

Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1950	0.01	0.05	0.10	0.27	0.44	2.96	3.98	5.78	3.24	2.32	1.58	1.38	22.12
1951	0.37	0.34	0.00	0.38	0.53	2.09	2.87	2.16	6.88	3.92	1.63	0.19	21.37
1952	0.00	0.25	0.18	0.17	0.00	1.82	4.12	8.47	7.56	4.17	2.16	1.14	30.04
1953	0.00	0.28	0.29	0.42	0.00	1.06	2.19	7.62	7.39	2.84	3.67	1.08	26.85
1954	0.00	0.00	0.00	0.50	0.33	3.92	2.76	7.92	6.23	4.85	3.56	0.00	30.07
1955	0.55	0.20	0.34	0.15	0.69	2.96	1.98	5.20	7.19	5.15	2.92	1.16	28.50
1956	0.37	0.26	0.00	0.00	0.43	2.12	4.07	7.12	4.94	2.55	3.68	1.36	26.91
1957	0.00	0.39	0.18	0.44	0.00	0.00	1.87	4.75	5.31	4.28	2.08	0.18	19.48
1958	0.00	0.48	0.00	0.24	0.00	2.01	2.47	5.12	3.63	5.50	3.33	0.97	23.75
1959	0.00	0.37	0.00	0.23	0.51	2.20	3.30	6.09	6.42	4.58	1.72	0.00	25.42
1960	0.26	0.43	0.00	0.00	0.34	1.92	3.45	6.56	5.14	6.17	2.72	0.00	27.01
1961	0.38	0.00	0.41	0.00	0.01	2.36	3.37	3.55	4.39	3.25	1.89	0.68	20.28
1962	0.00	0.17	0.00	0.43	0.44	2.87	3.03	4.59	4.06	5.77	2.61	0.88	24.85
1963	0.00	0.38	0.00	0.40	0.10	3.67	4.64	5.78	7.30	4.35	2.61	1.41	30.63
1964	0.25	0.02	0.42	0.00	0.61	1.87	0.78	6.02	8.15	5.38	2.33	0.99	26.80
1965	0.22	0.25	0.20	0.08	0.00	3.46	2.54	2.06	6.06	3.78	1.62	0.00	20.26
1966	0.55	0.00	0.00	0.00	0.97	1.49	4.66	6.18	5.50	2.32	1.56	0.55	23.79
1967	0.53	0.18	0.29	0.50	0.85	3.66	1.20	3.80	5.63	4.19	2.07	0.82	23.71
1968	0.15	0.00	0.38	0.27	0.49	2.18	0.69	5.29	5.55	3.99	2.56	0.97	22.51
1969	0.32	0.05	0.39	0.38	0.00	1.11	2.59	3.56	5.44	4.52	1.09	0.00	19.45
1970	0.31	0.26	0.43	0.54	0.00	1.88	3.79	5.79	3.91	5.22	1.79	0.00	23.93
1971	0.33	0.47	0.08	0.00	0.77	2.40	2.20	6.45	4.55	4.32	1.97	0.18	23.71
1972	0.00	0.28	0.13	0.48	0.76	2.32	3.56	5.17	6.34	3.21	2.18	0.60	25.03
1973	0.00	0.02	0.16	0.49	0.00	1.37	3.33	6.25	4.83	6.26	0.57	0.93	24.21
1974	0.00	0.00	0.24	0.33	0.19	3.30	3.90	5.72	6.46	5.50	3.06	0.00	28.69
1975	0.34	0.23	0.23	0.30	0.08	2.27	3.75	3.39	5.87	4.98	2.72	1.32	25.48
1976	0.00	0.45	0.12	0.33	0.55	2.39	2.53	5.34	6.75	5.61	1.53	0.00	25.60
1977	0.20	0.37	0.17	0.38	0.80	2.40	2.63	6.23	6.79	3.26	3.97	1.26	28.46
1978	0.14	0.25	0.01	0.00	0.88	2.77	1.68	3.45	7.03	3.56	3.38	0.90	24.04
1979	0.00	0.07	0.00	0.32	0.00	3.11	0.80	5.54	4.97	4.03	2.98	0.12	21.93
1980	0.00	0.00	0.00	0.09	0.00	0.00	2.09	7.16	7.75	5.28	3.22	1.21	26.80
1981	0.01	0.47	0.31	0.44	0.00	4.39	3.09	6.84	6.86	4.18	3.14	1.03	30.76
1982	0.20	0.07	0.39	0.00	0.48	3.20	2.23	3.25	5.28	5.52	1.20	1.12	22.94
1983	0.42	0.00	0.00	0.00	0.00	1.04	2.08	4.62	7.52	6.34	3.85	1.27	27.14
1984	0.13	0.00	0.00	0.00	0.00	1.06	4.27	6.96	5.55	5.43	2.67	0.00	26.07
1985	0.53	0.04	0.00	0.00	0.68	2.64	3.06	6.66	5.65	5.55	2.26	0.00	27.06
1986	0.00	0.18	0.42	0.35	1.04	3.99	4.84	4.94	5.34	2.05	2.05	0.00	25.19
1987	0.00	0.31	0.01	0.00	0.00	3.60	2.60	5.34	8.17	4.24	1.58	1.22	27.07
1988	0.00	0.00	0.00	0.34	0.50	2.10	3.21	6.61	6.41	6.49	1.26	1.22	28.13
1989	0.51	0.15	0.27	0.15	0.47	3.46	2.66	3.79	7.22	4.37	1.81	1.12	25.97
1990	0.53	0.07	0.00	0.00	0.04	3.06	2.35	6.18	5.24	5.94	2.49	0.90	26.80
1991	0.00	0.00	0.21	0.54	0.00	2.68	4.55	5.33	6.21	2.71	2.69	0.67	25.60
1992	0.00	0.00	0.19	0.00	0.32	3.77	3.07	3.33	3.85	2.08	3.93	0.90	21.44
1993	0.00	0.09	0.00	0.00	0.00	1.69	1.93	3.98	7.13	4.33	2.32	0.00	21.46
1994	0.00	0.45	0.10	0.41	0.19	1.51	3.66	5.50	6.12	4.78	3.25	0.53	26.50
1995	0.00	0.37	0.00	0.32	0.00	0.34	0.14	3.04	6.35	6.41	2.97	1.20	21.14
1996	0.55	0.41	0.32	0.20	0.00	3.42	2.47	3.30	4.14	3.15	2.09	1.00	21.04
1997	0.33	0.26	0.11	0.00	0.72	1.46	4.50	5.85	6.37	1.98	2.62	0.00	24.20
1998	0.26	0.00	0.45	0.25	0.00	2.63	4.91	6.22	3.80	3.23	4.14	0.00	25.88
1999	0.00	0.19	0.00	0.45	0.00	0.03	1.93	4.79	6.07	3.82	3.05	0.91	21.23
2000	0.47	0.41	0.20	0.34	0.00	1.47	4.54	6.27	5.10	6.72	3.68	0.00	29.19
2001	0.39	0.24	0.00	0.07	0.00	3.77	1.02	5.86	5.85	5.79	3.69	1.28	27.97
2002	0.30	0.02	0.00	0.44	0.61	4.51	5.62	7.80	8.50	4.78	2.71	0.00	35.28
2003	0.38	0.00	0.23	0.00	0.00	4.75	5.36	3.76	9.76	7.12	4.01	1.69	37.06
2004	0.35	0.39	0.31	0.09	0.46	0.96	7.72	4.56	4.13	3.97	3.04	0.78	26.75
2005	0.00	0.34	0.07	0.11	0.31	2.58	3.47	4.93	9.40	5.84	6.09	0.00	33.15

Table 15
Crop Irrigation Requirement - All Crops
Fort Lyon Canal
(values in inches)

Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
2006	0.43	0.28	0.04	0.44	0.21	5.43	5.48	7.51	4.72	2.94	1.02	0.00	28.50
2007	0.43	0.00	0.00	0.00	0.85	0.84	2.95	3.28	6.61	5.92	4.26	0.81	25.94
2008	0.46	0.00	0.17	0.25	0.84	3.79	6.17	6.86	6.99	2.93	3.85	0.00	32.31
2009	0.36	0.26	0.43	0.08	0.57	1.96	4.21	3.78	5.60	5.35	3.19	0.00	25.77
2010	0.14	0.00	0.00	0.00	0.00	3.10	5.03	7.02	4.22	5.35	5.18	1.20	31.23
2011	0.45	0.28	0.25	0.10	1.08	4.96	6.54	6.27	7.05	6.20	4.10	1.34	38.62
2012	0.00	0.00	0.39	0.33	1.10	2.76	7.16	10.49	10.70	8.74	4.48	1.02	47.17
2013	0.55	0.25	0.32	0.37	0.72	5.17	8.35	8.75	7.53	5.03	4.17	0.94	42.15
2014	0.25	0.36	0.18	0.16	0.48	4.06	7.71	8.89	7.63	5.70	4.67	0.35	40.43
Average	0.21	0.19	0.16	0.22	0.35	2.56	3.47	5.55	6.13	4.62	2.80	0.66	26.90
Maximum	0.55	0.48	0.45	0.54	1.10	5.43	8.35	10.49	10.70	8.74	6.09	1.69	47.17
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.14	2.06	3.24	1.98	0.57	0.00	19.45

Note:
a) Calculated as the maximum of Table 12 minus Table 14 or zero. If monthly value is zero then there was enough effective precipitation to satisfy crop demand (PET).

Table 16
Fort Lyon Irrigated Acreage by Farm
(units of acres unless noted)

Irrigation Year	ARF Farm No. 1	ARF Farm No. 2	ARF Farm No. 3	ARF Farm No. 13	ARF Farm No. 14	ARF Farm No. 15	ARF Farm No. 19	ARF Farm No. 21	ARF Farm No. 22	ARF Farm No. 23
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1950	140.4	100.5	73.3	110.1	155.1	296.3	196.6	74.1	77.9	136.8
1951	134.6	102.5	73.1	110.2	155.3	296.4	196.4	74.5	77.9	136.8
1952	128.7	104.4	73.0	110.3	155.4	296.5	196.1	74.9	77.9	136.8
1953	122.9	106.4	72.8	110.4	155.6	296.5	195.9	75.3	77.9	136.8
1954	**117.0**	**108.3**	**72.7**	**110.5**	**155.7**	**296.6**	**195.7**	**75.7**	**77.9**	**136.8**
1955	119.0	108.0	72.7	110.5	155.7	296.8	195.9	75.6	78.0	136.8
1956	120.9	107.8	72.6	110.4	155.6	297.1	196.1	75.5	78.0	136.8
1957	122.9	107.5	72.6	110.4	155.5	297.3	196.3	75.4	78.0	136.8
1958	124.8	107.2	72.6	110.3	155.5	297.5	196.4	75.3	78.1	136.8
1959	126.8	106.9	72.6	110.3	155.4	297.8	196.6	75.3	78.1	136.8
1960	128.7	106.6	72.6	110.2	155.3	298.0	196.8	75.2	78.2	136.8
1961	130.7	106.3	72.6	110.2	155.3	298.3	197.0	75.1	78.2	136.8
1962	132.6	106.0	72.6	110.1	155.2	298.5	197.2	75.0	78.2	136.8
1963	134.6	105.7	72.6	110.1	155.1	298.7	197.4	74.9	78.3	136.8
1964	136.5	105.5	72.6	110.0	155.1	299.0	197.6	74.8	78.3	136.8
1965	138.5	105.2	72.6	110.0	155.0	299.2	197.8	74.8	78.3	136.8
1966	140.4	104.9	72.6	109.9	154.9	299.5	198.0	74.7	78.4	136.8
1967	142.3	104.6	72.5	109.9	154.9	299.7	198.2	74.6	78.4	136.8
1968	144.3	104.3	72.5	109.8	154.8	300.0	198.4	74.5	78.4	136.8
1969	146.2	104.0	72.5	109.8	154.7	300.2	198.6	74.4	78.5	136.8
1970	148.2	103.7	72.5	109.7	154.7	300.4	198.8	74.4	78.5	136.8
1971	150.1	103.4	72.5	109.7	154.6	300.7	199.0	74.3	78.5	136.8
1972	152.1	103.2	72.5	109.6	154.5	300.9	199.2	74.2	78.6	136.8
1973	154.0	102.9	72.5	109.6	154.5	301.2	199.4	74.1	78.6	136.8
1974	156.0	102.6	72.5	109.5	154.4	301.4	199.6	74.0	78.7	136.8
1975	**157.9**	**102.3**	**72.5**	**109.5**	**154.3**	**301.7**	**199.8**	**73.9**	**78.7**	**136.8**
1976	157.9	99.0	72.5	109.0	155.8	302.2	199.7	72.7	78.3	136.8
1977	157.9	95.7	72.5	108.5	157.2	302.7	199.6	71.4	78.0	136.8
1978	157.9	92.4	72.5	108.0	158.7	303.2	199.6	70.1	77.6	136.8
1979	157.9	89.1	72.6	107.6	160.2	303.7	199.5	68.9	77.3	136.8
1980	157.9	85.8	72.6	107.1	161.6	304.2	199.4	67.6	76.9	136.8
1981	157.9	82.6	72.6	106.6	163.1	304.7	199.3	66.3	76.6	136.8
1982	157.9	79.3	72.6	106.2	164.6	305.2	199.2	65.0	76.2	136.8
1983	**157.9**	**76.0**	**72.7**	**105.7**	**166.0**	**305.7**	**199.2**	**63.8**	**75.9**	**136.8**
1984	146.2	84.1	74.7	105.7	164.8	302.3	179.1	59.4	75.1	140.4
1985	***134.4***	***92.3***	***76.8***	***105.7***	***163.6***	***298.9***	***159.0***	***55.1***	***74.3***	***144.1***
1986	136.3	90.9	76.7	105.6	162.1	298.8	160.8	54.9	74.3	143.6
1987	138.2	89.5	76.6	105.5	160.5	298.7	162.7	54.8	74.4	143.2
1988	140.1	88.0	76.6	105.5	159.0	298.7	164.6	54.6	74.4	142.7
1989	142.1	86.6	76.5	105.4	157.5	298.6	166.5	54.4	74.4	142.2
1990	144.0	85.2	76.4	105.3	155.9	298.5	168.4	54.2	74.4	141.8
1991	145.9	83.8	76.3	105.2	154.4	298.4	170.3	54.1	74.4	141.3
1992	147.8	82.3	76.3	105.2	152.9	298.4	172.2	53.9	74.5	140.9
1993	149.7	80.9	**76.2**	105.1	151.3	298.3	174.0	53.7	74.5	140.4
1994	151.6	79.5	75.9	105.0	149.8	298.2	175.9	53.5	74.5	140.0
1995	153.5	78.1	75.6	104.9	148.3	298.2	177.8	53.4	74.5	139.5
1996	155.4	76.6	75.3	104.8	146.7	298.1	179.7	53.2	74.5	139.1
1997	157.3	75.2	75.0	104.8	145.2	298.0	181.6	53.0	74.6	138.6
1998	159.3	73.8	74.7	104.7	143.7	297.9	183.5	52.8	74.6	138.2
1999	161.2	72.4	74.4	104.6	142.1	297.9	185.4	52.7	74.6	137.7
2000	163.1	70.9	74.0	104.5	140.6	297.8	187.2	52.5	74.6	137.3
2001	**165.0**	**69.5**	73.7	**104.5**	**139.1**	**297.7**	**189.1**	**52.3**	**74.6**	**136.8**
2002	165.0	69.5	73.4	104.5	139.1	297.7	189.1	52.3	74.6	136.8
2003	165.0	69.5	73.1	104.5	139.1	297.7	189.1	52.3	74.6	136.8
2004	**165.0**	**69.5**	**72.8**	**104.5**	**139.1**	**297.7**	**189.1**	**52.3**	**74.6**	**136.8**
2005	**165.0**	**69.5**	**72.8**	**104.5**	**139.1**	**297.7**	**189.1**	**52.3**	**74.6**	**136.8**
2006	**165.0**	**69.5**	**72.8**	**104.5**	**139.1**	**297.7**	**189.1**	**52.3**	**74.6**	**136.8**
2007	165.0	69.5	72.8	104.5	139.1	297.7	189.1	52.3	74.6	136.8
2008	165.0	69.5	72.8	104.5	139.1	297.7	189.1	52.3	74.6	136.8

Table 16

Fort Lyon Irrigated Acreage by Farm

(units of acres unless noted)

Irrigation Year	ARF Farm No. 1	ARF Farm No. 2	ARF Farm No. 3	ARF Farm No. 13	ARF Farm No. 14	ARF Farm No. 15	ARF Farm No. 19	ARF Farm No. 21	ARF Farm No. 22	ARF Farm No. 23
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2009	**165.0**	**69.5**	**72.8**	**104.5**	**139.1**	**297.7**	**189.1**	**52.3**	**74.6**	**136.8**
2010	165.0	69.5	72.8	104.5	139.1	297.7	189.1	52.3	74.6	136.8
2011	**165.0**	**69.5**	**72.8**	**104.5**	**139.1**	**297.7**	**189.1**	**52.3**	**74.6**	**136.8**
2012	165.0	69.5	72.8	104.5	139.1	297.7	189.1	52.3	74.6	136.8
2013	**165.0**	**69.5**	**72.8**	**104.5**	**139.1**	**297.7**	**189.1**	**52.3**	**74.6**	**136.8**
2014	165.0	69.5	72.8	104.5	139.1	297.7	189.1	52.3	74.6	136.8
Average	148.5	89.1	73.5	107.2	151.8	299.1	189.6	63.7	76.4	137.8
Maximum	165.0	108.3	76.8	110.5	166.0	305.7	199.8	75.7	78.7	144.1
Minimum	117.0	69.5	72.5	104.5	139.1	296.3	159.0	52.3	74.3	136.8

Column Explanations:
1) November through October Irrigation year.
2 - 37) Irrigated acres obtained from aerial photography or Division Engineer's GIS coverages.
Notes:
a) Acreage identified in bold were measured from aerial photography. Acreage in shown in yellow & italics were obtained from Division Engineer's GIS coverage.
b) Acreage between measured values were interpolated.

Table 16 (continued)

Fort Lyon Irrigated Acreage by Farm

(units of acres unless noted)

Irrigation Year (1)	ARF Farm No. 25 (12)	ARF Farm No. 27 (13)	ARF Farm No. 30N (14)	ARF Farm No. 33 (15)	ARF Farm No. 36 (16)	ARF Farm No. 37 (17)	ARF Farm No. 39 (18)	ARF Farm No. 40 (19)	ARF Farm No. 41 (20)	ARF Farm No. 42 (21)
1950	505.7	381.0	92.6	157.0	145.5	160.2	256.3	59.6	115.0	180.8
1951	505.7	381.0	92.6	153.9	143.6	160.2	253.4	60.3	114.9	180.8
1952	505.7	381.0	92.6	150.7	141.6	160.2	250.4	61.0	114.8	180.8
1953	505.7	381.0	92.6	147.5	139.6	160.2	247.4	61.8	114.7	180.8
1954	**505.7**	**381.0**	**92.6**	**144.3**	**137.7**	**160.2**	**244.4**	**62.5**	**114.6**	**180.8**
1955	505.7	381.0	92.6	143.6	138.1	160.4	243.8	62.2	114.6	180.8
1956	505.7	381.0	92.5	142.9	138.5	160.5	243.3	62.0	114.6	180.8
1957	505.7	381.0	92.4	142.2	138.8	160.7	242.7	61.8	114.5	180.8
1958	505.7	381.0	92.4	141.5	139.2	160.9	242.1	61.5	114.5	180.8
1959	505.7	381.0	92.3	140.7	139.6	161.1	241.5	61.3	114.5	180.8
1960	505.7	381.0	92.2	140.0	140.0	161.3	241.0	61.0	114.5	180.8
1961	505.7	381.0	92.2	139.3	140.3	161.5	240.4	60.8	114.5	180.8
1962	505.7	381.0	92.1	138.6	140.7	161.6	239.8	60.5	114.5	180.8
1963	505.7	381.0	92.0	137.9	141.1	161.8	239.2	60.3	114.5	180.8
1964	505.7	381.0	91.9	137.2	141.5	162.0	238.7	60.0	114.5	180.8
1965	505.7	381.0	91.9	136.5	141.9	162.2	238.1	59.8	114.4	180.8
1966	505.7	381.0	91.8	135.7	142.2	162.4	237.5	59.6	114.4	180.8
1967	505.7	381.0	91.7	135.0	142.6	162.6	236.9	59.3	114.4	180.8
1968	505.7	381.0	91.7	134.3	143.0	162.7	236.4	59.1	114.4	180.8
1969	505.7	381.0	91.6	133.6	143.4	162.9	235.8	58.8	114.4	180.8
1970	505.7	381.0	91.5	132.9	143.7	163.1	235.2	58.6	114.4	180.8
1971	505.7	381.0	91.5	132.2	144.1	163.3	234.6	58.3	114.4	180.8
1972	505.7	381.0	91.4	131.5	144.5	163.5	234.1	58.1	114.4	180.8
1973	505.7	381.0	91.3	130.7	144.9	163.7	233.5	57.9	114.3	180.8
1974	505.7	381.0	91.3	130.0	145.3	163.8	232.9	57.6	114.3	180.8
1975	**505.7**	**381.0**	**91.2**	**129.3**	**145.6**	**164.0**	**232.3**	**57.4**	**114.3**	**180.8**
1976	505.7	381.0	91.0	130.3	145.2	163.5	234.4	57.4	113.7	180.8
1977	505.7	381.0	90.7	131.2	144.7	163.1	236.4	57.5	113.1	180.8
1978	505.7	381.0	90.5	132.2	144.2	162.6	238.5	57.6	112.5	180.8
1979	505.7	381.0	90.2	133.2	143.7	162.1	240.5	57.7	111.9	180.8
1980	505.7	381.0	90.0	134.1	143.2	161.6	242.5	57.8	111.3	180.8
1981	505.7	381.0	89.7	135.1	142.8	161.1	244.6	57.8	110.7	180.8
1982	505.7	381.0	89.5	136.1	142.3	160.6	246.6	57.9	110.1	180.8
1983	**505.7**	**381.0**	**89.3**	**137.0**	**141.8**	**160.2**	**248.6**	**58.0**	**109.5**	**180.8**
1984	483.8	347.2	91.6	102.4	144.5	156.8	241.5	60.3	112.4	131.5
1985	***462.0***	***313.4***	***94.0***	***67.8***	***147.1***	***153.5***	***234.3***	***62.7***	***115.2***	***82.3***
1986	460.9	316.7	93.2	71.7	146.6	153.3	234.7	62.7	115.0	86.9
1987	459.8	320.0	92.5	75.6	146.1	153.2	235.0	62.7	114.9	91.6
1988	458.7	323.4	91.7	79.5	145.6	153.0	235.3	62.7	114.8	96.3
1989	457.6	326.7	90.9	83.4	145.0	152.8	235.6	62.7	114.6	101.0
1990	456.5	330.0	90.2	87.3	144.5	152.7	235.9	62.7	114.5	105.7
1991	455.4	333.3	89.4	91.2	144.0	152.5	236.3	62.7	114.3	110.4
1992	454.3	336.6	88.6	95.1	143.5	152.3	236.6	62.7	114.2	115.0
1993	453.2	339.9	87.9	99.0	143.0	152.2	236.9	**60.9**	114.0	119.7
1994	452.1	343.2	87.1	102.9	142.4	152.0	237.2	62.7	113.9	124.4
1995	451.0	346.6	86.3	106.8	141.9	151.8	237.5	62.7	113.8	129.1
1996	449.9	349.9	85.6	110.7	141.4	151.7	237.9	62.7	113.6	133.8
1997	448.8	353.2	84.8	114.6	140.9	151.5	238.2	62.7	113.5	138.5
1998	447.7	356.5	84.0	118.5	140.4	151.3	238.5	62.7	113.3	143.2
1999	446.6	359.8	83.3	122.4	139.8	151.2	238.8	62.7	113.2	147.8
2000	445.5	363.1	82.5	126.3	139.3	151.0	239.1	62.7	113.1	152.5
2001	**444.4**	**366.5**	**81.7**	**130.2**	**138.8**	**150.8**	**239.5**	59.8	**112.9**	**157.2**
2002	444.4	366.5	81.7	130.2	138.8	150.8	239.5	59.8	112.9	157.2
2003	444.4	366.5	81.7	130.2	138.8	150.8	239.5	59.8	112.9	157.2
2004	**444.4**	**366.5**	**81.7**	**130.2**	**138.8**	**150.8**	**239.5**	**59.8**	**112.9**	**157.2**
2005	**444.4**	**366.5**	**81.7**	**130.2**	**138.8**	**150.8**	**239.5**	**59.8**	**112.9**	**157.2**
2006	**444.4**	**366.5**	**81.7**	**130.2**	**138.8**	**150.8**	**239.5**	**59.8**	**112.9**	**157.2**
2007	444.4	366.5	81.7	130.2	138.8	150.8	239.5	59.8	112.9	157.2
2008	444.4	366.5	81.7	130.2	138.8	150.8	239.5	59.8	112.9	157.2

Table 16 (continued)

Fort Lyon Irrigated Acreage by Farm

(units of acres unless noted)

Irrigation Year	ARF Farm No. 25	ARF Farm No. 27	ARF Farm No. 30N	ARF Farm No. 33	ARF Farm No. 36	ARF Farm No. 37	ARF Farm No. 39	ARF Farm No. 40	ARF Farm No. 41	ARF Farm No. 42
(1)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
2009	**444.4**	**366.5**	**81.7**	**130.2**	**138.8**	**150.8**	**239.5**	**59.8**	**112.9**	**157.2**
2010	444.4	366.5	81.7	130.2	138.8	150.8	239.5	59.8	112.9	157.2
2011	**444.4**	**366.5**	**81.7**	**130.2**	**138.8**	**150.8**	**239.5**	**59.8**	**112.9**	**157.2**
2012	444.4	366.5	81.7	130.2	138.8	150.8	239.5	59.8	112.9	157.2
2013	**444.4**	**366.5**	**81.7**	**130.2**	**138.8**	**150.8**	**239.5**	**59.8**	**112.9**	**157.2**
2014	444.4	366.5	81.7	130.2	138.8	150.8	239.5	59.8	112.9	157.2
Average	479.4	366.9	88.6	125.6	141.8	157.0	239.5	60.3	113.7	159.4
Maximum	505.7	381.0	94.0	157.0	147.1	164.0	256.3	62.7	115.2	180.8
Minimum	444.4	313.4	81.7	67.8	137.7	150.8	232.3	57.4	109.5	82.3

Table 16 (continued)
Fort Lyon Irrigated Acreage by Farm
(units of acres unless noted)

Irrigation Year	ARF Farm No. 53	ARF Farm No. 54B	ARF Farm No. 57	ARF Farm No. 58	ARF Farm No. 59	ARF Farm No. 60	ARF Farm No. 61	ARF Farm No. 62a&b	ARF Farm No. 63	ARF Farm No. 64
(1)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)
1950	154.2	151.8	63.5	108.9	68.9	114.2	230.6	209.2	782.7	218.1
1951	154.2	152.6	66.2	107.6	69.3	114.7	228.1	208.8	786.2	218.1
1952	154.2	153.5	68.8	106.2	69.8	115.1	225.5	208.3	789.7	218.1
1953	154.2	154.3	71.4	104.8	70.2	115.6	222.9	207.8	793.2	218.1
1954	**154.2**	**155.2**	**74.0**	**103.4**	**70.6**	**116.1**	**220.3**	**207.4**	**796.7**	**218.1**
1955	153.7	155.4	73.7	103.9	70.5	116.0	221.0	207.4	797.0	218.1
1956	153.2	155.5	73.4	104.3	70.4	115.9	221.7	207.4	797.3	218.1
1957	152.7	155.7	73.1	104.8	70.2	115.8	222.4	207.4	797.6	218.1
1958	152.2	155.9	72.8	105.3	70.1	115.8	223.0	207.4	797.9	218.1
1959	151.7	156.0	72.4	105.8	70.0	115.7	223.7	207.4	798.3	218.1
1960	151.1	156.2	72.1	106.2	69.9	115.6	224.4	207.4	798.6	218.1
1961	150.6	156.4	71.8	106.7	69.8	115.5	225.1	207.4	798.9	218.1
1962	150.1	156.5	71.5	107.2	69.6	115.5	225.8	207.4	799.2	218.1
1963	149.6	156.7	71.2	107.6	69.5	115.4	226.4	207.4	799.5	218.1
1964	149.1	156.9	70.9	108.1	69.4	115.3	227.1	207.4	799.8	218.1
1965	148.6	157.0	70.6	108.6	69.3	115.2	227.8	207.4	800.2	218.1
1966	148.0	157.2	70.3	109.1	69.1	115.2	228.5	207.4	800.5	218.1
1967	147.5	157.4	70.0	109.5	69.0	115.1	229.2	207.4	800.8	218.1
1968	147.0	157.6	69.6	110.0	68.9	115.0	229.8	207.4	801.1	218.1
1969	146.5	157.7	69.3	110.5	68.8	114.9	230.5	207.4	801.4	218.1
1970	146.0	157.9	69.0	111.0	68.7	114.8	231.2	207.4	801.7	218.1
1971	145.5	158.1	68.7	111.4	68.5	114.8	231.9	207.4	802.1	218.1
1972	144.9	158.2	68.4	111.9	68.4	114.7	232.6	207.4	802.4	218.1
1973	144.4	158.4	68.1	112.4	68.3	114.6	233.2	207.4	802.7	218.1
1974	143.9	158.6	67.8	112.8	68.2	114.5	233.9	207.4	803.0	218.1
1975	**143.4**	**158.7**	**67.5**	**113.3**	**68.0**	**114.5**	**234.6**	**207.4**	**803.3**	**218.1**
1976	142.0	158.2	67.4	117.6	67.7	114.6	232.8	207.4	802.8	218.1
1977	140.7	157.7	67.4	121.8	67.3	114.8	230.9	207.4	802.4	218.1
1978	139.3	157.2	67.3	126.0	66.9	114.9	229.1	207.4	801.9	218.1
1979	138.0	156.7	67.2	130.3	66.5	115.0	227.2	207.4	801.4	218.1
1980	136.6	156.2	67.2	134.5	66.1	115.2	225.4	207.4	800.9	218.1
1981	135.3	155.7	67.1	138.7	65.7	115.3	223.5	207.4	800.4	218.1
1982	133.9	155.2	67.1	143.0	65.3	115.5	221.7	207.4	799.9	218.1
1983	**132.5**	**154.6**	**67.0**	**147.2**	**64.9**	**115.6**	**219.8**	**207.4**	**799.4**	**218.1**
1984	138.0	156.9	65.4	145.7	64.7	107.9	194.8	199.3	778.9	189.0
1985	***143.5***	***159.2***	***63.9***	***144.2***	***64.5***	***98.4***	***169.8***	***191.2***	***758.4***	***160.0***
1986	143.4	158.4	64.0	143.9	64.6	100.2	172.2	191.9	759.6	162.3
1987	143.3	157.7	64.1	143.6	64.7	102.0	174.6	192.5	760.7	164.7
1988	143.1	156.9	64.2	143.2	64.7	103.9	177.0	193.1	761.8	167.1
1989	143.0	156.2	64.3	142.9	64.8	105.7	179.5	193.7	762.9	169.5
1990	142.9	155.4	64.5	142.5	64.9	107.5	181.9	194.3	764.0	171.9
1991	142.7	154.7	64.6	142.2	65.0	109.3	184.3	194.9	765.2	174.2
1992	142.6	153.9	64.7	141.9	65.1	111.2	186.7	195.6	766.3	176.6
1993	142.5	153.2	**64.8**	141.5	65.1	113.0	189.1	196.2	767.4	179.0
1994	142.3	152.4	64.6	141.2	65.2	113.0	191.5	196.8	768.5	181.4
1995	142.2	151.7	64.4	140.8	65.3	113.0	194.0	197.4	769.7	183.8
1996	142.0	150.9	64.2	140.5	65.4	113.0	196.4	198.0	770.8	186.2
1997	141.9	150.2	63.9	140.1	65.4	113.0	198.8	198.6	771.9	188.5
1998	141.8	149.5	63.7	139.8	65.5	113.0	201.2	199.3	773.0	190.9
1999	141.6	148.7	63.5	139.5	65.6	113.0	203.6	199.9	774.2	193.3
2000	141.5	148.0	63.3	139.1	65.7	113.0	206.0	200.5	775.3	195.7
2001	**141.4**	**147.2**	63.0	**138.8**	**65.7**	113.0	**208.5**	**201.1**	**776.4**	**198.1**
2002	141.4	147.2	62.8	138.8	65.7	113.0	208.5	201.1	776.4	198.1
2003	141.4	147.2	62.6	138.8	65.7	113.0	208.5	201.1	776.4	198.1
2004	**141.4**	**147.2**	**62.4**	**138.8**	**65.7**	**113.0**	**208.5**	**201.1**	**776.4**	**198.1**
2005	**141.4**	**147.2**	**62.4**	**138.8**	**65.7**	**113.0**	**208.5**	**201.1**	**776.4**	**198.1**
2006	**141.4**	**147.2**	**62.4**	**138.8**	**65.7**	**113.0**	**208.5**	**201.1**	**776.4**	**198.1**
2007	141.4	147.2	62.4	138.8	65.7	113.0	208.5	201.1	776.4	198.1
2008	141.4	147.2	62.4	138.8	65.7	113.0	208.5	201.1	776.4	198.1

Table 16 (continued)
Fort Lyon Irrigated Acreage by Farm
(units of acres unless noted)

Irrigation Year	ARF Farm No. 53	ARF Farm No. 54B	ARF Farm No. 57	ARF Farm No. 58	ARF Farm No. 59	ARF Farm No. 60	ARF Farm No. 61	ARF Farm No. 62a&b	ARF Farm No. 63	ARF Farm No. 64
(1)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)
2009	**141.4**	**147.2**	**62.4**	**138.8**	**65.7**	**113.0**	**208.5**	**201.1**	**776.4**	**198.1**
2010	141.4	147.2	62.4	138.8	65.7	113.0	208.5	201.1	776.4	198.1
2011	**141.4**	**147.2**	**62.4**	**138.8**	**65.7**	**113.0**	**208.5**	**201.1**	**776.4**	**198.1**
2012	141.4	147.2	62.4	138.8	65.7	113.0	208.5	201.1	776.4	198.1
2013	**141.4**	**147.2**	**62.4**	**138.8**	**65.7**	**113.0**	**208.5**	**201.1**	**776.4**	**198.1**
2014	141.4	147.2	62.4	138.8	65.7	113.0	208.5	201.1	776.4	198.1
Average	144.4	153.7	66.6	126.6	67.1	113.0	212.9	203.1	785.8	203.4
Maximum	154.2	159.2	74.0	147.2	70.6	116.1	234.6	209.2	803.3	218.1
Minimum	132.5	147.2	62.4	103.4	64.5	98.4	169.8	191.2	758.4	160.0

Table 16 (continued)
Fort Lyon Irrigated Acreage by Farm
(units of acres unless noted)

Irrigation Year	ARF Farm No. 65	ARF Farm No. 85	ARF Farm No. 110	ARF Farm No. 114	ARF Farm No. 118	ARF Farm No. 127	ARF Farm No. 132/133	ARF Farm No. 141	ARF FarmCoen
(1)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)
1950	147.9	175.2	227.5	233.9	185.9	90.5	183.7	223.6	125.1
1951	148.0	172.2	227.5	233.9	185.9	90.5	184.1	223.6	125.0
1952	148.1	169.3	227.5	233.9	185.9	90.5	184.5	223.6	124.9
1953	148.2	166.3	227.5	234.0	185.9	90.5	184.9	223.6	124.8
1954	**148.4**	**163.4**	**227.5**	**234.0**	**185.9**	**90.5**	**185.4**	**223.6**	**124.7**
1955	148.6	162.9	227.6	234.0	185.9	90.5	181.3	223.6	125.2
1956	148.9	162.4	227.7	234.0	185.9	90.5	177.2	223.6	125.8
1957	149.2	161.9	227.8	234.0	185.9	90.5	173.1	223.6	126.3
1958	149.4	161.5	228.0	234.0	185.9	90.5	169.1	223.6	126.9
1959	149.7	161.0	228.1	234.0	185.9	90.5	165.0	223.6	127.4
1960	150.0	160.5	228.2	234.0	185.9	90.5	160.9	223.6	128.0
1961	150.2	160.0	228.3	234.0	185.9	90.5	156.8	223.6	128.5
1962	150.5	159.5	228.5	234.0	185.9	90.5	152.8	223.6	129.0
1963	150.8	159.1	228.6	234.0	185.9	90.5	148.7	223.6	129.6
1964	151.0	158.6	228.7	234.0	185.9	90.5	144.6	223.6	130.1
1965	151.3	158.1	228.8	234.0	185.9	90.5	140.5	223.6	130.7
1966	151.6	157.6	229.0	234.0	185.9	90.5	136.5	223.6	131.2
1967	151.8	157.2	229.1	234.0	185.9	90.5	132.4	223.6	131.8
1968	152.1	156.7	229.2	234.0	185.9	90.5	128.3	223.6	132.3
1969	152.4	156.2	229.4	234.0	185.9	90.5	124.2	223.6	132.9
1970	152.6	155.7	229.5	234.0	185.9	90.5	120.2	223.6	133.4
1971	152.9	155.3	229.6	234.0	185.9	90.5	116.1	223.6	134.0
1972	153.2	154.8	229.7	234.0	185.9	90.5	112.0	223.6	134.5
1973	153.4	154.3	229.9	234.0	185.9	90.5	107.9	223.6	135.1
1974	153.7	153.8	230.0	234.0	185.9	90.5	103.9	223.6	135.6
1975	**154.0**	**153.3**	**230.1**	**234.0**	**185.9**	**90.5**	**99.8**	**223.6**	**136.2**
1976	153.3	153.6	229.9	233.9	185.9	90.5	110.6	223.6	136.5
1977	152.7	153.9	229.6	233.8	185.9	90.5	121.4	223.6	136.8
1978	152.0	154.2	229.4	233.7	185.9	90.5	132.2	223.6	137.2
1979	151.4	154.5	229.2	233.6	185.9	90.5	143.0	223.6	137.5
1980	150.7	154.8	228.9	233.5	185.9	90.5	153.8	223.6	137.9
1981	150.0	155.1	228.7	233.4	185.9	90.5	164.6	223.6	138.2
1982	149.4	155.4	228.5	233.3	185.9	90.5	175.3	223.6	138.5
1983	**148.7**	**155.7**	**228.3**	**233.2**	**185.9**	**90.5**	**186.1**	**223.6**	**138.9**
1984	152.2	152.3	223.4	229.3	178.2	92.8	190.3	216.4	145.8
1985	***155.7***	***149.0***	***218.5***	***225.5***	***170.5***	***95.2***	***194.4***	***209.2***	***152.8***
1986	155.2	148.5	219.1	224.5	170.9	94.7	194.0	209.9	151.7
1987	154.6	148.0	219.7	223.5	171.2	94.2	193.7	210.6	150.7
1988	154.1	147.6	220.2	222.5	171.5	93.7	193.3	211.2	149.6
1989	153.5	147.1	220.8	221.5	171.9	93.3	192.9	211.9	148.6
1990	153.0	146.6	221.4	220.5	172.2	92.8	192.5	212.5	147.5
1991	152.4	146.1	222.0	219.5	172.6	92.3	192.2	213.2	146.4
1992	151.9	145.7	222.5	218.5	172.9	91.8	191.8	213.9	145.4
1993	151.3	145.2	223.1	217.5	173.2	91.4	191.4	214.5	144.3
1994	150.8	144.7	223.7	216.5	173.6	90.9	191.0	215.2	143.3
1995	150.2	144.2	224.3	215.5	173.9	90.4	190.7	215.8	142.2
1996	149.7	143.7	224.8	214.5	174.3	89.9	190.3	216.5	141.1
1997	149.1	143.3	225.4	213.5	174.6	89.4	189.9	217.2	140.1
1998	148.6	142.8	226.0	212.5	175.0	89.0	189.5	217.8	139.0
1999	148.0	142.3	226.6	211.5	175.3	88.5	189.2	218.5	138.0
2000	147.5	141.8	227.1	210.5	175.6	88.0	188.8	219.2	136.9
2001	**146.9**	**141.4**	**227.7**	**209.5**	**176.0**	**87.5**	**188.4**	**219.8**	**135.8**
2002	146.9	141.4	227.7	209.5	176.0	87.5	188.4	219.8	135.8
2003	146.9	141.4	227.7	209.5	176.0	87.5	188.4	219.8	135.8
2004	**146.9**	**141.4**	**227.7**	**209.5**	**176.0**	**87.5**	**188.4**	**219.8**	**135.8**
2005	**146.9**	**141.4**	**227.7**	**209.5**	**176.0**	**87.5**	**188.4**	**219.8**	**135.8**
2006	**146.9**	**141.4**	**227.7**	**209.5**	**176.0**	**87.5**	**188.4**	**219.8**	**135.8**
2007	146.9	141.4	227.7	209.5	176.0	87.5	188.4	219.8	135.8
2008	146.9	141.4	227.7	209.5	176.0	87.5	188.4	219.8	135.8

Table 16 (continued)

Fort Lyon Irrigated Acreage by Farm

(units of acres unless noted)

Irrigation Year	ARF Farm No. 65	ARF Farm No. 85	ARF Farm No. 110	ARF Farm No. 114	ARF Farm No. 118	ARF Farm No. 127	ARF Farm No. 132/133	ARF Farm No. 141	ARF FarmCoen
(1)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)
2009	**146.9**	**141.4**	**227.7**	**209.5**	**176.0**	**87.5**	**188.4**	**219.8**	**135.8**
2010	146.9	141.4	227.7	209.5	176.0	87.5	188.4	219.8	135.8
2011	**146.9**	**141.4**	**227.7**	**209.5**	**176.0**	**87.5**	**188.4**	**219.8**	**135.8**
2012	146.9	141.4	227.7	209.5	176.0	87.5	188.4	219.8	135.8
2013	**146.9**	**141.4**	**227.7**	**209.5**	**176.0**	**87.5**	**188.4**	**219.8**	**135.8**
2014	146.9	141.4	227.7	209.5	176.0	87.5	188.4	219.8	135.8
Average	150.2	151.7	227.0	224.6	180.5	90.2	168.5	220.4	135.9
Maximum	155.7	175.2	230.1	234.0	185.9	95.2	194.4	223.6	152.8
Minimum	146.9	141.4	218.5	209.5	170.5	87.5	99.8	209.2	124.7

Table 17

Arkansas River Farms No. 1 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
1950	432	61	22	180	313	17	296	10	65	29	65%	**140**	147	63	45	0	11	221	221	61%	49
1951	417	38	21	166	288	16	272	10	59	26	65%	**135**	139	29	38	0	10	179	179	61%	71
1952	482	7	30	179	310	17	292	10	64	28	65%	**129**	149	50	41	0	11	210	210	61%	124
1953	399	0	27	146	252	14	238	8	52	23	65%	**123**	115	40	40	0	9	164	164	61%	120
1954	216	0	30	79	137	8	129	5	28	12	65%	**117**	48	31	36	0	4	83	83	61%	214
1955	314	8	28	118	204	11	193	7	42	19	65%	**119**	107	23	18	0	7	138	138	61%	152
1956	306	0	27	112	193	11	183	6	40	18	65%	**121**	82	37	37	0	6	125	125	61%	152
1957	599	11	19	224	387	21	365	13	80	35	65%	**123**	169	31	69	0	15	215	215	61%	0
1958	300	110	24	149	261	14	247	9	54	24	65%	**125**	156	43	5	0	11	210	210	61%	48
1959	411	55	25	170	295	16	279	10	61	27	65%	**127**	116	40	65	0	10	166	166	61%	113
1960	398	5	27	148	255	14	241	8	53	23	65%	**129**	105	68	51	0	9	181	181	61%	117
1961	506	7	20	188	325	18	307	11	67	30	65%	**131**	139	60	60	0	11	210	210	61%	22
1962	513	44	25	204	353	19	334	12	73	32	65%	**133**	184	41	33	0	14	239	239	61%	49
1963	319	6	31	119	205	11	194	7	42	19	65%	**135**	67	61	59	0	6	134	134	61%	215
1964	295	0	27	108	187	10	176	6	38	17	65%	**137**	76	38	38	0	6	120	120	61%	190
1965	528	69	20	218	378	21	358	13	78	35	65%	**138**	146	53	86	0	13	213	213	61%	34
1966	345	67	24	150	262	14	248	9	54	24	65%	**140**	139	51	22	0	10	200	200	61%	89
1967	443	66	24	186	323	18	306	11	67	29	65%	**142**	162	42	37	0	11	215	215	61%	78
1968	488	17	23	185	320	18	302	11	66	29	65%	**144**	134	62	62	0	11	207	207	61%	74
1969	538	16	19	203	351	19	331	12	72	32	65%	**146**	158	53	58	0	13	224	224	61%	26
1970	519	55	24	210	364	20	344	12	75	33	65%	**148**	187	32	37	0	14	233	233	61%	77
1971	438	60	24	182	316	17	299	10	65	29	65%	**150**	150	47	44	0	11	208	208	61%	100
1972	382	45	25	156	271	15	256	9	56	25	65%	**152**	132	41	34	0	9	182	182	61%	144
1973	472	47	24	190	329	18	311	11	68	30	65%	**154**	161	32	42	0	13	207	207	61%	117
1974	282	41	29	118	205	11	194	7	42	19	65%	**156**	79	49	47	0	7	136	136	61%	244
1975	454	0	25	167	288	16	272	10	59	26	65%	**158**	130	53	46	0	10	194	194	61%	152
1976	286	26	26	114	197	11	187	7	41	18	65%	**158**	92	20	29	0	7	119	119	61%	225
1977	249	25	28	100	174	10	164	6	36	16	65%	**158**	83	32	24	0	5	121	121	61%	259
1978	344	0	24	126	218	12	206	7	45	20	65%	**158**	99	35	35	0	8	141	141	61%	183
1979	396	50	22	163	283	16	268	9	58	26	65%	**158**	136	30	38	0	12	178	178	61%	122
1980	444	130	27	209	366	20	346	12	75	33	65%	**158**	174	58	51	0	15	247	247	61%	120
1981	217	140	31	129	228	12	215	8	47	21	65%	**158**	130	10	10	0	9	149	149	61%	265
1982	568	48	23	225	391	22	369	13	80	36	65%	**158**	184	18	56	0	15	217	217	61%	100
1983	657	132	27	287	501	28	474	17	103	46	65%	**158**	264	78	44	0	21	363	363	61%	15
1984	715	94	26	295	514	28	485	17	106	47	65%	**146**	261	32	55	0	21	314	314	61%	25
1985	679	167	27	308	538	30	509	18	111	49	65%	**134**	265	39	66	0	23	326	326	61%	0
1986	426	1	25	157	271	15	256	9	56	25	65%	**136**	139	62	27	0	11	212	212	61%	86
1987	585	0	27	215	371	20	350	12	76	34	65%	**138**	190	39	38	0	15	244	244	61%	83
1988	423	160	28	211	371	20	351	12	77	34	65%	**140**	185	54	43	0	15	254	254	61%	89
1989	309	113	26	153	269	15	254	9	55	25	65%	**142**	153	19	13	0	11	182	182	61%	136
1990	370	69	27	160	278	15	263	9	57	25	65%	**144**	163	7	8	0	12	182	182	61%	152
1991	331	92	26	154	269	15	255	9	56	25	65%	**146**	138	26	27	0	10	174	174	61%	147
1992	348	80	21	156	272	15	257	9	56	25	65%	**148**	155	15	12	0	11	181	181	61%	94
1993	445	100	21	198	346	19	327	11	71	32	65%	**150**	156	31	57	0	14	201	201	61%	80
1994	403	138	26	197	345	19	326	11	71	31	65%	**152**	175	55	37	0	14	243	243	61%	105
1995	638	72	21	259	451	25	426	15	93	41	65%	**154**	185	77	91	0	18	280	280	61%	8
1996	484	154	21	232	406	22	384	13	84	37	65%	**155**	207	57	42	0	16	280	280	61%	8
1997	587	95	24	249	433	24	409	14	89	39	65%	**157**	232	23	33	0	18	273	273	61%	62
1998	501	100	26	219	382	21	361	13	79	35	65%	**159**	213	20	22	0	16	249	249	61%	111
1999	595	65	21	241	419	23	396	14	86	38	65%	**161**	211	59	46	0	18	288	288	61%	15
2000	548	118	29	243	424	23	401	14	87	39	65%	**163**	186	65	74	0	16	267	267	61%	145
2001	310	129	28	159	280	15	264	9	58	26	65%	**165**	140	48	32	0	12	200	200	61%	196
2002	119	51	35	62	109	6	103	4	22	10	65%	**165**	58	6	8	0	4	68	68	61%	421

Table 17

Arkansas River Farms No. 1 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	267	0	37	98	169	9	160	6	35	15	65%	165	99	7	5	0	7	113	113	61%	403
2004	325	0	27	119	206	11	194	7	42	19	65%	165	121	6	6	0	9	135	135	61%	241
2005	433	0	33	159	274	15	259	9	56	25	65%	165	148	12	20	0	11	172	172	61%	295
2006	298	54	28	128	224	12	211	7	46	20	65%	165	116	14	21	0	9	139	139	61%	262
2007	501	115	26	224	391	22	370	13	81	36	65%	165	213	38	28	0	16	266	266	61%	106
2008	420	101	32	189	331	18	313	11	68	30	65%	165	184	11	19	0	13	208	208	61%	249
2009	389	81	26	171	299	16	282	10	62	27	65%	165	164	18	20	0	12	194	194	61%	173
2010	435	82	31	188	328	18	310	11	68	30	65%	165	179	39	22	0	13	231	231	61%	211
2011	333	50	39	140	243	13	230	8	50	22	65%	165	149	0	0	0	11	160	160	61%	382
2012	126	52	47	65	114	6	107	4	23	10	65%	165	59	10	10	0	4	74	74	61%	579
2013	296	0	42	109	187	10	177	6	39	17	65%	165	115	0	0	0	7	122	122	61%	464
2014	417	24	40	162	280	15	264	9	58	26	65%	165	164	2	8	0	12	177	177	61%	391
Avg	416	58	27	173	300	17	284	10	62	27	65%	148	149	36	36	0	12	196	196	61%	151
Max	715	167	47	308	538	30	509	18	111	49	65%	165	265	78	91	0	23	363	363	61%	579
Min	119	0	19	62	109	6	103	4	22	10	65%	117	48	0	0	0	4	68	68	61%	0
1979 to 2014																					
Avg	426	79	28	184	321	18	303	11	66	29	65%	156	167	30	30	0	13	210	210	61%	176
Max	715	167	47	308	538	30	509	18	111	49	65%	165	265	78	91	0	23	363	363	61%	579
Min	119	0	21	62	109	6	103	4	22	10	65%	134	58	0	0	0	4	68	68	61%	0

Explanation of Columns
(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Total No. of Shares	**204**
Trade Shares	**204**
Total Consumptive Use	**210**
Trade Shares Pro Rata CU	**210**

Table 18

Arkansas River Farms No. 2 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year (1)	River Headgate Diversions (2)	Reservoir Releases (3)	Crop Irrigation Reqt (In) (4)	Ditch Loss (5)	Farm Turnout Delivery (6)	Off-Farm Lateral Loss (7)	Farm Delivery (8)	On-Farm Lateral Loss (9)	Initial Deep Percolation (10)	Tail water (11)	Max Farm Efficiency (12)	Irrigated Acreage (13)	Applied Irrigation Water to Crop Consumptive Use (14)	Consumptive Use From Soil Moisture (15)	Applied Irrigation Water to Soil Moisture Storage (16)	Applied Irrigation Water to Additional Deep Perc (17)	SEV Losses (18)	Total Consumptive Use (19)	Prorated Total Consumptive Use (20)	Calculated Actual Farm Efficiency (21)	Crop Consumptive Use Shortage (22)
1950	305	43	22	127	221	12	209	7	46	20	65%	**101**	104	45	32	0	8	156	156	61%	37
1951	294	27	21	117	203	11	192	7	42	19	65%	**102**	99	20	26	0	7	126	126	61%	63
1952	340	5	30	127	219	12	206	7	45	20	65%	**104**	106	35	29	0	8	148	148	61%	121
1953	281	0	27	103	178	10	168	6	37	16	65%	**106**	83	27	27	0	6	116	116	61%	129
1954	153	0	30	56	97	5	91	3	20	9	65%	**108**	36	20	24	0	3	59	59	61%	216
1955	222	6	28	83	144	8	136	5	30	13	65%	**108**	77	15	11	0	5	97	97	61%	165
1956	216	0	27	79	137	8	129	5	28	12	65%	**108**	60	24	24	0	5	88	88	61%	158
1957	423	8	19	158	273	15	258	9	56	25	65%	**107**	128	34	40	0	11	173	173	61%	12
1958	212	78	24	105	184	10	174	6	38	17	65%	**107**	111	8	2	0	8	127	127	61%	93
1959	290	38	25	120	208	11	197	7	43	19	65%	**107**	83	27	45	0	7	117	117	61%	116
1960	281	3	27	104	180	10	170	6	37	16	65%	**107**	75	46	35	0	6	128	128	61%	118
1961	357	5	20	133	229	13	217	8	47	21	65%	**106**	101	41	40	0	8	150	150	61%	37
1962	362	31	25	144	249	14	236	8	51	23	65%	**106**	132	26	21	0	10	167	167	61%	62
1963	225	4	31	84	145	8	137	5	30	13	65%	**106**	48	41	41	0	4	94	94	61%	180
1964	208	0	27	76	132	7	124	4	27	12	65%	**105**	55	26	26	0	4	85	85	61%	155
1965	372	48	20	154	267	15	252	9	55	24	65%	**105**	105	37	59	0	9	151	151	61%	36
1966	244	48	24	106	185	10	175	6	38	17	65%	**105**	99	34	15	0	7	140	140	61%	75
1967	313	47	24	131	228	13	216	8	47	21	65%	**105**	115	28	25	0	8	151	151	61%	63
1968	345	12	23	131	226	12	213	7	46	21	65%	**104**	95	43	43	0	7	146	146	61%	57
1969	380	11	19	143	248	14	234	8	51	23	65%	**104**	111	38	41	0	9	158	158	61%	20
1970	366	39	24	148	257	14	243	9	53	23	65%	**104**	131	23	26	0	10	164	164	61%	53
1971	309	43	24	128	223	12	211	7	46	20	65%	**103**	105	34	32	0	8	147	147	61%	65
1972	270	32	25	110	191	11	181	6	39	17	65%	**103**	93	29	25	0	7	129	129	61%	93
1973	333	33	24	134	232	13	220	8	48	21	65%	**103**	113	23	30	0	10	145	145	61%	72
1974	199	29	29	83	145	8	137	5	30	13	65%	**103**	56	36	33	0	5	96	96	61%	154
1975	321	0	25	118	203	11	192	7	42	19	65%	**102**	91	38	34	0	7	137	137	61%	88
1976	202	18	26	80	139	8	132	5	29	13	65%	**99**	64	15	21	0	5	84	84	61%	132
1977	176	18	28	71	123	7	116	4	25	11	65%	**96**	56	25	19	0	4	85	85	61%	146
1978	243	0	24	89	154	8	145	5	32	14	65%	**92**	69	25	25	0	5	100	100	61%	91
1979	280	36	22	115	200	11	189	7	41	18	65%	**89**	94	23	29	0	8	126	126	61%	46
1980	314	92	27	147	258	14	244	9	53	24	65%	**86**	123	41	36	0	10	174	174	61%	28
1981	153	98	31	91	161	9	152	5	33	15	65%	**83**	92	7	7	0	7	105	105	61%	113
1982	401	34	23	159	276	15	261	9	57	25	65%	**79**	119	17	51	0	11	147	147	61%	15
1983	464	93	27	203	354	19	334	12	73	32	65%	**76**	161	11	42	14	15	186	186	57%	0
1984	505	66	26	209	363	20	343	12	75	33	65%	**84**	173	9	9	40	15	198	198	50%	0
1985	479	118	27	217	380	21	359	13	78	35	65%	**92**	184	24	24	25	16	224	224	55%	0
1986	301	1	25	111	191	11	180	6	39	17	65%	**91**	97	78	16	4	8	183	183	59%	16
1987	413	0	27	152	262	14	247	9	54	24	65%	**89**	130	30	30	0	11	171	171	61%	42
1988	298	113	28	149	262	14	248	9	54	24	65%	**88**	127	41	34	0	10	178	178	61%	38
1989	218	80	26	108	190	10	179	6	39	17	65%	**87**	106	17	11	0	7	130	130	61%	64
1990	261	48	27	113	197	11	186	6	40	18	65%	**85**	113	6	8	0	8	127	127	61%	72
1991	234	65	26	109	190	10	180	6	39	17	65%	**84**	96	20	21	0	7	123	123	61%	63
1992	246	56	21	110	192	11	181	6	40	18	65%	**82**	105	16	13	0	8	129	129	61%	26
1993	314	70	21	140	245	13	231	8	50	22	65%	**81**	103	29	47	0	10	142	142	61%	12
1994	285	98	26	139	244	13	230	8	50	22	65%	**79**	118	42	31	0	10	170	170	61%	15
1995	450	51	21	183	318	18	301	11	66	29	65%	**78**	119	18	76	0	13	150	150	61%	0
1996	341	109	21	164	287	16	271	9	59	26	65%	**77**	124	10	11	41	11	145	145	47%	0
1997	414	67	24	176	306	17	289	10	63	28	65%	**75**	143	8	8	36	13	164	164	50%	0
1998	354	70	26	154	269	15	255	9	56	25	65%	**74**	134	25	25	6	11	171	171	59%	0
1999	420	46	21	170	295	16	279	10	61	27	65%	**72**	125	3	3	53	12	140	140	43%	0
2000	387	83	29	171	299	16	283	10	62	27	65%	**71**	123	50	13	48	11	184	184	45%	0
2001	219	91	28	112	197	11	187	7	41	18	65%	**70**	93	50	28	0	8	151	151	61%	19
2002	84	36	35	44	77	4	73	3	16	7	65%	**70**	39	7	8	0	3	48	48	61%	159

Table 18

Arkansas River Farms No. 2 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	189	0	37	69	119	7	113	4	25	11	65%	**70**	68	7	6	0	5	80	80	61%	140
2004	229	0	27	84	145	8	137	5	30	13	65%	**70**	78	10	11	0	6	94	94	61%	67
2005	306	0	33	112	193	11	183	6	40	18	65%	**70**	97	18	22	0	8	123	123	61%	77
2006	210	38	28	91	158	9	149	5	33	14	65%	**70**	78	12	19	0	6	96	96	61%	75
2007	353	81	26	158	276	15	261	9	57	25	65%	**70**	119	31	50	0	11	161	161	61%	0
2008	296	71	32	134	234	13	221	8	48	21	65%	**70**	123	43	21	0	10	175	175	61%	22
2009	275	57	26	121	211	12	199	7	43	19	65%	**70**	104	24	25	0	9	137	137	61%	21
2010	307	58	31	133	232	13	219	8	48	21	65%	**70**	118	35	24	0	9	163	163	61%	27
2011	235	35	39	99	172	9	162	6	35	16	65%	**70**	105	1	1	0	7	113	113	61%	118
2012	89	37	47	46	80	4	76	3	17	7	65%	**70**	42	7	7	0	3	52	52	61%	224
2013	209	0	42	77	132	7	125	4	27	12	65%	**70**	79	1	2	0	5	86	86	61%	164
2014	295	17	40	114	198	11	187	7	41	18	65%	**70**	113	4	9	0	9	125	125	61%	118
Avg	293	41	27	122	212	12	200	7	44	19	65%	**89**	101	25	25	4	8	134	134	60%	71
Max	505	118	47	217	380	21	359	13	78	35	65%	**108**	184	78	76	53	16	224	224	61%	224
Min	84	0	19	44	77	4	73	3	16	7	65%	**70**	36	1	1	0	3	48	48	43%	0
1979 to 2014																					
Avg	301	56	28	130	227	12	214	7	47	21	65%	**77**	110	22	22	7	9	141	141	59%	49
Max	505	118	47	217	380	21	359	13	78	35	65%	**92**	184	78	76	53	16	224	224	61%	224
Min	84	0	21	44	77	4	73	3	16	7	65%	**70**	39	1	1	0	3	48	48	43%	0

Explanation of Columns
(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Total No. of Shares	**144**
Trade Shares	**144**
Total Consumptive Use	**141**
Trade Shares Pro Rata CU	**141**

Table 19

Arkansas River Farms No. 3 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
1950	176	25	22	73	127	7	120	4	26	12	65%	73	61	26	17	0	6	94	93	61%	48
1951	170	15	21	68	117	6	111	4	24	11	65%	73	59	9	13	0	6	75	74	61%	61
1952	196	3	30	73	126	7	119	4	26	11	65%	73	62	19	16	0	7	87	86	61%	102
1953	162	0	27	60	103	6	97	3	21	9	65%	73	49	14	14	0	5	68	68	61%	100
1954	88	0	30	32	56	3	53	2	11	5	65%	73	21	11	13	0	2	35	34	61%	150
1955	128	3	28	48	83	5	79	3	17	8	65%	73	45	8	6	0	4	57	57	61%	119
1956	124	0	27	46	79	4	74	3	16	7	65%	73	35	13	13	0	4	52	51	61%	115
1957	244	5	19	91	157	9	149	5	32	14	65%	73	75	18	21	0	9	102	101	61%	24
1958	122	45	24	60	106	6	100	4	22	10	65%	73	64	4	1	0	7	75	74	61%	75
1959	167	22	25	69	120	7	114	4	25	11	65%	73	49	14	25	0	6	69	68	61%	90
1960	162	2	27	60	104	6	98	3	21	9	65%	73	44	26	20	0	5	75	74	61%	93
1961	206	3	20	77	132	7	125	4	27	12	65%	73	59	24	22	0	7	89	88	61%	40
1962	209	18	25	83	144	8	136	5	30	13	65%	73	77	13	11	0	8	99	97	61%	60
1963	130	2	31	48	84	5	79	3	17	8	65%	73	29	23	23	0	3	55	54	61%	134
1964	120	0	27	44	76	4	72	3	16	7	65%	73	33	14	14	0	3	50	49	61%	115
1965	215	28	20	89	154	8	145	5	32	14	65%	73	63	21	32	0	8	91	90	61%	39
1966	140	27	24	61	107	6	101	4	22	10	65%	73	58	17	8	0	6	81	80	61%	68
1967	180	27	24	76	132	7	124	4	27	12	65%	73	69	13	12	0	7	89	88	61%	61
1968	199	7	23	75	130	7	123	4	27	12	65%	73	57	23	23	0	6	86	85	61%	56
1969	219	6	19	83	143	8	135	5	29	13	65%	73	66	20	21	0	7	94	93	61%	31
1970	211	22	24	85	148	8	140	5	31	14	65%	73	79	11	12	0	8	98	97	61%	55
1971	178	25	24	74	129	7	121	4	26	12	65%	73	63	16	16	0	7	85	84	61%	65
1972	156	18	25	64	110	6	104	4	23	10	65%	73	55	15	13	0	6	76	75	61%	81
1973	192	19	24	77	134	7	127	4	28	12	65%	72	66	14	16	0	8	88	87	61%	67
1974	115	17	29	48	83	5	79	3	17	8	65%	72	33	18	19	0	4	55	54	61%	122
1975	185	0	25	68	117	6	111	4	24	11	65%	72	54	21	18	0	6	81	80	61%	79
1976	116	10	26	46	80	4	76	3	17	7	65%	73	38	7	11	0	4	50	49	61%	109
1977	101	10	28	41	71	4	67	2	15	6	65%	73	35	12	8	0	3	50	49	61%	125
1978	140	0	24	51	89	5	84	3	18	8	65%	73	40	14	14	0	5	59	58	61%	91
1979	161	21	22	66	115	6	109	4	24	11	65%	73	56	12	15	0	7	75	74	61%	65
1980	181	53	27	85	149	8	141	5	31	14	65%	73	71	24	21	0	9	103	102	61%	68
1981	88	57	31	52	93	5	88	3	19	8	65%	73	53	4	4	0	5	62	62	61%	129
1982	231	19	23	92	159	9	150	5	33	14	65%	73	77	7	21	0	9	92	91	61%	55
1983	267	54	27	117	204	11	193	7	42	19	65%	73	111	28	14	0	12	151	149	61%	26
1984	291	38	26	120	209	12	197	7	43	19	65%	75	108	11	20	0	13	131	130	61%	44
1985	276	68	27	125	219	12	207	7	45	20	65%	77	119	17	16	0	13	149	148	61%	37
1986	173	1	25	64	110	6	104	4	23	10	65%	77	58	11	10	0	7	76	75	61%	92
1987	238	0	27	87	151	8	142	5	31	14	65%	77	85	12	7	0	9	107	105	61%	75
1988	172	65	28	86	151	8	143	5	31	14	65%	77	82	13	11	0	9	104	102	61%	84
1989	126	46	26	62	109	6	103	4	23	10	65%	76	64	4	4	0	6	73	72	61%	98
1990	150	28	27	65	113	6	107	4	23	10	65%	76	68	2	2	0	7	76	76	61%	101
1991	135	38	26	63	110	6	104	4	23	10	65%	76	57	10	10	0	6	73	72	61%	96
1992	142	32	21	63	111	6	105	4	23	10	65%	76	64	5	4	0	7	75	74	61%	68
1993	181	41	21	81	141	8	133	5	29	13	65%	76	66	10	21	0	8	84	83	61%	60
1994	164	56	26	80	140	8	133	5	29	13	65%	76	74	20	13	0	8	102	101	61%	74
1995	259	29	21	106	183	10	173	6	38	17	65%	76	79	30	33	0	11	120	119	61%	24
1996	197	63	21	94	165	9	156	5	34	15	65%	75	88	17	13	0	9	114	113	61%	27
1997	239	39	24	101	176	10	166	6	36	16	65%	75	97	6	12	0	11	114	112	61%	48
1998	204	40	26	89	155	9	147	5	32	14	65%	75	87	8	9	0	10	104	103	61%	67
1999	242	26	21	98	170	9	161	6	35	16	65%	74	87	24	18	0	10	121	119	61%	21
2000	223	48	29	99	172	9	163	6	36	16	65%	74	77	24	29	0	9	111	110	61%	78
2001	126	52	28	65	114	6	108	4	23	10	65%	74	58	19	12	0	7	83	82	61%	95
2002	49	21	35	25	44	2	42	1	9	4	65%	73	24	2	3	0	2	28	28	61%	190

Table 19

Arkansas River Farms No. 3 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)

3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	109	0	37	40	69	4	65	2	14	6	65%	73	40	3	2	0	4	47	47	61%	183
2004	132	0	27	49	84	5	79	3	17	8	65%	73	50	2	2	0	5	56	56	61%	111
2005	176	0	33	65	111	6	105	4	23	10	65%	73	60	5	8	0	7	72	71	61%	136
2006	121	22	28	52	91	5	86	3	19	8	65%	73	48	5	8	0	5	58	57	61%	120
2007	204	47	26	91	159	9	150	5	33	15	65%	73	88	15	10	0	9	112	110	61%	55
2008	171	41	32	77	135	7	127	4	28	12	65%	73	76	3	7	0	8	87	86	61%	117
2009	158	33	26	70	121	7	115	4	25	11	65%	73	67	7	8	0	7	81	80	61%	83
2010	177	33	31	77	134	7	126	4	28	12	65%	73	73	16	9	0	8	96	95	61%	101
2011	135	20	39	57	99	5	93	3	20	9	65%	73	61	0	0	0	6	67	66	61%	174
2012	51	21	47	26	46	3	44	2	10	4	65%	73	24	4	4	0	2	31	30	61%	258
2013	120	0	42	44	76	4	72	3	16	7	65%	73	47	0	0	0	4	51	51	61%	209
2014	170	10	40	66	114	6	108	4	23	10	65%	73	67	1	3	0	7	75	74	61%	178
Avg	169	23	27	70	122	7	115	4	25	11	65%	74	62	13	13	0	7	82	81	61%	90
Max	291	68	47	125	219	12	207	7	45	20	65%	77	119	30	33	0	13	151	149	61%	258
Min	49	0	19	25	44	2	42	1	9	4	65%	72	21	0	0	0	2	28	28	61%	21
1979 to 2014																					
Avg	173	32	28	75	131	7	123	4	27	12	65%	74	70	11	11	0	8	88	87	61%	96
Max	291	68	47	125	219	12	207	7	45	20	65%	77	119	30	33	0	13	151	149	61%	258
Min	49	0	21	25	44	2	42	1	9	4	65%	73	24	0	0	0	2	28	28	61%	21

Explanation of Columns

(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Total No. of Shares	**83**
Trade Shares	**82**
Total Consumptive Use	**88**
Trade Shares Pro Rata CU	**87**

Table 20

Arkansas River Farms No. 13 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
1950	398	56	22	166	289	16	273	10	59	26	65%	**110**	134	57	43	0	15	206	206	61%	12
1951	384	35	21	153	266	15	251	9	55	24	65%	**110**	124	31	39	0	14	169	169	61%	41
1952	444	6	30	165	285	16	270	9	59	26	65%	**110**	137	47	39	0	15	198	198	61%	93
1953	367	0	27	135	233	13	220	8	48	21	65%	**110**	106	37	37	0	12	155	155	61%	104
1954	199	0	30	73	126	7	119	4	26	12	65%	**111**	45	28	33	0	6	79	79	61%	204
1955	290	7	28	109	188	10	178	6	39	17	65%	**110**	99	21	17	0	10	130	130	61%	142
1956	282	0	27	103	178	10	168	6	37	16	65%	**110**	75	34	34	0	9	118	118	61%	138
1957	552	10	19	206	356	20	337	12	73	32	65%	**110**	153	26	66	0	20	199	199	61%	0
1958	276	101	24	137	241	13	227	8	50	22	65%	**110**	143	44	5	0	15	202	202	61%	31
1959	378	50	25	157	272	15	257	9	56	25	65%	**110**	106	38	61	0	13	157	157	61%	90
1960	367	4	27	136	235	13	222	8	48	21	65%	**110**	96	63	48	0	11	170	170	61%	89
1961	466	7	20	173	299	17	283	10	62	27	65%	**110**	126	55	58	0	15	196	196	61%	6
1962	473	40	25	188	325	18	308	11	67	30	65%	**110**	165	44	35	0	18	227	227	61%	19
1963	294	5	31	110	189	10	179	6	39	17	65%	**110**	61	58	55	0	7	126	126	61%	162
1964	272	0	27	100	172	10	162	6	35	16	65%	**110**	68	38	38	0	8	113	113	61%	140
1965	486	63	20	201	349	19	329	12	72	32	65%	**110**	126	50	88	0	18	194	194	61%	9
1966	318	62	24	139	242	13	228	8	50	22	65%	**110**	124	55	25	0	13	192	192	61%	39
1967	408	61	24	171	298	16	282	10	61	27	65%	**110**	142	47	41	0	15	204	204	61%	28
1968	450	15	23	170	295	16	278	10	61	27	65%	**110**	120	63	61	0	14	197	197	61%	23
1969	496	15	19	187	323	18	305	11	67	29	65%	**110**	137	41	61	0	17	195	195	61%	0
1970	478	51	24	193	336	19	317	11	69	31	65%	**110**	162	52	44	0	19	233	233	61%	5
1971	403	56	24	167	291	16	275	10	60	27	65%	**110**	134	51	45	0	15	200	200	61%	32
1972	352	42	25	144	250	14	236	8	52	23	65%	**110**	117	42	37	0	13	171	171	61%	70
1973	435	43	24	175	303	17	287	10	63	28	65%	**110**	145	30	41	0	18	193	193	61%	45
1974	260	38	29	109	189	10	178	6	39	17	65%	**110**	72	51	44	0	9	132	132	61%	140
1975	419	0	25	154	265	15	250	9	55	24	65%	**109**	116	53	46	0	13	182	182	61%	63
1976	263	24	26	105	182	10	172	6	38	17	65%	**109**	82	21	30	0	9	113	113	61%	129
1977	229	23	28	92	160	9	151	5	33	15	65%	**109**	71	36	28	0	7	113	113	61%	151
1978	317	0	24	116	201	11	189	7	41	18	65%	**108**	90	33	33	0	10	133	133	61%	93
1979	365	46	22	150	261	14	247	9	54	24	65%	**108**	122	31	38	0	16	169	169	61%	44
1980	410	120	27	192	337	19	319	11	69	31	65%	**107**	160	54	47	0	20	234	234	61%	25
1981	200	129	31	119	210	12	199	7	43	19	65%	**107**	120	10	9	0	12	141	141	61%	144
1982	524	44	23	208	360	20	340	12	74	33	65%	**106**	156	22	65	0	20	198	198	61%	25
1983	605	121	27	265	462	25	436	15	95	42	65%	**106**	219	20	57	7	28	267	267	60%	0
1984	659	87	26	272	473	26	447	16	98	43	65%	**106**	223	7	15	53	29	258	258	50%	0
1985	626	154	27	284	496	27	469	16	102	45	65%	**106**	222	16	16	66	30	269	269	48%	0
1986	393	1	25	145	249	14	236	8	51	23	65%	**106**	124	89	23	6	15	229	229	59%	8
1987	540	0	27	198	342	19	323	11	70	31	65%	**106**	165	46	45	0	20	231	231	61%	27
1988	389	148	28	195	342	19	324	11	71	31	65%	**105**	160	60	50	0	19	240	240	61%	27
1989	285	104	26	141	248	14	234	8	51	23	65%	**105**	136	27	16	0	14	177	177	61%	65
1990	341	63	27	147	257	14	242	8	53	23	65%	**105**	147	8	11	0	16	170	170	61%	81
1991	305	85	26	142	248	14	235	8	51	23	65%	**105**	124	28	29	0	14	165	165	61%	73
1992	321	73	21	143	251	14	237	8	52	23	65%	**105**	136	22	18	0	15	173	173	61%	30
1993	410	92	21	183	319	18	302	11	66	29	65%	**105**	135	38	61	0	18	191	191	61%	15
1994	372	127	26	181	318	17	301	11	66	29	65%	**105**	155	55	41	0	18	228	228	61%	22
1995	588	67	21	239	415	23	392	14	86	38	65%	**105**	157	28	98	0	24	209	209	61%	0
1996	446	142	21	213	374	21	354	12	77	34	65%	**105**	168	16	24	38	21	205	205	51%	0
1997	541	87	24	229	399	22	377	13	82	36	65%	**105**	193	18	18	34	24	235	235	53%	0
1998	462	92	26	202	352	19	332	12	72	32	65%	**105**	181	45	33	2	22	247	247	61%	0
1999	548	60	21	222	386	21	364	13	79	35	65%	**105**	175	10	22	40	23	209	209	51%	0
2000	505	109	29	224	391	22	369	13	80	36	65%	**105**	163	90	18	59	21	274	274	46%	2
2001	286	119	28	147	258	14	244	9	53	24	65%	**104**	123	50	35	0	15	189	189	61%	70
2002	110	47	35	57	100	6	95	3	21	9	65%	**104**	52	8	10	0	5	65	65	61%	248

Table 20

Arkansas River Farms No. 13 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	246	0	37	90	156	9	147	5	32	14	65%	**104**	91	7	5	0	9	107	107	61%	225
2004	299	0	27	110	190	10	179	6	39	17	65%	**104**	105	11	12	0	11	127	127	61%	117
2005	399	0	33	146	252	14	239	8	52	23	65%	**104**	131	18	24	0	15	164	164	61%	140
2006	274	50	28	118	206	11	195	7	42	19	65%	**104**	104	15	23	0	12	130	130	61%	129
2007	461	106	26	206	361	20	341	12	74	33	65%	**104**	166	60	55	0	21	247	247	61%	0
2008	387	93	32	175	305	17	288	10	63	28	65%	**104**	165	21	23	0	18	203	203	61%	96
2009	358	74	26	158	275	15	260	9	57	25	65%	**104**	143	24	26	0	16	183	183	61%	57
2010	400	75	31	173	302	17	286	10	62	28	65%	**104**	158	43	27	0	17	218	218	61%	71
2011	307	46	39	129	224	12	212	7	46	20	65%	**104**	137	0	0	0	14	152	152	61%	199
2012	116	48	47	59	105	6	99	3	22	10	65%	**104**	55	10	10	0	5	70	70	61%	346
2013	273	0	42	100	173	10	163	6	36	16	65%	**104**	105	1	1	0	10	116	116	61%	261
2014	385	22	40	149	258	14	244	9	53	24	65%	**104**	148	3	10	0	16	167	167	61%	201
Avg	383	53	27	159	277	15	262	9	57	25	65%	**107**	131	35	35	5	15	181	181	60%	75
Max	659	154	47	284	496	27	469	16	102	45	65%	**111**	223	90	98	66	30	274	274	61%	346
Min	110	0	19	57	100	6	95	3	21	9	65%	**104**	45	0	0	0	5	65	65	46%	0
1979 to 2014																					
Avg	393	73	28	170	296	16	280	10	61	27	65%	**105**	145	28	28	8	17	190	190	59%	76
Max	659	154	47	284	496	27	469	16	102	45	65%	**108**	223	90	98	66	30	274	274	61%	346
Min	110	0	21	57	100	6	95	3	21	9	65%	**104**	52	0	0	0	5	65	65	46%	0

Explanation of Columns

(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Total No. of Shares	**188**
Trade Shares	**188**
Total Consumptive Use	**190**
Trade Shares Pro Rata CU	**190**

Table 21

Arkansas River Farms No. 14 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year (1)	River Headgate Diversions (2)	Reservoir Releases (3)	Crop Irrigation Reqt (In) (4)	Ditch Loss (5)	Farm Turnout Delivery (6)	Off-Farm Lateral Loss (7)	Farm Delivery (8)	On-Farm Lateral Loss (9)	Initial Deep Percolation (10)	Tail water (11)	Max Farm Efficiency (12)	Irrigated Acreage (13)	Applied Irrigation Water to Crop Consumptive Use (14)	Consumptive Use From Soil Moisture (15)	Applied Irrigation Water to Soil Moisture Storage (16)	Applied Irrigation Water to Additional Deep Perc (17)	SEV Losses (18)	Total Consumptive Use (19)	Prorated Total Consumptive Use (20)	Calculated Actual Farm Efficiency (21)	Crop Consumptive Use Shortage (22)
1950	250	35	22	104	181	10	171	6	37	17	65%	**155**	89	42	22	0	6	137	137	61%	155
1951	241	22	21	96	167	9	157	6	34	15	65%	**155**	91	8	12	0	6	105	105	61%	178
1952	279	4	30	104	179	10	169	6	37	16	65%	**155**	90	24	20	0	7	120	120	61%	275
1953	231	0	27	85	146	8	138	5	30	13	65%	**156**	74	16	16	0	5	95	95	61%	259
1954	125	0	30	46	79	4	75	3	16	7	65%	**156**	33	13	16	0	2	48	48	61%	344
1955	182	5	28	68	118	7	112	4	24	11	65%	**156**	67	8	5	0	4	80	80	61%	294
1956	177	0	27	65	112	6	106	4	23	10	65%	**156**	55	14	14	0	4	72	72	61%	280
1957	347	6	19	130	224	12	211	7	46	20	65%	**156**	111	22	26	0	9	142	142	61%	119
1958	173	64	24	86	151	8	143	5	31	14	65%	**155**	91	5	2	0	6	103	103	61%	211
1959	237	32	25	98	171	9	161	6	35	16	65%	**155**	73	17	31	0	6	96	96	61%	239
1960	230	3	27	85	147	8	139	5	30	13	65%	**155**	66	34	25	0	5	105	105	61%	250
1961	292	4	20	109	188	10	178	6	39	17	65%	**155**	89	32	27	0	7	127	127	61%	142
1962	297	25	25	118	204	11	193	7	42	19	65%	**155**	113	13	12	0	8	134	134	61%	196
1963	184	3	31	69	119	7	112	4	24	11	65%	**155**	45	28	28	0	3	76	76	61%	323
1964	170	0	27	63	108	6	102	4	22	10	65%	**155**	50	16	16	0	3	70	70	61%	280
1965	305	40	20	126	219	12	207	7	45	20	65%	**155**	98	26	36	0	8	132	132	61%	137
1966	200	39	24	87	152	8	143	5	31	14	65%	**155**	87	17	7	0	6	109	109	61%	204
1967	256	38	24	107	187	10	177	6	39	17	65%	**155**	104	11	11	0	7	121	121	61%	191
1968	282	10	23	107	185	10	175	6	38	17	65%	**155**	87	27	27	0	6	120	120	61%	177
1969	311	9	19	117	203	11	192	7	42	18	65%	**155**	99	24	25	0	7	130	130	61%	128
1970	300	32	24	121	211	12	199	7	43	19	65%	**155**	115	13	15	0	8	136	136	61%	180
1971	253	35	24	105	183	10	173	6	38	17	65%	**155**	95	17	18	0	7	119	119	61%	193
1972	221	26	25	90	157	9	148	5	32	14	65%	**155**	80	20	17	0	5	105	105	61%	223
1973	273	27	24	110	190	11	180	6	39	17	65%	**154**	96	21	21	0	8	125	125	61%	195
1974	163	24	29	68	118	7	112	4	24	11	65%	**154**	48	20	24	0	4	73	73	61%	300
1975	263	0	25	96	166	9	157	5	34	15	65%	**154**	81	25	21	0	6	112	112	61%	222
1976	165	15	26	66	114	6	108	4	24	10	65%	**156**	57	8	13	0	4	69	69	61%	267
1977	144	14	28	58	101	6	95	3	21	9	65%	**157**	54	13	8	0	3	70	70	61%	306
1978	199	0	24	73	126	7	119	4	26	11	65%	**159**	59	18	18	0	4	82	82	61%	241
1979	229	29	22	94	164	9	155	5	34	15	65%	**160**	84	13	16	0	7	104	104	61%	196
1980	257	75	27	121	212	12	200	7	44	19	65%	**162**	101	33	29	0	9	142	142	61%	227
1981	126	81	31	74	132	7	125	4	27	12	65%	**163**	75	6	6	0	5	86	86	61%	337
1982	329	28	23	130	226	12	213	7	47	21	65%	**165**	124	7	15	0	9	139	139	61%	184
1983	380	76	27	166	290	16	274	10	60	26	65%	**166**	170	16	8	0	12	198	198	61%	189
1984	414	54	26	171	297	16	281	10	61	27	65%	**165**	158	10	25	0	12	180	180	61%	190
1985	393	97	27	178	311	17	294	10	64	28	65%	**164**	176	21	15	0	13	210	210	61%	172
1986	246	1	25	91	157	9	148	5	32	14	65%	**162**	82	12	14	0	7	101	101	61%	246
1987	339	0	27	124	214	12	203	7	44	20	65%	**161**	124	17	7	0	9	151	151	61%	220
1988	244	93	28	122	215	12	203	7	44	20	65%	**159**	121	11	11	0	8	140	140	61%	241
1989	179	65	26	89	156	9	147	5	32	14	65%	**157**	94	2	2	0	6	102	102	61%	245
1990	214	40	27	92	161	9	152	5	33	15	65%	**156**	97	2	2	0	7	106	106	61%	249
1991	191	53	26	89	156	9	147	5	32	14	65%	**154**	82	14	14	0	6	102	102	61%	234
1992	201	46	21	90	157	9	149	5	32	14	65%	**153**	92	5	5	0	6	103	103	61%	177
1993	257	58	21	115	200	11	189	7	41	18	65%	**151**	96	13	27	0	8	116	116	61%	162
1994	233	80	26	114	200	11	189	7	41	18	65%	**150**	110	25	13	0	8	143	143	61%	196
1995	369	42	21	150	261	14	246	9	54	24	65%	**148**	118	39	42	0	10	168	168	61%	103
1996	280	89	21	134	235	13	222	8	48	21	65%	**147**	130	18	14	0	9	157	157	61%	109
1997	339	55	24	144	250	14	237	8	52	23	65%	**145**	141	3	13	0	10	154	154	61%	149
1998	290	58	26	127	221	12	209	7	45	20	65%	**144**	123	11	12	0	9	143	143	61%	176
1999	344	37	21	139	242	13	229	8	50	22	65%	**142**	126	34	23	0	10	170	170	61%	92
2000	317	68	29	140	245	13	232	8	51	22	65%	**141**	116	26	35	0	9	151	151	61%	200
2001	179	74	28	92	162	9	153	5	33	15	65%	**139**	86	23	13	0	7	115	115	61%	215
2002	69	30	35	36	63	3	60	2	13	6	65%	**139**	35	2	4	0	2	40	40	61%	372

Table 21

Arkansas River Farms No. 14 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	154	0	37	57	98	5	92	3	20	9	65%	**139**	57	4	3	0	4	65	65	61%	368
2004	188	0	27	69	119	7	112	4	25	11	65%	**139**	73	0	0	0	5	78	78	61%	237
2005	250	0	33	92	158	9	150	5	33	14	65%	**139**	87	6	10	0	7	99	99	61%	291
2006	172	31	28	74	129	7	122	4	27	12	65%	**139**	69	6	10	0	5	80	80	61%	255
2007	290	66	26	130	226	12	214	7	47	21	65%	**139**	131	17	8	0	9	157	157	61%	153
2008	243	59	32	110	192	11	181	6	39	17	65%	**139**	109	0	8	0	8	117	117	61%	265
2009	225	47	26	99	173	10	163	6	36	16	65%	**139**	96	9	10	0	7	112	112	61%	194
2010	251	47	31	109	190	10	179	6	39	17	65%	**139**	104	22	12	0	8	134	134	61%	236
2011	193	29	39	81	141	8	133	5	29	13	65%	**139**	86	0	0	0	6	92	92	61%	361
2012	73	30	47	37	66	4	62	2	14	6	65%	**139**	34	6	6	0	2	43	43	61%	506
2013	171	0	42	63	108	6	102	4	22	10	65%	**139**	67	0	0	0	4	71	71	61%	422
2014	241	14	40	94	162	9	153	5	33	15	65%	**139**	97	0	3	0	7	104	104	61%	372
Avg	240	33	27	100	174	10	164	6	36	16	65%	**152**	92	15	15	0	7	114	114	61%	232
Max	414	97	47	178	311	17	294	10	64	28	65%	**166**	176	42	42	0	13	210	210	61%	506
Min	69	0	19	36	63	3	60	2	13	6	65%	**139**	33	0	0	0	2	40	40	61%	92
1979 to 2014																					
Avg	246	46	28	107	186	10	176	6	38	17	65%	**149**	102	12	12	0	8	122	122	61%	237
Max	414	97	47	178	311	17	294	10	64	28	65%	**166**	176	39	42	0	13	210	210	61%	506
Min	69	0	21	36	63	3	60	2	13	6	65%	**139**	34	0	0	0	2	40	40	61%	92

Explanation of Columns

(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Total No. of Shares	**118**
Trade Shares	**118**
Total Consumptive Use	**122**
Trade Shares Pro Rata CU	**122**

Table 22

Arkansas River Farms No. 15 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
1950	464	66	22	193	336	19	318	11	69	31	65%	**296**	166	78	41	0	12	255	255	61%	303
1951	447	40	21	178	309	17	292	10	64	28	65%	**296**	169	14	21	0	11	195	195	61%	344
1952	518	7	30	192	332	18	314	11	68	30	65%	**296**	167	43	37	0	12	223	223	61%	531
1953	428	0	27	157	271	15	256	9	56	25	65%	**297**	137	29	29	0	10	176	176	61%	497
1954	232	0	30	85	147	8	139	5	30	13	65%	**297**	61	24	29	0	5	89	89	61%	658
1955	338	9	28	127	219	12	207	7	45	20	65%	**297**	125	14	9	0	8	148	148	61%	565
1956	328	0	27	120	208	11	196	7	43	19	65%	**297**	102	25	25	0	7	134	134	61%	539
1957	643	12	19	240	415	23	392	14	86	38	65%	**297**	207	41	48	0	16	265	265	61%	234
1958	322	118	24	160	280	15	265	9	58	26	65%	**298**	169	10	3	0	12	191	191	61%	410
1959	441	59	25	182	317	17	299	10	65	29	65%	**298**	137	30	58	0	11	178	178	61%	464
1960	427	5	27	159	274	15	259	9	56	25	65%	**298**	122	63	46	0	9	194	194	61%	485
1961	543	8	20	202	349	19	329	12	72	32	65%	**298**	166	59	48	0	12	236	236	61%	280
1962	551	47	25	219	379	21	358	13	78	35	65%	**299**	211	22	22	0	14	247	247	61%	385
1963	342	6	31	128	220	12	208	7	45	20	65%	**299**	83	52	52	0	6	141	141	61%	627
1964	316	0	27	116	200	11	189	7	41	18	65%	**299**	94	29	29	0	6	129	129	61%	545
1965	566	74	20	234	406	22	384	13	84	37	65%	**299**	183	47	66	0	14	245	245	61%	274
1966	371	72	24	161	282	16	266	9	58	26	65%	**299**	161	30	12	0	11	202	202	61%	402
1967	475	71	24	199	347	19	328	11	72	32	65%	**300**	193	20	20	0	12	225	225	61%	379
1968	524	18	23	199	343	19	324	11	71	31	65%	**300**	162	48	48	0	11	222	222	61%	352
1969	577	17	19	218	376	21	356	12	78	34	65%	**300**	185	44	46	0	13	242	242	61%	258
1970	557	59	24	225	391	22	370	13	81	36	65%	**300**	214	24	26	0	15	253	253	61%	361
1971	470	65	24	195	339	19	321	11	70	31	65%	**301**	177	31	32	0	12	220	220	61%	386
1972	411	48	25	168	291	16	275	10	60	27	65%	**301**	148	36	31	0	10	194	194	61%	444
1973	507	50	24	204	354	20	334	12	73	32	65%	**301**	179	38	38	0	14	232	232	61%	390
1974	303	44	29	126	220	12	208	7	45	20	65%	**301**	90	38	45	0	8	135	135	61%	593
1975	488	0	25	179	309	17	292	10	64	28	65%	**302**	153	44	37	0	11	208	208	61%	444
1976	307	28	26	122	212	12	200	7	44	19	65%	**302**	106	14	24	0	8	128	128	61%	524
1977	267	27	28	108	187	10	176	6	38	17	65%	**303**	100	24	15	0	6	130	130	61%	594
1978	369	0	24	135	234	13	221	8	48	21	65%	**303**	110	33	33	0	8	152	152	61%	464
1979	425	54	22	175	304	17	287	10	63	28	65%	**304**	157	23	30	0	13	193	193	61%	375
1980	477	140	27	224	393	22	371	13	81	36	65%	**304**	187	61	55	0	16	264	264	61%	431
1981	233	150	31	138	245	13	231	8	50	22	65%	**305**	140	11	11	0	10	160	160	61%	631
1982	610	51	23	242	419	23	396	14	86	38	65%	**305**	229	13	28	0	16	259	259	61%	341
1983	705	141	27	308	538	30	508	18	111	49	65%	**306**	315	30	15	0	22	368	368	61%	346
1984	768	101	26	317	551	30	521	18	114	50	65%	**302**	293	18	46	0	23	335	335	61%	345
1985	729	179	27	331	578	32	546	19	119	53	65%	**299**	326	40	29	0	24	390	390	61%	308
1986	457	1	25	168	291	16	274	10	60	26	65%	**299**	153	22	26	0	12	187	187	61%	452
1987	628	0	27	231	398	22	376	13	82	36	65%	**299**	231	33	13	0	16	280	280	61%	410
1988	454	172	28	227	399	22	377	13	82	36	65%	**299**	224	21	21	0	16	261	261	61%	455
1989	332	121	26	164	289	16	273	10	59	26	65%	**299**	174	3	3	0	11	189	189	61%	469
1990	397	74	27	171	299	16	282	10	62	27	65%	**299**	180	4	4	0	13	196	196	61%	483
1991	355	99	26	165	289	16	273	10	60	26	65%	**298**	151	26	26	0	11	189	189	61%	459
1992	374	85	21	167	292	16	276	10	60	27	65%	**298**	170	9	9	0	12	191	191	61%	354
1993	478	107	21	213	372	20	351	12	77	34	65%	**298**	178	23	51	0	15	216	216	61%	332
1994	433	149	26	211	370	20	350	12	76	34	65%	**298**	205	47	22	0	15	267	267	61%	407
1995	685	78	21	279	484	27	457	16	100	44	65%	**298**	223	71	74	0	19	314	314	61%	231
1996	519	165	21	249	436	24	412	14	90	40	65%	**298**	243	31	25	0	17	290	290	61%	249
1997	630	102	24	267	465	26	439	15	96	42	65%	**298**	262	5	24	0	19	285	285	61%	335
1998	538	107	26	235	410	23	387	14	84	37	65%	**298**	228	20	23	0	17	266	266	61%	394
1999	639	69	21	259	449	25	425	15	93	41	65%	**298**	235	63	41	0	19	317	317	61%	229
2000	589	127	29	261	455	25	430	15	94	41	65%	**298**	222	40	57	0	17	279	279	61%	462
2001	333	138	28	171	300	16	284	10	62	27	65%	**298**	165	37	20	0	12	214	214	61%	492
2002	128	55	35	66	117	6	110	4	24	11	65%	**298**	66	4	6	0	4	73	73	61%	806

Table 22

Arkansas River Farms No. 15 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	287	0	37	105	181	10	171	6	37	17	65%	**298**	106	8	5	0	7	121	121	61%	806
2004	349	0	27	128	221	12	209	7	45	20	65%	**298**	136	0	0	0	9	145	145	61%	528
2005	465	0	33	171	294	16	278	10	61	27	65%	**298**	162	10	18	0	12	184	184	61%	650
2006	319	58	28	138	240	13	227	8	49	22	65%	**298**	129	10	18	0	9	149	149	61%	568
2007	537	123	26	240	420	23	397	14	87	38	65%	**298**	247	27	11	0	17	292	292	61%	369
2008	450	109	32	203	356	20	336	12	73	32	65%	**298**	203	0	15	0	14	218	218	61%	598
2009	418	87	26	184	320	18	303	11	66	29	65%	**298**	179	15	18	0	13	208	208	61%	445
2010	466	88	31	202	352	19	333	12	73	32	65%	**298**	194	40	23	0	14	248	248	61%	541
2011	357	54	39	150	261	14	247	9	54	24	65%	**298**	160	0	0	0	11	172	172	61%	798
2012	135	56	47	69	122	7	115	4	25	11	65%	**298**	64	11	11	0	4	79	79	61%	1,095
2013	318	0	42	117	201	11	190	7	41	18	65%	**298**	123	0	0	0	8	131	131	61%	922
2014	448	26	40	174	300	17	284	10	62	27	65%	**298**	181	0	4	0	13	194	194	61%	822
Avg	446	62	27	185	322	18	305	11	66	29	65%	**299**	171	27	27	0	12	211	211	61%	472
Max	768	179	47	331	578	32	546	19	119	53	65%	**306**	326	78	74	0	24	390	390	61%	1,095
Min	128	0	19	66	117	6	110	4	24	11	65%	**296**	61	0	0	0	4	73	73	61%	229
1979 to 2014																					
Avg	457	85	28	198	345	19	326	11	71	31	65%	**299**	190	22	22	0	14	226	226	61%	498
Max	768	179	47	331	578	32	546	19	119	53	65%	**306**	326	71	74	0	24	390	390	61%	1,095
Min	128	0	21	66	117	6	110	4	24	11	65%	**298**	64	0	0	0	4	73	73	61%	229

Explanation of Columns

(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Total No. of Shares	**219**
Trade Shares	**219**
Total Consumptive Use	**226**
Trade Shares Pro Rata CU	**226**

Table 23

Arkansas River Farms No. 19 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
1950	610	86	22	254	442	24	418	15	91	40	65%	**197**	207	89	64	0	16	312	312	61%	66
1951	588	53	21	235	407	22	384	13	84	37	65%	**196**	197	41	52	0	15	253	253	61%	112
1952	681	10	30	253	437	24	413	14	90	40	65%	**196**	211	70	58	0	16	296	296	61%	211
1953	563	0	27	207	356	20	337	12	73	32	65%	**196**	164	54	54	0	13	232	232	61%	220
1954	305	0	30	112	193	11	183	6	40	18	65%	**196**	70	42	49	0	6	118	118	61%	379
1955	444	11	28	167	288	16	272	10	59	26	65%	**196**	154	30	23	0	10	194	194	61%	281
1956	431	0	27	158	273	15	258	9	56	25	65%	**196**	118	50	50	0	9	177	177	61%	272
1957	846	16	19	316	546	30	516	18	112	50	65%	**196**	250	68	85	0	21	340	340	61%	0
1958	423	155	24	210	369	20	348	12	76	34	65%	**196**	221	22	6	0	16	259	259	61%	146
1959	580	77	25	240	417	23	394	14	86	38	65%	**197**	165	55	91	0	14	234	234	61%	197
1960	562	7	27	208	360	20	340	12	74	33	65%	**197**	150	94	71	0	12	256	256	61%	199
1961	714	10	20	266	459	25	433	15	94	42	65%	**197**	199	83	82	0	16	299	299	61%	50
1962	724	62	25	288	499	28	471	16	103	45	65%	**197**	261	55	45	0	19	335	335	61%	92
1963	450	8	31	168	290	16	274	10	60	26	65%	**197**	95	85	83	0	8	188	188	61%	324
1964	416	0	27	153	263	15	249	9	54	24	65%	**198**	108	53	53	0	8	170	170	61%	280
1965	745	97	20	307	534	29	505	18	110	49	65%	**198**	207	75	121	0	19	301	301	61%	52
1966	487	95	24	212	370	20	350	12	76	34	65%	**198**	196	71	31	0	14	281	281	61%	126
1967	625	94	24	262	457	25	431	15	94	42	65%	**198**	227	60	53	0	16	303	303	61%	105
1968	689	23	23	261	451	25	426	15	93	41	65%	**198**	189	89	88	0	15	292	292	61%	95
1969	759	22	19	287	495	27	468	16	102	45	65%	**199**	221	76	83	0	18	315	315	61%	25
1970	733	78	24	296	514	28	486	17	106	47	65%	**199**	260	48	56	0	20	328	328	61%	88
1971	618	85	24	257	446	25	422	15	92	41	65%	**199**	209	70	65	0	16	295	295	61%	114
1972	540	64	25	220	383	21	362	13	79	35	65%	**199**	184	60	51	0	13	257	257	61%	172
1973	667	66	24	268	465	26	439	15	96	42	65%	**199**	226	45	59	0	19	290	290	61%	131
1974	398	58	29	166	289	16	273	10	60	26	65%	**200**	111	73	67	0	10	193	193	61%	294
1975	641	0	25	235	406	22	384	13	84	37	65%	**200**	181	77	68	0	14	273	273	61%	165
1976	403	36	26	161	279	15	263	9	57	25	65%	**200**	129	30	43	0	10	169	169	61%	267
1977	352	35	28	141	245	14	232	8	51	22	65%	**200**	114	49	37	0	7	171	171	61%	310
1978	485	0	24	178	307	17	290	10	63	28	65%	**200**	139	50	50	0	11	200	200	61%	211
1979	559	71	22	230	400	22	378	13	82	36	65%	**199**	190	44	55	0	17	252	252	61%	130
1980	627	184	27	295	516	28	488	17	106	47	65%	**199**	246	83	72	0	21	349	349	61%	117
1981	306	197	31	182	322	18	304	11	66	29	65%	**199**	183	14	14	0	13	211	211	61%	313
1982	802	67	23	318	551	30	521	18	114	50	65%	**199**	253	27	85	0	21	301	301	61%	101
1983	927	186	27	406	708	39	669	23	146	65	65%	**199**	364	87	71	0	29	480	480	61%	0
1984	1,010	133	26	417	725	40	685	24	149	66	65%	**179**	355	34	90	0	30	419	419	61%	0
1985	959	236	27	435	760	42	718	25	157	69	65%	**159**	336	23	71	60	32	390	390	53%	0
1986	602	2	25	221	382	21	361	13	79	35	65%	**161**	191	135	36	8	16	342	342	59%	12
1987	827	0	27	303	523	29	494	17	108	48	65%	**163**	253	71	68	0	21	345	345	61%	43
1988	597	226	28	298	524	29	496	17	108	48	65%	**165**	247	91	75	0	21	359	359	61%	47
1989	436	160	26	216	380	21	359	13	78	35	65%	**166**	210	39	23	0	15	264	264	61%	112
1990	522	97	27	225	393	22	371	13	81	36	65%	**168**	226	11	16	0	17	254	254	61%	139
1991	467	131	26	217	380	21	359	13	78	35	65%	**170**	192	40	41	0	15	247	247	61%	131
1992	491	112	21	220	384	21	363	13	79	35	65%	**172**	214	28	21	0	16	258	258	61%	66
1993	628	141	21	280	489	27	462	16	101	45	65%	**174**	211	54	90	0	20	284	284	61%	47
1994	569	195	26	278	487	27	460	16	100	44	65%	**176**	240	83	60	0	20	342	342	61%	66
1995	900	102	21	366	636	35	601	21	131	58	65%	**178**	247	67	144	0	25	339	339	61%	0
1996	683	218	21	327	573	32	542	19	118	52	65%	**180**	276	39	76	0	22	337	337	61%	0
1997	828	134	24	351	611	34	578	20	126	56	65%	**182**	308	58	64	3	25	391	391	61%	0
1998	707	141	26	309	539	30	509	18	111	49	65%	**183**	288	108	43	0	23	419	419	61%	0
1999	840	91	21	340	591	33	558	20	122	54	65%	**185**	287	41	76	0	25	353	353	61%	0
2000	774	167	29	343	598	33	565	20	123	55	65%	**187**	255	161	74	39	22	438	438	55%	39
2001	438	182	28	224	395	22	373	13	81	36	65%	**189**	193	73	50	0	16	282	282	61%	175
2002	168	73	35	87	154	8	145	5	32	14	65%	**189**	81	10	13	0	5	96	96	61%	465

Table 23

Arkansas River Farms No. 19 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	377	0	37	138	239	13	225	8	49	22	65%	**189**	140	10	7	0	10	160	160	61%	434
2004	459	0	27	168	290	16	274	10	60	26	65%	**189**	166	12	12	0	12	190	190	61%	243
2005	611	0	33	224	387	21	365	13	80	35	65%	**189**	207	19	30	0	16	242	242	61%	296
2006	420	76	28	181	316	17	298	10	65	29	65%	**189**	162	22	32	0	12	196	196	61%	266
2007	707	162	26	316	552	30	522	18	114	50	65%	**189**	275	75	64	0	22	373	373	61%	58
2008	592	143	32	268	468	26	442	15	96	43	65%	**189**	255	23	32	0	19	297	297	61%	231
2009	549	114	26	242	421	23	398	14	87	38	65%	**189**	229	27	30	0	17	273	273	61%	150
2010	613	116	31	266	463	26	438	15	95	42	65%	**189**	250	57	34	0	18	326	326	61%	184
2011	470	71	39	197	343	19	324	11	71	31	65%	**189**	211	0	0	0	15	226	226	61%	398
2012	177	74	47	91	160	9	151	5	33	15	65%	**189**	84	15	15	0	6	104	104	61%	645
2013	418	0	42	153	264	15	250	9	54	24	65%	**189**	162	0	0	0	10	173	173	61%	502
2014	589	34	40	228	395	22	373	13	81	36	65%	**189**	229	3	14	0	17	249	249	61%	405
Avg	587	81	27	244	424	23	401	14	87	39	65%	**190**	206	53	53	2	16	275	275	61%	166
Max	1,010	236	47	435	760	42	718	25	157	69	65%	**200**	364	161	144	60	32	480	480	61%	645
Min	168	0	19	87	154	8	145	5	32	14	65%	**159**	70	0	0	0	5	96	96	53%	0
1979 to 2014																					
Avg	601	112	28	260	453	25	428	15	93	41	65%	**183**	228	47	47	3	18	293	293	61%	162
Max	1,010	236	47	435	760	42	718	25	157	69	65%	**199**	364	161	144	60	32	480	480	61%	645
Min	168	0	21	87	154	8	145	5	32	14	65%	**159**	81	0	0	0	5	96	96	53%	0

Explanation of Columns

(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Total No. of Shares	**288**
Trade Shares	**288**
Total Consumptive Use	**293**
Trade Shares Pro Rata CU	**293**

Table 24

Arkansas River Farms No. 21 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
1950	415	59	22	173	301	17	284	10	62	27	65%	**74**	122	14	63	0	11	147	132	**61%**	0
1951	400	36	21	160	277	15	262	9	57	25	65%	**74**	111	21	22	37	10	143	128	**48%**	0
1952	463	7	30	172	297	16	281	10	61	27	65%	**75**	133	55	5	45	11	198	178	**46%**	0
1953	383	0	27	141	242	13	229	8	50	22	65%	**75**	106	52	43	0	9	167	150	**61%**	11
1954	208	0	30	76	132	7	124	4	27	12	65%	**76**	44	32	37	0	4	80	72	**61%**	114
1955	302	8	28	114	196	11	185	6	40	18	65%	**76**	97	28	23	0	7	132	119	**61%**	54
1956	294	0	27	108	186	10	176	6	38	17	65%	**75**	75	39	39	0	6	120	108	**61%**	55
1957	576	11	19	215	372	21	351	12	77	34	65%	**75**	118	5	67	43	15	137	123	**50%**	0
1958	288	106	24	143	251	14	237	8	52	23	65%	**75**	132	17	12	10	11	160	144	**57%**	0
1959	394	52	25	163	284	16	268	9	58	26	65%	**75**	107	52	30	38	10	169	152	**48%**	0
1960	382	5	27	142	245	14	231	8	50	22	65%	**75**	97	63	37	17	8	168	151	**55%**	10
1961	486	7	20	181	312	17	295	10	64	28	65%	**75**	106	21	74	11	11	138	124	**58%**	0
1962	493	42	25	196	339	19	321	11	70	31	65%	**75**	135	20	6	67	13	168	151	**42%**	0
1963	306	5	31	114	197	11	186	7	41	18	65%	**75**	61	62	14	47	5	128	115	**38%**	68
1964	283	0	27	104	179	10	169	6	37	16	65%	**75**	64	46	46	0	6	116	104	**61%**	57
1965	507	66	20	209	364	20	344	12	75	33	65%	**75**	106	20	83	35	13	139	125	**52%**	0
1966	332	65	24	144	252	14	238	8	52	23	65%	**75**	113	35	23	19	10	158	142	**54%**	0
1967	426	64	24	179	311	17	294	10	64	28	65%	**75**	129	18	31	31	11	158	142	**51%**	0
1968	469	16	23	178	307	17	290	10	63	28	65%	**75**	112	27	10	67	10	150	135	**40%**	0
1969	517	15	19	195	337	19	318	11	69	31	65%	**74**	114	7	25	68	12	133	119	**41%**	0
1970	499	53	24	202	350	19	331	12	72	32	65%	**74**	135	13	13	67	14	162	146	**42%**	0
1971	420	58	24	175	304	17	287	10	63	28	65%	**74**	129	17	11	46	11	158	142	**46%**	0
1972	367	43	25	150	261	14	246	9	54	24	65%	**74**	113	42	11	36	9	164	147	**48%**	0
1973	454	45	24	182	316	17	299	10	65	29	65%	**74**	129	21	57	8	13	162	146	**59%**	0
1974	271	39	29	113	197	11	186	7	41	18	65%	**74**	73	63	8	40	7	143	128	**41%**	41
1975	436	0	25	160	276	15	261	9	57	25	65%	**74**	108	49	62	0	10	167	150	**61%**	0
1976	274	25	26	109	190	10	179	6	39	17	65%	**73**	82	45	34	0	7	134	120	**61%**	28
1977	239	24	28	96	167	9	158	6	34	15	65%	**71**	67	44	35	0	5	116	104	**61%**	58
1978	330	0	24	121	209	12	198	7	43	19	65%	**70**	79	50	50	0	7	136	122	**61%**	12
1979	380	48	22	157	272	15	257	9	56	25	65%	**69**	110	15	57	0	11	137	123	**61%**	0
1980	427	125	27	201	351	19	332	12	72	32	65%	**68**	137	14	30	49	14	165	148	**47%**	0
1981	209	134	31	124	219	12	207	7	45	20	65%	**66**	111	59	17	6	9	179	161	**58%**	0
1982	546	46	23	216	375	21	355	12	77	34	65%	**65**	121	4	45	65	14	139	125	**44%**	0
1983	631	127	27	276	482	27	455	16	99	44	65%	**64**	144	0	0	152	20	164	147	**30%**	0
1984	687	90	26	284	494	27	466	16	102	45	65%	**59**	129	0	0	174	21	150	134	**26%**	0
1985	652	160	27	296	517	28	489	17	107	47	65%	**55**	123	1	1	193	22	146	131	**24%**	0
1986	409	1	25	151	260	14	246	9	54	24	65%	**55**	95	20	20	44	11	126	113	**44%**	0
1987	562	0	27	206	356	20	336	12	73	32	65%	**55**	115	8	8	95	14	138	124	**35%**	0
1988	406	154	28	203	357	20	337	12	74	33	65%	**55**	121	7	7	91	14	142	127	**36%**	0
1989	297	109	26	147	258	14	244	9	53	24	65%	**54**	94	24	9	56	10	128	115	**40%**	0
1990	355	66	27	153	267	15	253	9	55	24	65%	**54**	117	5	19	29	11	132	119	**51%**	0
1991	318	89	26	148	259	14	245	9	53	24	65%	**54**	95	21	21	44	10	125	112	**45%**	0
1992	334	76	21	150	261	14	247	9	54	24	65%	**54**	90	7	5	65	11	107	96	**36%**	0
1993	428	96	21	191	333	18	315	11	69	30	65%	**54**	92	4	6	107	13	109	98	**29%**	0
1994	387	133	26	189	332	18	313	11	68	30	65%	**54**	114	4	4	85	13	132	118	**36%**	0
1995	613	70	21	249	433	24	409	14	89	39	65%	**53**	91	3	3	172	17	111	100	**22%**	0
1996	465	148	21	223	390	21	369	13	80	36	65%	**53**	90	3	3	146	15	108	97	**24%**	0
1997	564	91	24	239	416	23	393	14	86	38	65%	**53**	105	2	2	149	17	124	111	**26%**	0
1998	481	96	26	210	367	20	347	12	76	33	65%	**53**	112	2	2	111	16	129	116	**31%**	0
1999	572	62	21	232	402	22	380	13	83	37	65%	**53**	92	1	1	154	17	110	99	**23%**	0
2000	527	114	29	233	407	22	385	13	84	37	65%	**52**	118	10	10	122	15	143	128	**31%**	0
2001	298	124	28	153	269	15	254	9	55	25	65%	**52**	110	12	12	43	11	133	119	**45%**	0
2002	115	49	35	59	105	6	99	3	22	10	65%	**52**	50	46	4	10	4	99	89	**52%**	59

Table 24

Arkansas River Farms No. 21 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	257	0	37	94	162	9	153	5	33	15	65%	52	78	24	22	0	7	109	98	61%	60
2004	312	0	27	115	198	11	187	7	41	18	65%	52	92	23	29	0	8	124	111	61%	1
2005	416	0	33	153	263	15	249	9	54	24	65%	52	98	46	48	16	11	154	139	55%	1
2006	286	52	28	123	215	12	203	7	44	20	65%	52	98	19	34	0	8	125	112	61%	8
2007	481	110	26	215	376	21	355	12	77	34	65%	52	113	0	21	97	15	128	115	36%	0
2008	403	97	32	182	318	18	301	11	66	29	65%	52	133	8	8	55	13	154	138	44%	0
2009	374	78	26	164	287	16	271	9	59	26	65%	52	102	11	11	64	12	124	111	39%	0
2010	417	79	31	181	315	17	298	10	65	29	65%	52	128	8	4	61	13	149	134	42%	0
2011	320	48	39	134	234	13	221	8	48	21	65%	52	129	40	15	0	10	178	160	61%	0
2012	121	50	47	62	109	6	103	4	22	10	65%	52	54	28	13	0	4	86	77	61%	124
2013	284	0	42	104	180	10	170	6	37	16	65%	52	101	5	10	0	7	113	102	61%	78
2014	401	23	40	155	269	15	254	9	55	25	65%	52	148	12	17	0	12	172	154	61%	16
Avg	399	55	27	166	289	16	273	10	59	26	65%	64	105	23	23	49	11	139	125	47%	13
Max	687	160	47	296	517	28	489	17	107	47	65%	76	148	63	83	193	22	198	178	61%	124
Min	115	0	19	59	105	6	99	3	22	10	65%	52	44	0	0	0	4	80	72	22%	0
1979 to 2014																					
Avg	409	76	28	177	309	17	292	10	64	28	65%	55	107	14	14	68	13	133	120	43%	10
Max	687	160	47	296	517	28	489	17	107	47	65%	69	148	59	57	193	22	179	161	61%	124
Min	115	0	21	59	105	6	99	3	22	10	65%	52	50	0	0	0	4	86	77	22%	0

Explanation of Columns

(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Total No. of Shares	**196**
Trade Shares	**176**
Total Consumptive Use	**133**
Trade Shares Pro Rata CU	**120**

Table 25

Arkansas River Farms No. 22 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year (1)	River Headgate Diversions (2)	Reservoir Releases (3)	Crop Irrigation Reqt (In) (4)	Ditch Loss (5)	Farm Turnout Delivery (6)	Off-Farm Lateral Loss (7)	Farm Delivery (8)	On-Farm Lateral Loss (9)	Initial Deep Percolation (10)	Tail water (11)	Max Farm Efficiency (12)	Irrigated Acreage (13)	Applied Irrigation Water to Crop Consumptive Use (14)	Consumptive Use From Soil Moisture (15)	Applied Irrigation Water to Soil Moisture Storage (16)	Applied Irrigation Water to Additional Deep Perc (17)	SEV Losses (18)	Total Consumptive Use (19)	Prorated Total Consumptive Use (20)	Calculated Actual Farm Efficiency (21)	Crop Consumptive Use Shortage (22)
1950	229	32	22	95	166	9	157	5	34	15	65%	78	78	34	24	0	6	117	110	61%	32
1951	221	20	21	88	153	8	144	5	31	14	65%	78	75	15	19	0	6	95	89	61%	49
1952	255	4	30	95	164	9	155	5	34	15	65%	78	79	26	21	0	6	111	104	61%	90
1953	211	0	27	77	134	7	126	4	28	12	65%	78	62	20	20	0	5	87	81	61%	92
1954	114	0	30	42	72	4	68	2	15	7	65%	78	27	15	18	0	2	44	41	61%	153
1955	166	4	28	63	108	6	102	4	22	10	65%	78	58	11	8	0	4	73	68	61%	116
1956	162	0	27	59	102	6	97	3	21	9	65%	78	44	18	18	0	3	66	62	61%	112
1957	317	6	19	119	205	11	193	7	42	19	65%	78	95	26	31	0	8	129	121	61%	5
1958	159	58	24	79	138	8	131	5	28	13	65%	78	83	6	2	0	6	95	89	61%	65
1959	217	29	25	90	156	9	148	5	32	14	65%	78	62	20	34	0	5	88	82	61%	83
1960	211	3	27	78	135	7	127	4	28	12	65%	78	56	35	27	0	5	96	90	61%	85
1961	268	4	20	100	172	10	162	6	35	16	65%	78	76	31	30	0	6	113	105	61%	25
1962	272	23	25	108	187	10	177	6	39	17	65%	78	99	19	16	0	7	125	117	61%	44
1963	169	3	31	63	109	6	103	4	22	10	65%	78	36	31	31	0	3	70	66	61%	132
1964	156	0	27	57	99	5	93	3	20	9	65%	78	41	20	20	0	3	64	60	61%	114
1965	279	36	20	115	200	11	189	7	41	18	65%	78	79	28	45	0	7	113	106	61%	26
1966	183	36	24	80	139	8	131	5	29	13	65%	78	74	26	11	0	5	105	98	61%	56
1967	234	35	24	98	171	9	162	6	35	16	65%	78	86	21	19	0	6	114	106	61%	47
1968	258	9	23	98	169	9	160	6	35	15	65%	78	71	32	32	0	6	110	102	61%	43
1969	285	8	19	107	186	10	175	6	38	17	65%	78	84	28	30	0	7	118	111	61%	15
1970	275	29	24	111	193	11	182	6	40	18	65%	79	99	17	20	0	8	123	115	61%	41
1971	232	32	24	96	167	9	158	6	34	15	65%	79	79	25	24	0	6	110	103	61%	51
1972	202	24	25	83	144	8	136	5	30	13	65%	79	70	22	19	0	5	96	90	61%	72
1973	250	25	24	100	174	10	165	6	36	16	65%	79	85	17	22	0	7	109	102	61%	57
1974	149	22	29	62	108	6	102	4	22	10	65%	79	42	27	25	0	4	72	67	61%	120
1975	240	0	25	88	152	8	144	5	31	14	65%	79	68	29	25	0	5	102	96	61%	70
1976	151	14	26	60	105	6	99	3	22	10	65%	78	49	11	16	0	4	63	59	61%	108
1977	132	13	28	53	92	5	87	3	19	8	65%	78	43	18	13	0	3	64	60	61%	124
1978	182	0	24	67	115	6	109	4	24	11	65%	78	52	19	19	0	4	75	70	61%	85
1979	210	27	22	86	150	8	142	5	31	14	65%	77	72	16	21	0	6	94	88	61%	53
1980	235	69	27	111	194	11	183	6	40	18	65%	77	92	31	27	0	8	131	122	61%	49
1981	115	74	31	68	121	7	114	4	25	11	65%	77	69	5	5	0	5	79	74	61%	122
1982	301	25	23	119	207	11	195	7	43	19	65%	76	95	10	32	0	8	113	106	61%	40
1983	348	70	27	152	265	15	251	9	55	24	65%	76	137	35	26	0	11	183	171	61%	0
1984	379	50	26	156	272	15	257	9	56	25	65%	75	137	26	30	0	11	174	163	61%	0
1985	360	88	27	163	285	16	269	9	59	26	65%	74	143	25	32	0	12	180	168	61%	0
1986	226	1	25	83	143	8	135	5	30	13	65%	74	74	29	14	0	6	109	102	61%	53
1987	310	0	27	114	196	11	185	6	40	18	65%	74	101	20	20	0	8	129	121	61%	46
1988	224	85	28	112	197	11	186	7	41	18	65%	74	98	28	23	0	8	134	125	61%	48
1989	164	60	26	81	142	8	135	5	29	13	65%	74	81	10	7	0	6	96	90	61%	70
1990	196	36	27	85	147	8	139	5	30	13	65%	74	86	4	5	0	6	96	90	61%	76
1991	175	49	26	81	143	8	135	5	29	13	65%	74	73	14	15	0	5	92	86	61%	72
1992	184	42	21	82	144	8	136	5	30	13	65%	74	82	8	6	0	6	96	90	61%	43
1993	236	53	21	105	183	10	173	6	38	17	65%	74	82	17	31	0	7	107	100	61%	34
1994	214	73	26	104	183	10	173	6	38	17	65%	74	91	30	21	0	7	128	120	61%	43
1995	338	38	21	137	239	13	225	8	49	22	65%	75	96	36	51	0	9	141	132	61%	0
1996	256	82	21	123	215	12	203	7	44	20	65%	75	107	24	25	0	8	139	130	61%	0
1997	311	50	24	132	229	13	217	8	47	21	65%	75	119	31	21	0	9	160	149	61%	0
1998	265	53	26	116	202	11	191	7	42	18	65%	75	110	15	14	0	9	134	125	61%	36
1999	315	34	21	128	222	12	209	7	46	20	65%	75	110	22	26	0	9	141	132	61%	0
2000	290	63	29	129	224	12	212	7	46	20	65%	75	97	48	41	0	8	153	143	61%	37
2001	164	68	28	84	148	8	140	5	31	14	65%	75	73	27	18	0	6	106	99	61%	74
2002	63	27	35	33	58	3	54	2	12	5	65%	75	31	4	5	0	2	36	34	61%	185

Table 25

Arkansas River Farms No. 22 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	141	0	37	52	89	5	85	3	18	8	65%	75	52	4	3	0	4	60	56	61%	174
2004	172	0	27	63	109	6	103	4	22	10	65%	75	63	4	4	0	5	71	67	61%	100
2005	229	0	33	84	145	8	137	5	30	13	65%	75	78	7	11	0	6	91	85	61%	121
2006	158	29	28	68	118	7	112	4	24	11	65%	75	61	8	12	0	5	73	69	61%	109
2007	265	61	26	119	207	11	196	7	43	19	65%	75	106	26	21	0	8	140	131	61%	30
2008	222	54	32	100	175	10	166	6	36	16	65%	75	96	8	12	0	7	111	104	61%	97
2009	206	43	26	91	158	9	149	5	33	14	65%	75	86	10	11	0	7	102	96	61%	64
2010	230	43	31	100	174	10	164	6	36	16	65%	75	95	21	12	0	7	122	114	61%	79
2011	176	27	39	74	129	7	122	4	27	12	65%	75	79	0	0	0	6	85	79	61%	161
2012	66	28	47	34	60	3	57	2	12	5	65%	75	31	6	6	0	2	39	37	61%	256
2013	157	0	42	58	99	5	94	3	20	9	65%	75	61	0	0	0	4	65	61	61%	201
2014	221	13	40	86	148	8	140	5	31	14	65%	75	86	1	5	0	6	94	88	61%	164
Avg	220	30	27	91	159	9	150	5	33	14	65%	76	78	19	19	0	6	104	97	61%	73
Max	379	88	47	163	285	16	269	9	59	26	65%	79	143	48	51	0	12	183	171	61%	256
Min	63	0	19	33	58	3	54	2	12	5	65%	74	27	0	0	0	2	36	34	61%	0
1979 to 2014																					
Avg	226	42	28	98	170	9	161	6	35	16	65%	75	87	17	17	0	7	111	104	61%	73
Max	379	88	47	163	285	16	269	9	59	26	65%	77	143	48	51	0	12	183	171	61%	256
Min	63	0	21	33	58	3	54	2	12	5	65%	74	31	0	0	0	2	36	34	61%	0

Total No. of Shares	**108**
Trade Shares	**101**
Total Consumptive Use	**111**
Trade Shares Pro Rata CU	**104**

Explanation of Columns

(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Table 26

Arkansas River Farms No. 23 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)

3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
1950	519	73	22	216	376	21	355	12	77	34	65%	**137**	174	74	57	0	13	261	261	61%	4
1951	500	45	21	200	346	19	327	11	71	32	65%	**137**	159	43	53	0	13	215	215	61%	42
1952	579	8	30	215	372	21	351	12	77	34	65%	**137**	178	61	51	0	14	253	253	61%	104
1953	479	0	27	176	303	17	286	10	62	28	65%	**137**	137	49	49	0	11	197	197	61%	120
1954	260	0	30	95	164	9	155	5	34	15	65%	**137**	58	37	43	0	5	100	100	61%	248
1955	378	10	28	142	245	14	232	8	51	22	65%	**137**	128	28	22	0	9	165	165	61%	168
1956	367	0	27	135	232	13	219	8	48	21	65%	**137**	97	45	45	0	8	150	150	61%	164
1957	720	13	19	269	464	26	439	15	96	42	65%	**137**	194	28	91	0	18	240	240	61%	0
1958	360	132	24	179	314	17	296	10	65	29	65%	**137**	186	69	7	0	13	268	268	61%	16
1959	493	66	25	204	355	20	335	12	73	32	65%	**137**	138	50	80	0	12	200	200	61%	102
1960	478	6	27	177	306	17	289	10	63	28	65%	**137**	125	82	63	0	10	217	217	61%	101
1961	607	9	20	226	390	22	369	13	80	36	65%	**137**	162	69	78	0	14	245	245	61%	0
1962	616	53	25	245	424	23	401	14	87	39	65%	**137**	212	64	48	0	16	292	292	61%	7
1963	383	7	31	143	247	14	233	8	51	22	65%	**137**	79	77	73	0	7	162	162	61%	194
1964	354	0	27	130	224	12	212	7	46	20	65%	**137**	87	50	50	0	7	145	145	61%	168
1965	634	82	20	261	454	25	429	15	94	41	65%	**137**	161	66	118	0	16	243	243	61%	4
1966	415	81	24	181	315	17	298	10	65	29	65%	**137**	159	74	35	0	12	245	245	61%	38
1967	532	80	24	223	388	21	367	13	80	35	65%	**137**	183	65	55	0	14	262	262	61%	22
1968	586	20	23	222	384	21	363	13	79	35	65%	**137**	155	83	80	0	13	251	251	61%	18
1969	646	19	19	244	421	23	398	14	87	38	65%	**137**	176	46	83	0	15	237	237	61%	0
1970	623	66	24	252	438	24	413	14	90	40	65%	**137**	209	64	60	0	17	290	290	61%	0
1971	525	72	24	218	380	21	359	13	78	35	65%	**137**	173	84	60	0	14	271	271	61%	13
1972	459	54	25	188	326	18	308	11	67	30	65%	**137**	151	55	49	0	11	217	217	61%	79
1973	567	56	24	228	395	22	374	13	81	36	65%	**137**	189	39	54	0	16	244	244	61%	48
1974	338	49	29	141	246	14	232	8	51	22	65%	**137**	93	67	58	0	8	169	169	61%	167
1975	546	0	25	200	345	19	326	11	71	31	65%	**137**	151	69	61	0	12	232	232	61%	70
1976	343	31	26	137	237	13	224	8	49	22	65%	**137**	107	28	39	0	8	143	143	61%	157
1977	299	30	28	120	209	12	197	7	43	19	65%	**137**	91	47	37	0	6	145	145	61%	186
1978	413	0	24	152	261	14	247	9	54	24	65%	**137**	116	44	44	0	9	170	170	61%	114
1979	476	61	22	196	340	19	322	11	70	31	65%	**137**	159	40	50	0	14	214	214	61%	51
1980	534	156	27	251	439	24	415	15	91	40	65%	**137**	208	71	62	0	18	297	297	61%	27
1981	261	168	31	155	274	15	259	9	56	25	65%	**137**	156	13	12	0	11	179	179	61%	182
1982	682	57	23	271	469	26	443	16	97	43	65%	**137**	203	29	85	0	18	250	250	61%	29
1983	789	158	27	345	602	33	569	20	124	55	65%	**137**	284	25	74	12	25	334	334	60%	0
1984	859	113	26	355	617	34	583	20	127	56	65%	**140**	293	12	21	65	26	331	331	51%	0
1985	816	201	27	370	646	36	611	21	133	59	65%	**144**	297	28	28	72	27	352	352	50%	0
1986	512	2	25	188	325	18	307	11	67	30	65%	**144**	163	122	29	7	14	299	299	59%	16
1987	703	0	27	258	445	25	420	15	92	41	65%	**143**	217	57	56	0	18	292	292	61%	49
1988	508	193	28	254	446	25	422	15	92	41	65%	**143**	212	75	62	0	18	305	305	61%	47
1989	371	136	26	184	323	18	305	11	67	29	65%	**142**	179	32	20	0	13	224	224	61%	97
1990	444	82	27	192	334	18	316	11	69	30	65%	**142**	192	10	14	0	14	216	216	61%	115
1991	397	111	26	185	324	18	306	11	67	30	65%	**141**	163	35	36	0	12	210	210	61%	104
1992	418	95	21	187	327	18	309	11	67	30	65%	**141**	179	27	21	0	13	219	219	61%	46
1993	535	120	21	238	416	23	393	14	86	38	65%	**140**	177	48	79	0	17	242	242	61%	26
1994	484	166	26	236	414	23	392	14	85	38	65%	**140**	202	71	52	0	17	290	290	61%	36
1995	766	87	21	312	541	30	511	18	112	49	65%	**140**	205	41	127	0	22	267	267	61%	0
1996	581	185	21	278	488	27	461	16	101	44	65%	**139**	221	22	40	39	19	263	263	54%	0
1997	705	114	24	299	520	29	491	17	107	47	65%	**139**	253	27	27	39	21	301	301	54%	0
1998	602	120	26	263	458	25	433	15	94	42	65%	**138**	237	61	42	2	19	317	317	61%	0
1999	715	78	21	290	503	28	475	17	104	46	65%	**138**	229	14	33	46	21	265	265	52%	0
2000	659	142	29	292	509	28	481	17	105	46	65%	**137**	213	118	23	77	19	349	349	46%	3
2001	372	154	28	191	336	18	318	11	69	31	65%	**137**	161	65	45	0	14	240	240	61%	93
2002	143	62	35	74	131	7	124	4	27	12	65%	**137**	67	10	13	0	5	82	82	61%	325

Table 26

Arkansas River Farms No. 23 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year (1)	River Headgate Diversions (2)	Reservoir Releases (3)	Crop Irrigation Reqt (In) (4)	Ditch Loss (5)	Farm Turnout Delivery (6)	Off-Farm Lateral Loss (7)	Farm Delivery (8)	On-Farm Lateral Loss (9)	Initial Deep Percolation (10)	Tail water (11)	Max Farm Efficiency (12)	Irrigated Acreage (13)	Applied Irrigation Water to Crop Consumptive Use (14)	Consumptive Use From Soil Moisture (15)	Applied Irrigation Water to Soil Moisture Storage (16)	Applied Irrigation Water to Additional Deep Perc (17)	SEV Losses (18)	Total Consumptive Use (19)	Prorated Total Consumptive Use (20)	Calculated Actual Farm Efficiency (21)	Crop Consumptive Use Shortage (22)
2003	321	0	37	118	203	11	192	7	42	19	65%	**137**	118	9	6	0	8	136	136	61%	295
2004	390	0	27	143	247	14	233	8	51	23	65%	**137**	136	14	15	0	10	161	161	61%	155
2005	520	0	33	191	329	18	311	11	68	30	65%	**137**	170	23	32	0	14	207	207	61%	184
2006	357	65	28	154	268	15	254	9	55	24	65%	**137**	135	20	30	0	10	165	165	61%	170
2007	601	138	26	269	470	26	444	16	97	43	65%	**137**	217	79	72	0	19	315	315	61%	0
2008	504	121	32	228	398	22	376	13	82	36	65%	**137**	214	25	30	0	16	256	256	61%	129
2009	467	97	26	205	359	20	339	12	74	33	65%	**137**	187	30	33	0	15	232	232	61%	76
2010	522	98	31	226	394	22	372	13	81	36	65%	**137**	207	55	36	0	16	278	278	61%	94
2011	400	60	39	168	292	16	276	10	60	27	65%	**137**	179	1	1	0	13	192	192	61%	261
2012	151	63	47	77	136	7	129	5	28	12	65%	**137**	71	12	12	0	5	89	89	61%	454
2013	355	0	42	130	225	12	213	7	46	21	65%	**137**	137	1	1	0	9	147	147	61%	342
2014	501	29	40	194	336	19	318	11	69	31	65%	**137**	193	4	13	0	15	211	211	61%	264
Avg	499	69	27	207	361	20	341	12	74	33	65%	**138**	170	46	46	6	14	230	230	60%	93
Max	859	201	47	370	646	36	611	21	133	59	65%	**144**	297	122	127	77	27	352	352	61%	454
Min	143	0	19	74	131	7	124	4	27	12	65%	**137**	58	1	1	0	5	82	82	46%	0
1979 to 2014																					
Avg	512	95	28	221	386	21	364	13	79	35	65%	**139**	190	37	37	10	16	242	242	60%	102
Max	859	201	47	370	646	36	611	21	133	59	65%	**144**	297	122	127	77	27	352	352	61%	454
Min	143	0	21	74	131	7	124	4	27	12	65%	**137**	67	1	1	0	5	82	82	46%	0

Explanation of Columns

(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Total No. of Shares	**245**
Trade Shares	**245**
Total Consumptive Use	**242**
Trade Shares Pro Rata CU	**242**

Table 27

Arkansas River Farms No. 25 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year (1)	River Headgate Diversions (2)	Reservoir Releases (3)	Crop Irrigation Reqt (In) (4)	Ditch Loss (5)	Farm Turnout Delivery (6)	Off-Farm Lateral Loss (7)	Farm Delivery (8)	On-Farm Lateral Loss (9)	Initial Deep Percolation (10)	Tail water (11)	Max Farm Efficiency (12)	Irrigated Acreage (13)	Applied Irrigation Water to Crop Consumptive Use (14)	Consumptive Use From Soil Moisture (15)	Applied Irrigation Water to Soil Moisture Storage (16)	Applied Irrigation Water to Additional Deep Perc (17)	SEV Losses (18)	Total Consumptive Use (19)	Prorated Total Consumptive Use (20)	Calculated Actual Farm Efficiency (21)	Crop Consumptive Use Shortage (22)
1950	682	96	22	284	494	27	467	16	102	45	65%	**506**	246	121	57	0	8	375	375	61%	565
1951	658	59	21	262	455	25	430	15	94	41	65%	**506**	254	17	26	0	8	278	278	61%	630
1952	761	11	30	283	489	27	462	16	101	45	65%	**506**	250	59	50	0	8	317	317	61%	957
1953	629	0	27	231	398	22	376	13	82	36	65%	**506**	205	39	39	0	7	251	251	61%	887
1954	341	0	30	125	216	12	204	7	45	20	65%	**506**	91	34	42	0	3	128	128	61%	1,142
1955	496	13	28	187	322	18	305	11	66	29	65%	**506**	188	17	10	0	5	211	211	61%	995
1956	482	0	27	177	305	17	288	10	63	28	65%	**506**	154	34	34	0	5	192	192	61%	947
1957	946	18	19	353	610	34	577	20	126	56	65%	**506**	307	59	68	0	11	377	377	61%	455
1958	473	174	24	235	412	23	389	14	85	38	65%	**506**	248	14	5	0	8	270	270	61%	739
1959	648	86	25	268	466	26	440	15	96	42	65%	**506**	204	42	82	0	7	253	253	61%	825
1960	628	8	27	233	402	22	380	13	83	37	65%	**506**	184	89	63	0	6	279	279	61%	866
1961	798	12	20	297	513	28	484	17	106	47	65%	**506**	246	84	69	0	8	338	338	61%	525
1962	810	69	25	321	557	31	527	18	115	51	65%	**506**	313	29	29	0	10	352	352	61%	705
1963	503	9	31	188	324	18	306	11	67	30	65%	**506**	128	71	71	0	4	203	203	61%	1,092
1964	465	0	27	171	294	16	278	10	61	27	65%	**506**	142	39	39	0	4	185	185	61%	949
1965	833	108	20	344	597	33	564	20	123	54	65%	**506**	274	66	93	0	10	349	349	61%	514
1966	545	106	24	237	414	23	391	14	85	38	65%	**506**	238	43	16	0	7	289	289	61%	721
1967	699	105	24	293	510	28	482	17	105	47	65%	**506**	286	27	27	0	8	322	322	61%	686
1968	770	26	23	292	505	28	477	17	104	46	65%	**506**	246	64	64	0	8	318	318	61%	639
1969	849	25	19	320	554	31	523	18	114	50	65%	**506**	278	58	62	0	9	345	345	61%	483
1970	819	87	24	331	575	32	543	19	119	52	65%	**506**	317	32	36	0	10	360	360	61%	659
1971	691	95	24	287	499	28	471	16	103	45	65%	**506**	265	42	41	0	8	315	315	61%	692
1972	604	71	25	246	428	24	405	14	88	39	65%	**506**	219	51	44	0	7	276	276	61%	785
1973	746	74	24	300	520	29	491	17	107	47	65%	**506**	266	53	53	0	10	329	329	61%	701
1974	445	64	29	186	323	18	305	11	67	29	65%	**506**	133	55	65	0	5	193	193	61%	1,021
1975	717	0	25	263	454	25	429	15	94	41	65%	**506**	231	59	48	0	7	297	297	61%	784
1976	451	41	26	180	312	17	295	10	64	28	65%	**506**	159	19	33	0	5	183	183	61%	902
1977	393	39	28	158	274	15	259	9	57	25	65%	**506**	148	35	21	0	4	186	186	61%	1,017
1978	543	0	24	199	344	19	325	11	71	31	65%	**506**	164	46	46	0	6	217	217	61%	802
1979	625	80	22	257	447	25	423	15	92	41	65%	**506**	236	29	39	0	9	274	274	61%	659
1980	701	206	27	330	577	32	546	19	119	53	65%	**506**	275	90	80	0	11	375	375	61%	765
1981	343	220	31	203	360	20	340	12	74	33	65%	**506**	205	16	16	0	7	228	228	61%	1,075
1982	897	75	23	356	617	34	583	20	127	56	65%	**506**	349	19	29	0	11	379	379	61%	599
1983	1,037	208	27	454	791	44	748	26	163	72	65%	**506**	465	32	21	0	15	512	512	61%	647
1984	1,129	148	26	466	811	45	766	27	167	74	65%	**484**	431	27	67	0	16	474	474	61%	593
1985	1,072	264	27	486	849	47	803	28	175	77	65%	**462**	481	56	41	0	16	553	553	61%	505
1986	673	2	25	248	427	24	404	14	88	39	65%	**461**	225	33	38	0	8	266	266	61%	710
1987	924	0	27	339	585	32	553	19	121	53	65%	**460**	340	48	20	0	11	398	398	61%	650
1988	667	253	28	334	586	32	554	19	121	53	65%	**459**	330	30	30	0	11	371	371	61%	715
1989	488	179	26	242	424	23	401	14	87	39	65%	**458**	257	4	4	0	8	268	268	61%	730
1990	583	108	27	252	439	24	415	15	91	40	65%	**456**	264	6	6	0	9	278	278	61%	750
1991	522	146	26	243	425	23	402	14	88	39	65%	**455**	223	39	39	0	7	269	269	61%	710
1992	549	125	21	246	429	24	406	14	88	39	65%	**454**	251	13	13	0	8	272	272	61%	548
1993	703	158	21	313	547	30	517	18	113	50	65%	**453**	261	34	75	0	10	306	306	61%	515
1994	637	218	26	310	545	30	515	18	112	50	65%	**452**	302	69	32	0	10	381	381	61%	627
1995	1,007	114	21	410	711	39	672	24	147	65	65%	**451**	330	104	107	0	13	447	447	61%	361
1996	763	243	21	366	641	35	606	21	132	58	65%	**450**	358	43	36	0	11	412	412	61%	388
1997	926	150	24	393	683	38	646	23	141	62	65%	**449**	385	6	35	0	13	404	404	61%	514
1998	791	157	26	345	602	33	569	20	124	55	65%	**448**	336	30	34	0	12	378	378	61%	600
1999	939	102	21	381	661	36	624	22	136	60	65%	**447**	346	93	60	0	13	451	451	61%	352
2000	866	187	29	383	669	37	632	22	138	61	65%	**445**	328	57	83	0	11	397	397	61%	698
2001	489	203	28	251	442	24	417	15	91	40	65%	**444**	243	54	28	0	8	305	305	61%	739
2002	188	81	35	98	172	9	162	6	35	16	65%	**444**	97	5	9	0	3	105	105	61%	1,205

Table 27

Arkansas River Farms No. 25 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)

3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	422	0	37	155	267	15	252	9	55	24	65%	**444**	156	11	8	0	5	173	173	61%	1,205
2004	513	0	27	188	325	18	307	11	67	30	65%	**444**	199	0	0	0	6	206	206	61%	791
2005	683	0	33	251	432	24	409	14	89	39	65%	**444**	239	14	27	0	8	261	261	61%	975
2006	470	86	28	202	353	19	333	12	73	32	65%	**444**	190	15	27	0	6	211	211	61%	851
2007	790	181	26	354	618	34	584	20	127	56	65%	**444**	364	39	15	0	11	415	415	61%	557
2008	662	160	32	299	523	29	494	17	108	48	65%	**444**	298	0	23	0	10	308	308	61%	898
2009	614	127	26	270	471	26	445	16	97	43	65%	**444**	264	23	26	0	9	295	295	61%	668
2010	686	129	31	297	518	29	489	17	107	47	65%	**444**	285	59	33	0	9	354	354	61%	813
2011	525	79	39	221	384	21	363	13	79	35	65%	**444**	236	0	0	0	8	243	243	61%	1,194
2012	198	83	47	102	179	10	169	6	37	16	65%	**444**	94	16	16	0	3	113	113	61%	1,637
2013	467	0	42	171	296	16	279	10	61	27	65%	**444**	182	0	0	0	5	187	187	61%	1,379
2014	659	38	40	255	442	24	417	15	91	40	65%	**444**	266	0	5	0	9	275	275	61%	1,231
Avg	656	91	27	273	474	26	448	16	98	43	65%	**479**	253	39	38	0	8	300	300	61%	777
Max	1,129	264	47	486	849	47	803	28	175	77	65%	**506**	481	121	107	0	16	553	553	61%	1,637
Min	188	0	19	98	172	9	162	6	35	16	65%	**444**	91	0	0	0	3	105	105	61%	352
1979 to 2014																					
Avg	672	125	28	291	507	28	479	17	104	46	65%	**458**	280	31	31	0	9	321	321	61%	774
Max	1,129	264	47	486	849	47	803	28	175	77	65%	**506**	481	104	107	0	16	553	553	61%	1,637
Min	188	0	21	98	172	9	162	6	35	16	65%	**444**	94	0	0	0	3	105	105	61%	352

Total No. of Shares	**322**
Trade Shares	**322**
Total Consumptive Use	**321**
Trade Shares Pro Rata CU	**321**

Explanation of Columns

(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Table 28

Arkansas River Farms No. 27 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
1950	1,398	197	22	582	1,013	56	957	34	209	92	65%	**381**	470	200	152	0	16	686	686	61%	33
1951	1,348	122	21	537	932	51	881	31	192	85	65%	**381**	434	111	139	0	16	560	560	61%	134
1952	1,560	22	30	580	1,002	55	946	33	206	91	65%	**381**	479	164	136	0	17	660	660	61%	311
1953	1,290	0	27	473	817	45	771	27	168	74	65%	**381**	371	130	130	0	13	515	515	61%	351
1954	700	0	30	257	443	24	418	15	91	40	65%	**381**	156	100	116	0	6	262	262	61%	699
1955	1,017	26	28	382	661	37	624	22	136	60	65%	**381**	347	75	59	0	11	433	433	61%	483
1956	989	0	27	363	626	35	591	21	129	57	65%	**381**	263	121	121	0	10	394	394	61%	470
1957	1,939	36	19	724	1,251	69	1,182	41	258	114	65%	**381**	533	85	235	0	22	641	641	61%	0
1958	970	356	24	481	845	46	798	28	174	77	65%	**381**	501	165	18	0	17	683	683	61%	88
1959	1,328	176	25	549	955	53	903	32	197	87	65%	**381**	372	134	214	0	15	521	521	61%	301
1960	1,287	16	27	478	825	46	779	27	170	75	65%	**381**	337	221	169	0	13	571	571	61%	299
1961	1,636	24	20	609	1,051	58	993	35	217	96	65%	**381**	439	193	206	0	17	650	650	61%	11
1962	1,660	142	25	659	1,143	63	1,080	38	235	104	65%	**381**	577	158	125	0	20	755	755	61%	55
1963	1,031	18	31	385	664	37	627	22	137	61	65%	**381**	213	205	194	0	8	427	427	61%	554
1964	953	0	27	350	603	33	570	20	124	55	65%	**381**	237	134	134	0	9	379	379	61%	481
1965	1,707	222	20	704	1,224	67	1,157	40	252	112	65%	**381**	441	176	311	0	20	636	636	61%	27
1966	1,117	218	24	486	848	47	802	28	175	77	65%	**381**	433	194	88	0	15	642	642	61%	128
1967	1,433	215	24	601	1,046	58	988	35	216	95	65%	**381**	498	168	144	0	17	682	682	61%	87
1968	1,579	54	23	598	1,034	57	977	34	213	94	65%	**381**	421	221	215	0	16	657	657	61%	74
1969	1,740	51	19	657	1,135	63	1,072	38	234	103	65%	**381**	479	138	217	0	19	636	636	61%	0
1970	1,679	179	24	679	1,179	65	1,114	39	243	107	65%	**381**	567	191	157	0	21	779	779	61%	2
1971	1,416	195	24	588	1,022	56	966	34	211	93	65%	**381**	469	181	159	0	17	667	667	61%	103
1972	1,237	146	25	505	878	48	829	29	181	80	65%	**381**	408	147	131	0	14	570	570	61%	239
1973	1,528	151	24	614	1,065	59	1,007	35	220	97	65%	**381**	510	106	144	0	20	636	636	61%	153
1974	912	132	29	381	663	37	626	22	137	60	65%	**381**	251	179	156	0	10	440	440	61%	481
1975	1,470	0	25	539	930	51	879	31	192	85	65%	**381**	408	185	163	0	15	608	608	61%	216
1976	924	83	26	368	639	35	604	21	132	58	65%	**381**	288	75	104	0	10	374	374	61%	449
1977	806	81	28	324	562	31	531	19	116	51	65%	**381**	248	126	97	0	8	382	382	61%	530
1978	1,112	0	24	408	704	39	665	23	145	64	65%	**381**	315	117	117	0	11	444	444	61%	331
1979	1,281	163	22	528	917	51	866	30	189	84	65%	**381**	430	107	133	0	18	555	555	61%	159
1980	1,438	421	27	676	1,183	65	1,118	39	244	108	65%	**381**	562	190	165	0	22	774	774	61%	99
1981	702	451	31	416	737	40	697	24	152	67	65%	**381**	420	33	33	0	14	467	467	61%	523
1982	1,839	154	23	729	1,264	70	1,194	42	260	115	65%	**381**	553	74	223	0	22	649	649	61%	101
1983	2,125	426	27	930	1,622	89	1,532	54	334	148	65%	**381**	783	79	204	10	31	893	893	61%	0
1984	2,314	304	26	956	1,662	92	1,570	55	342	152	65%	**347**	745	9	49	227	32	786	786	48%	0
1985	2,197	540	27	996	1,741	96	1,645	58	359	159	65%	**313**	685	22	22	363	34	740	740	41%	0
1986	1,378	5	25	507	875	48	827	29	180	80	65%	**317**	422	243	96	19	17	682	682	59%	0
1987	1,894	0	27	695	1,199	66	1,133	40	247	109	65%	**320**	544	178	192	0	22	744	744	61%	0
1988	1,367	519	28	684	1,202	66	1,136	40	248	110	65%	**323**	531	227	191	16	22	780	780	60%	0
1989	999	366	26	495	870	48	822	29	179	79	65%	**327**	464	169	70	0	16	649	649	61%	74
1990	1,196	222	27	517	901	50	851	30	186	82	65%	**330**	502	37	51	0	17	556	556	61%	198
1991	1,071	299	26	498	872	48	824	29	180	79	65%	**333**	424	108	111	0	15	548	548	61%	178
1992	1,126	257	21	504	880	48	831	29	181	80	65%	**337**	456	99	84	0	16	571	571	61%	47
1993	1,440	323	21	642	1,121	62	1,059	37	231	102	65%	**340**	462	146	226	0	21	628	628	61%	0
1994	1,305	448	26	636	1,116	61	1,055	37	230	102	65%	**343**	538	199	148	0	21	758	758	61%	21
1995	2,063	234	21	839	1,458	80	1,377	48	300	133	65%	**347**	536	74	330	30	27	637	637	59%	0
1996	1,565	499	21	749	1,314	72	1,242	43	271	120	65%	**350**	566	47	47	194	23	637	637	47%	0
1997	1,898	307	24	805	1,401	77	1,324	46	289	128	65%	**353**	666	46	46	148	27	739	739	51%	0
1998	1,621	322	26	708	1,235	68	1,167	41	254	113	65%	**357**	627	142	123	8	24	793	793	61%	0
1999	1,925	209	21	780	1,354	75	1,280	45	279	123	65%	**360**	607	30	48	177	26	663	663	48%	0
2000	1,774	382	29	786	1,371	75	1,296	45	283	125	65%	**363**	572	311	62	209	23	906	906	46%	0
2001	1,003	416	28	514	905	50	855	30	187	83	65%	**366**	433	176	123	0	17	626	626	61%	245
2002	386	166	35	200	352	19	333	12	73	32	65%	**366**	182	27	35	0	6	214	214	61%	869

Table 28

Arkansas River Farms No. 27 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	864	0	37	317	547	30	517	18	113	50	65%	366	319	25	17	0	10	354	354	61%	788
2004	1,051	0	27	386	665	37	629	22	137	61	65%	366	367	38	42	0	13	418	418	61%	412
2005	1,400	0	33	514	886	49	837	29	183	81	65%	366	459	63	86	0	17	539	539	61%	490
2006	963	175	28	415	723	40	683	24	149	66	65%	366	364	53	80	0	13	430	430	61%	453
2007	1,619	371	26	725	1,266	70	1,196	42	261	115	65%	366	583	210	195	0	24	816	816	61%	0
2008	1,357	327	32	613	1,071	59	1,012	35	221	98	65%	366	578	73	81	0	20	670	670	61%	336
2009	1,258	261	26	554	966	53	913	32	199	88	65%	366	503	83	90	0	18	605	605	61%	201
2010	1,406	265	31	609	1,062	58	1,003	35	219	97	65%	366	556	149	96	0	19	725	725	61%	249
2011	1,077	162	39	452	787	43	743	26	162	72	65%	366	482	1	1	0	16	499	499	61%	696
2012	406	170	47	209	367	20	347	12	76	33	65%	366	192	34	34	0	6	232	232	61%	1,215
2013	957	0	42	351	606	34	573	20	125	55	65%	366	369	3	3	0	11	383	383	61%	915
2014	1,350	79	40	523	906	50	856	30	187	83	65%	366	520	10	36	0	18	548	548	61%	705
Avg	1,344	186	27	559	972	54	918	32	200	89	65%	367	453	122	122	22	17	592	592	60%	247
Max	2,314	540	47	996	1,741	96	1,645	58	359	159	65%	381	783	311	330	363	34	906	906	61%	1,215
Min	386	0	19	200	352	19	333	12	73	32	65%	313	156	1	1	0	6	214	214	41%	0
1979 to 2014																					
Avg	1,378	257	28	596	1,039	57	982	34	214	95	65%	355	500	98	99	39	19	617	617	59%	249
Max	2,314	540	47	996	1,741	96	1,645	58	359	159	65%	381	783	311	330	363	34	906	906	61%	1,215
Min	386	0	21	200	352	19	333	12	73	32	65%	313	182	1	1	0	6	214	214	41%	0

Total No. of Shares	**660**
Trade Shares	**660**
Total Consumptive Use	**617**
Trade Shares Pro Rata CU	**617**

Explanation of Columns
(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Table 29

Arkansas River Farms No. 30N - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
1950	186	26	22	78	135	7	128	4	28	12	65%	**93**	66	29	17	0	2	97	97	61%	76
1951	180	16	21	72	124	7	117	4	26	11	65%	**93**	65	8	11	0	2	75	75	61%	92
1952	208	3	30	77	134	7	126	4	28	12	65%	**93**	66	19	16	0	2	87	87	61%	147
1953	172	0	27	63	109	6	103	4	22	10	65%	**93**	53	14	14	0	2	69	69	61%	140
1954	93	0	30	34	59	3	56	2	12	5	65%	**93**	24	10	13	0	1	35	35	61%	198
1955	136	3	28	51	88	5	83	3	18	8	65%	**93**	49	7	5	0	1	58	58	61%	164
1956	132	0	27	48	83	5	79	3	17	8	65%	**92**	39	12	12	0	1	53	53	61%	156
1957	259	5	19	97	167	9	158	6	34	15	65%	**92**	81	18	21	0	3	102	102	61%	51
1958	129	47	24	64	113	6	106	4	23	10	65%	**92**	68	4	1	0	2	74	74	61%	111
1959	177	24	25	73	127	7	120	4	26	12	65%	**92**	53	14	25	0	2	69	69	61%	128
1960	172	2	27	64	110	6	104	4	23	10	65%	**92**	48	27	20	0	2	76	76	61%	133
1961	218	3	20	81	140	8	132	5	29	13	65%	**92**	64	24	22	0	2	91	91	61%	67
1962	221	19	25	88	152	8	144	5	31	14	65%	**92**	83	12	10	0	3	98	98	61%	96
1963	137	2	31	51	89	5	84	3	18	8	65%	**92**	31	23	23	0	1	55	55	61%	181
1964	127	0	27	47	80	4	76	3	17	7	65%	**92**	36	13	13	0	1	51	51	61%	156
1965	228	30	20	94	163	9	154	5	34	15	65%	**92**	70	21	31	0	3	93	93	61%	65
1966	149	29	24	65	113	6	107	4	23	10	65%	**92**	63	16	7	0	2	81	81	61%	103
1967	191	29	24	80	139	8	132	5	29	13	65%	**92**	75	12	11	0	2	89	89	61%	95
1968	211	7	23	80	138	8	130	5	28	13	65%	**92**	62	23	23	0	2	87	87	61%	87
1969	232	7	19	88	151	8	143	5	31	14	65%	**92**	72	20	21	0	2	94	94	61%	57
1970	224	24	24	91	157	9	149	5	32	14	65%	**92**	85	11	12	0	3	98	98	61%	87
1971	189	26	24	78	136	8	129	5	28	12	65%	**91**	68	15	15	0	2	85	85	61%	98
1972	165	19	25	67	117	6	111	4	24	11	65%	**91**	59	16	13	0	2	76	76	61%	116
1973	204	20	24	82	142	8	134	5	29	13	65%	**91**	71	16	17	0	3	89	89	61%	98
1974	122	18	29	51	88	5	83	3	18	8	65%	**91**	35	17	19	0	1	54	54	61%	166
1975	196	0	25	72	124	7	117	4	26	11	65%	**91**	58	21	18	0	2	81	81	61%	115
1976	123	11	26	49	85	5	80	3	18	8	65%	**91**	42	7	11	0	1	50	50	61%	146
1977	107	11	28	43	75	4	71	2	15	7	65%	**91**	38	12	8	0	1	51	51	61%	165
1978	148	0	24	54	94	5	89	3	19	9	65%	**90**	43	14	14	0	2	59	59	61%	124
1979	171	22	22	70	122	7	116	4	25	11	65%	**90**	61	11	15	0	2	74	74	61%	93
1980	192	56	27	90	158	9	149	5	33	14	65%	**90**	75	25	22	0	3	103	103	61%	101
1981	94	60	31	56	98	5	93	3	20	9	65%	**90**	56	4	4	0	2	62	62	61%	170
1982	245	21	23	97	169	9	159	6	35	15	65%	**90**	85	7	19	0	3	94	94	61%	80
1983	283	57	27	124	216	12	204	7	45	20	65%	**89**	122	23	11	0	4	149	149	61%	57
1984	308	41	26	127	222	12	209	7	46	20	65%	**92**	116	9	20	0	4	129	129	61%	74
1985	293	72	27	133	232	13	219	8	48	21	65%	**94**	129	18	14	0	4	151	151	61%	65
1986	184	1	25	68	117	6	110	4	24	11	65%	**93**	61	10	10	0	2	73	73	61%	125
1987	253	0	27	93	160	9	151	5	33	15	65%	**92**	93	13	5	0	3	109	109	61%	103
1988	182	69	28	91	160	9	151	5	33	15	65%	**92**	88	10	10	0	3	101	101	61%	116
1989	133	49	26	66	116	6	110	4	24	11	65%	**91**	68	3	3	0	2	73	73	61%	126
1990	159	30	27	69	120	7	113	4	25	11	65%	**90**	72	2	2	0	2	76	76	61%	128
1991	143	40	26	66	116	6	110	4	24	11	65%	**89**	61	11	11	0	2	73	73	61%	119
1992	150	34	21	67	117	6	111	4	24	11	65%	**89**	68	4	4	0	2	74	74	61%	86
1993	192	43	21	86	149	8	141	5	31	14	65%	**88**	71	10	21	0	3	84	84	61%	76
1994	174	60	26	85	149	8	141	5	31	14	65%	**87**	79	20	12	0	3	102	102	61%	93
1995	275	31	21	112	194	11	184	6	40	18	65%	**86**	85	31	34	0	4	120	120	61%	36
1996	209	66	21	100	175	10	166	6	36	16	65%	**86**	94	17	13	0	3	114	114	61%	39
1997	253	41	24	107	187	10	176	6	38	17	65%	**85**	103	6	12	0	4	112	112	61%	62
1998	216	43	26	94	165	9	156	5	34	15	65%	**84**	92	8	9	0	3	103	103	61%	81
1999	257	28	21	104	181	10	171	6	37	16	65%	**83**	92	25	19	0	3	121	121	61%	30
2000	237	51	29	105	183	10	173	6	38	17	65%	**83**	83	25	30	0	3	111	111	61%	93
2001	134	55	28	69	121	7	114	4	25	11	65%	**82**	62	19	12	0	2	83	83	61%	109
2002	51	22	35	27	47	3	44	2	10	4	65%	**82**	25	2	3	0	1	29	29	61%	212

Table 29

Arkansas River Farms No. 30N - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	115	0	37	42	73	4	69	2	15	7	65%	82	43	3	2	0	1	47	47	61%	207
2004	140	0	27	51	89	5	84	3	18	8	65%	82	53	2	2	0	2	56	56	61%	128
2005	187	0	33	69	118	7	112	4	24	11	65%	82	64	5	8	0	2	71	71	61%	157
2006	128	23	28	55	96	5	91	3	20	9	65%	82	51	5	9	0	2	58	58	61%	138
2007	216	49	26	97	169	9	159	6	35	15	65%	82	94	15	10	0	3	112	112	61%	68
2008	181	44	32	82	143	8	135	5	29	13	65%	82	81	3	7	0	3	86	86	61%	137
2009	168	35	26	74	129	7	122	4	27	12	65%	82	71	7	8	0	2	81	81	61%	97
2010	187	35	31	81	142	8	134	5	29	13	65%	82	77	17	10	0	3	97	97	61%	119
2011	144	22	39	60	105	6	99	3	22	10	65%	82	64	0	0	0	2	67	67	61%	199
2012	54	23	47	28	49	3	46	2	10	4	65%	82	26	4	4	0	1	31	31	61%	291
2013	128	0	42	47	81	4	76	3	17	7	65%	82	50	0	0	0	1	51	51	61%	237
2014	180	10	40	70	121	7	114	4	25	11	65%	82	71	1	3	0	2	74	74	61%	204
Avg	179	25	27	75	130	7	122	4	27	12	65%	89	67	13	13	0	2	82	82	61%	118
Max	308	72	47	133	232	13	219	8	48	21	65%	94	129	31	34	0	4	151	151	61%	291
Min	51	0	19	27	47	3	44	2	10	4	65%	82	24	0	0	0	1	29	29	61%	30
1979 to 2014																					
Avg	184	34	28	79	139	8	131	5	29	13	65%	86	75	10	11	0	3	88	88	61%	118
Max	308	72	47	133	232	13	219	8	48	21	65%	94	129	31	34	0	4	151	151	61%	291
Min	51	0	21	27	47	3	44	2	10	4	65%	82	25	0	0	0	1	29	29	61%	30

Total No. of Shares	88
Trade Shares	88
Total Consumptive Use	88
Trade Shares Pro Rata CU	88

Explanation of Columns

(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Table 30

Arkansas River Farms No. 33 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
1950	229	32	22	95	166	9	157	5	34	15	65%	**157**	82	39	20	0	6	127	123	61%	168
1951	221	20	21	88	153	8	144	5	31	14	65%	**154**	84	6	9	0	6	96	93	61%	183
1952	255	4	30	95	164	9	155	5	34	15	65%	**151**	83	21	18	0	6	110	106	61%	273
1953	211	0	27	77	134	7	126	4	28	12	65%	**147**	68	14	14	0	5	87	84	61%	248
1954	114	0	30	42	72	4	68	2	15	7	65%	**144**	30	12	14	0	2	44	42	61%	320
1955	166	4	28	63	108	6	102	4	22	10	65%	**144**	62	7	5	0	4	73	70	61%	272
1956	162	0	27	59	102	6	97	3	21	9	65%	**143**	50	13	13	0	3	66	64	61%	258
1957	317	6	19	119	205	11	193	7	42	19	65%	**142**	102	20	24	0	8	130	126	61%	108
1958	159	58	24	79	138	8	131	5	28	13	65%	**141**	83	5	2	0	6	94	91	61%	192
1959	217	29	25	90	156	9	148	5	32	14	65%	**141**	67	15	29	0	5	88	85	61%	216
1960	211	3	27	78	135	7	127	4	28	12	65%	**140**	60	31	23	0	5	96	92	61%	224
1961	268	4	20	100	172	10	162	6	35	16	65%	**139**	81	29	25	0	6	116	112	61%	125
1962	272	23	25	108	187	10	177	6	39	17	65%	**139**	104	12	11	0	7	122	118	61%	172
1963	169	3	31	63	109	6	103	4	22	10	65%	**138**	40	26	26	0	3	70	67	61%	285
1964	156	0	27	57	99	5	93	3	20	9	65%	**137**	46	15	15	0	3	64	61	61%	246
1965	279	36	20	115	200	11	189	7	41	18	65%	**136**	90	24	33	0	7	121	116	61%	117
1966	183	36	24	80	139	8	131	5	29	13	65%	**136**	79	15	6	0	5	100	96	61%	175
1967	234	35	24	98	171	9	162	6	35	16	65%	**135**	94	11	11	0	6	111	107	61%	162
1968	258	9	23	98	169	9	160	6	35	15	65%	**134**	79	25	25	0	6	110	105	61%	148
1969	285	8	19	107	186	10	175	6	38	17	65%	**134**	90	23	24	0	7	119	115	61%	104
1970	275	29	24	111	193	11	182	6	40	18	65%	**133**	105	13	14	0	8	125	120	61%	148
1971	232	32	24	96	167	9	158	6	34	15	65%	**132**	86	17	17	0	6	108	104	61%	159
1972	202	24	25	83	144	8	136	5	30	13	65%	**131**	73	18	16	0	5	96	92	61%	183
1973	250	25	24	100	174	10	165	6	36	16	65%	**131**	87	20	20	0	7	114	110	61%	157
1974	149	22	29	62	108	6	102	4	22	10	65%	**130**	44	19	23	0	4	67	64	61%	248
1975	240	0	25	88	152	8	144	5	31	14	65%	**129**	73	24	20	0	5	102	99	61%	178
1976	151	14	26	60	105	6	99	3	22	10	65%	**130**	52	8	12	0	4	63	61	61%	218
1977	132	13	28	53	92	5	87	3	19	8	65%	**131**	49	12	8	0	3	64	62	61%	250
1978	182	0	24	67	115	6	109	4	24	11	65%	**132**	54	17	17	0	4	75	72	61%	194
1979	210	27	22	86	150	8	142	5	31	14	65%	**133**	76	12	16	0	6	95	91	61%	155
1980	235	69	27	111	194	11	183	6	40	18	65%	**134**	92	30	27	0	8	130	125	61%	177
1981	115	74	31	68	121	7	114	4	25	11	65%	**135**	69	5	5	0	5	79	76	61%	272
1982	301	25	23	119	207	11	195	7	43	19	65%	**136**	110	7	17	0	8	125	120	61%	143
1983	348	70	27	152	265	15	251	9	55	24	65%	**137**	155	18	8	0	11	184	177	61%	137
1984	379	50	26	156	272	15	257	9	56	25	65%	**102**	141	13	26	0	11	165	159	61%	69
1985	360	88	27	163	285	16	269	9	59	26	65%	**68**	136	17	39	0	12	165	159	61%	0
1986	226	1	25	83	143	8	135	5	30	13	65%	**72**	73	38	15	0	6	117	113	61%	39
1987	310	0	27	114	196	11	185	6	40	18	65%	**76**	101	21	19	0	8	130	125	61%	48
1988	224	85	28	112	197	11	186	7	41	18	65%	**79**	100	28	21	0	8	135	130	61%	59
1989	164	60	26	81	142	8	135	5	29	13	65%	**83**	81	8	6	0	6	95	92	61%	91
1990	196	36	27	85	147	8	139	5	30	13	65%	**87**	87	3	3	0	6	97	93	61%	104
1991	175	49	26	81	143	8	135	5	29	13	65%	**91**	74	13	14	0	5	92	89	61%	108
1992	184	42	21	82	144	8	136	5	30	13	65%	**95**	83	7	6	0	6	95	92	61%	81
1993	236	53	21	105	183	10	173	6	38	17	65%	**99**	86	13	27	0	7	107	103	61%	78
1994	214	73	26	104	183	10	173	6	38	17	65%	**103**	97	26	16	0	7	130	125	61%	104
1995	338	38	21	137	239	13	225	8	49	22	65%	**107**	104	39	42	0	9	153	147	61%	45
1996	256	82	21	123	215	12	203	7	44	20	65%	**111**	116	21	16	0	8	146	140	61%	57
1997	311	50	24	132	229	13	217	8	47	21	65%	**115**	127	6	13	0	9	143	137	61%	98
1998	265	53	26	116	202	11	191	7	42	18	65%	**118**	113	10	11	0	9	132	127	61%	132
1999	315	34	21	128	222	12	209	7	46	20	65%	**122**	115	32	21	0	9	156	150	61%	70
2000	290	63	29	129	224	12	212	7	46	20	65%	**126**	106	25	32	0	8	139	134	61%	177
2001	164	68	28	84	148	8	140	5	31	14	65%	**130**	79	21	12	0	6	106	102	61%	203
2002	63	27	35	33	58	3	54	2	12	5	65%	**130**	32	2	3	0	2	36	35	61%	349

Table 30

Arkansas River Farms No. 33 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydrologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	141	0	37	52	89	5	85	3	18	8	65%	**130**	52	4	3	0	4	60	58	61%	346
2004	172	0	27	63	109	6	103	4	22	10	65%	**130**	67	0	0	0	5	71	69	61%	223
2005	229	0	33	84	145	8	137	5	30	13	65%	**130**	80	5	9	0	6	91	88	61%	275
2006	158	29	28	68	118	7	112	4	24	11	65%	**130**	63	5	9	0	5	73	71	61%	240
2007	265	61	26	119	207	11	196	7	43	19	65%	**130**	120	15	7	0	8	144	138	61%	146
2008	222	54	32	100	175	10	166	6	36	16	65%	**130**	100	0	8	0	7	107	103	61%	250
2009	206	43	26	91	158	9	149	5	33	14	65%	**130**	88	8	9	0	7	102	99	61%	184
2010	230	43	31	100	174	10	164	6	36	16	65%	**130**	95	20	11	0	7	122	118	61%	223
2011	176	27	39	74	129	7	122	4	27	12	65%	**130**	79	0	0	0	6	85	82	61%	340
2012	66	28	47	34	60	3	57	2	12	5	65%	**130**	31	6	6	0	2	39	38	61%	475
2013	157	0	42	58	99	5	94	3	20	9	65%	**130**	61	0	0	0	4	65	62	61%	396
2014	221	13	40	86	148	8	140	5	31	14	65%	**130**	89	0	2	0	6	95	92	61%	350
Avg	220	30	27	91	159	9	150	5	33	14	65%	**126**	83	15	15	0	6	104	100	61%	184
Max	379	88	47	163	285	16	269	9	59	26	65%	**157**	155	39	42	0	12	184	177	61%	475
Min	63	0	19	33	58	3	54	2	12	5	65%	**68**	30	0	0	0	2	36	35	61%	0
1979 to 2014																					
Avg	226	42	28	98	170	9	161	6	35	16	65%	**115**	91	13	13	0	7	111	107	61%	173
Max	379	88	47	163	285	16	269	9	59	26	65%	**137**	155	39	42	0	12	184	177	61%	475
Min	63	0	21	33	58	3	54	2	12	5	65%	**68**	31	0	0	0	2	36	35	61%	0

Explanation of Columns

(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Total No. of Shares	**108**
Trade Shares	**104**
Total Consumptive Use	**111**
Trade Shares Pro Rata CU	**107**

Table 31

Arkansas River Farms No. 36 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)

3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
1950	449	63	22	187	325	18	307	11	67	30	65%	**146**	153	65	47	0	11	229	229	61%	50
1951	433	39	21	173	299	17	283	10	62	27	65%	**144**	145	30	39	0	11	186	186	61%	80
1952	501	7	30	186	322	18	304	11	66	29	65%	**142**	155	51	43	0	12	218	218	61%	148
1953	414	0	27	152	262	15	248	9	54	24	65%	**140**	121	40	40	0	9	170	170	61%	151
1954	225	0	30	82	142	8	134	5	29	13	65%	**138**	51	31	36	0	4	87	87	61%	263
1955	327	8	28	123	212	12	201	7	44	19	65%	**138**	113	23	18	0	8	143	143	61%	192
1956	318	0	27	117	201	11	190	7	41	18	65%	**138**	86	37	37	0	7	130	130	61%	187
1957	623	12	19	233	402	22	380	13	83	37	65%	**139**	182	43	65	0	16	241	241	61%	0
1958	311	114	24	154	271	15	256	9	56	25	65%	**139**	162	26	4	0	12	200	200	61%	87
1959	427	57	25	176	307	17	290	10	63	28	65%	**140**	121	41	67	0	10	172	172	61%	134
1960	413	5	27	153	265	15	250	9	55	24	65%	**140**	110	70	53	0	9	188	188	61%	136
1961	525	8	20	196	338	19	319	11	70	31	65%	**140**	146	62	62	0	12	219	219	61%	30
1962	533	45	25	212	367	20	347	12	76	33	65%	**141**	192	42	34	0	14	248	248	61%	58
1963	331	6	31	124	213	12	202	7	44	19	65%	**141**	70	63	61	0	6	139	139	61%	227
1964	306	0	27	112	194	11	183	6	40	18	65%	**141**	79	40	40	0	6	125	125	61%	197
1965	548	71	20	226	393	22	372	13	81	36	65%	**142**	152	55	90	0	14	221	221	61%	33
1966	359	70	24	156	273	15	258	9	56	25	65%	**142**	144	53	23	0	10	207	207	61%	85
1967	460	69	24	193	336	19	318	11	69	31	65%	**143**	166	45	40	0	12	223	223	61%	70
1968	507	17	23	192	332	18	314	11	68	30	65%	**143**	139	66	66	0	11	216	216	61%	64
1969	559	16	19	211	364	20	344	12	75	33	65%	**143**	162	56	62	0	13	232	232	61%	14
1970	539	57	24	218	379	21	358	13	78	35	65%	**144**	190	36	42	0	15	242	242	61%	60
1971	455	63	24	189	328	18	310	11	68	30	65%	**144**	154	52	48	0	12	218	218	61%	79
1972	397	47	25	162	282	16	266	9	58	26	65%	**145**	135	44	38	0	10	189	189	61%	122
1973	491	48	24	197	342	19	323	11	71	31	65%	**145**	166	33	44	0	14	214	214	61%	93
1974	293	42	29	122	213	12	201	7	44	19	65%	**145**	82	54	49	0	7	143	143	61%	212
1975	472	0	25	173	299	17	282	10	62	27	65%	**146**	133	57	50	0	10	201	201	61%	119
1976	297	27	26	118	205	11	194	7	42	19	65%	**145**	94	22	32	0	7	124	124	61%	193
1977	259	26	28	104	181	10	171	6	37	16	65%	**145**	83	37	28	0	5	126	126	61%	223
1978	357	0	24	131	226	13	214	7	47	21	65%	**144**	102	37	37	0	8	147	147	61%	150
1979	412	52	22	169	295	16	278	10	61	27	65%	**144**	140	33	41	0	12	185	185	61%	90
1980	462	135	27	217	380	21	359	13	78	35	65%	**143**	181	61	53	0	15	257	257	61%	78
1981	226	145	31	134	237	13	224	8	49	22	65%	**143**	135	10	10	0	10	155	155	61%	220
1982	591	50	23	234	406	22	384	13	84	37	65%	**142**	185	20	64	0	16	221	221	61%	67
1983	683	137	27	299	521	29	492	17	107	47	65%	**142**	266	55	54	0	22	342	342	61%	0
1984	743	98	26	307	534	29	504	18	110	49	65%	**144**	269	45	59	0	22	336	336	61%	0
1985	706	174	27	320	559	31	529	18	115	51	65%	**147**	281	50	62	0	24	355	355	61%	0
1986	443	1	25	163	281	16	266	9	58	26	65%	**147**	145	80	28	0	12	237	237	61%	83
1987	608	0	27	223	385	21	364	13	79	35	65%	**146**	198	40	38	0	16	254	254	61%	92
1988	439	167	28	220	386	21	365	13	80	35	65%	**146**	192	56	45	0	15	263	263	61%	93
1989	321	118	26	159	279	15	264	9	58	25	65%	**145**	158	19	13	0	11	189	189	61%	136
1990	384	71	27	166	289	16	273	10	60	26	65%	**145**	169	7	9	0	12	188	188	61%	147
1991	344	96	26	160	280	15	265	9	58	26	65%	**144**	143	27	29	0	11	181	181	61%	137
1992	362	83	21	162	283	16	267	9	58	26	65%	**143**	161	16	13	0	12	189	189	61%	79
1993	463	104	21	206	360	20	340	12	74	33	65%	**143**	160	35	62	0	14	209	209	61%	61
1994	419	144	26	204	359	20	339	12	74	33	65%	**142**	179	59	41	0	14	252	252	61%	77
1995	663	75	21	270	468	26	442	15	96	43	65%	**142**	186	64	102	0	19	269	269	61%	0
1996	503	160	21	241	422	23	399	14	87	38	65%	**141**	209	39	51	0	16	264	264	61%	0
1997	610	99	24	258	450	25	425	15	93	41	65%	**141**	231	53	45	0	19	303	303	61%	0
1998	521	103	26	227	397	22	375	13	82	36	65%	**140**	214	58	30	0	17	289	289	61%	31
1999	618	67	21	251	435	24	411	14	90	40	65%	**140**	213	34	54	0	18	266	266	61%	0
2000	570	123	29	252	440	24	416	15	91	40	65%	**139**	188	106	82	0	16	311	311	61%	44
2001	322	134	28	165	291	16	275	10	60	27	65%	**139**	142	54	37	0	12	207	207	61%	128
2002	124	53	35	64	113	6	107	4	23	10	65%	**139**	60	7	10	0	4	71	71	61%	341

Table 31

Arkansas River Farms No. 36 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	278	0	37	102	176	10	166	6	36	16	65%	**139**	103	7	5	0	7	118	118	61%	318
2004	338	0	27	124	214	12	202	7	44	19	65%	**139**	122	9	9	0	9	140	140	61%	178
2005	450	0	33	165	285	16	269	9	59	26	65%	**139**	152	14	22	0	12	178	178	61%	217
2006	309	56	28	133	232	13	219	8	48	21	65%	**139**	119	16	24	0	9	144	144	61%	195
2007	520	119	26	233	407	22	384	13	84	37	65%	**139**	202	55	47	0	17	274	274	61%	42
2008	436	105	32	197	344	19	325	11	71	31	65%	**139**	188	17	24	0	14	219	219	61%	169
2009	404	84	26	178	310	17	293	10	64	28	65%	**139**	169	20	22	0	13	201	201	61%	110
2010	452	85	31	196	341	19	322	11	70	31	65%	**139**	184	42	25	0	14	240	240	61%	135
2011	346	52	39	145	253	14	239	8	52	23	65%	**139**	155	0	0	0	11	166	166	61%	291
2012	130	55	47	67	118	6	111	4	24	11	65%	**139**	62	11	11	0	4	77	77	61%	473
2013	308	0	42	113	195	11	184	6	40	18	65%	**139**	120	0	0	0	8	127	127	61%	368
2014	434	25	40	168	291	16	275	10	60	27	65%	**139**	168	2	10	0	13	183	183	61%	297
Avg	432	60	27	179	312	17	295	10	64	28	65%	**142**	153	39	39	0	12	204	204	61%	125
Max	743	174	47	320	559	31	529	18	115	51	65%	**147**	281	106	102	0	24	355	355	61%	473
Min	124	0	19	64	113	6	107	4	23	10	65%	**138**	51	0	0	0	4	71	71	61%	0
1979 to 2014																					
Avg	443	82	28	191	334	18	315	11	69	30	65%	**141**	171	34	34	0	14	218	218	61%	130
Max	743	174	47	320	559	31	529	18	115	51	65%	**147**	281	106	102	0	24	355	355	61%	473
Min	124	0	21	64	113	6	107	4	23	10	65%	**139**	60	0	0	0	4	71	71	61%	0

Explanation of Columns

(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Total No. of Shares	**212**
Trade Shares	**212**
Total Consumptive Use	**218**
Trade Shares Pro Rata CU	**218**

Table 32

Arkansas River Farms No. 37 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%)
35.1% <---- Res. Rel. Ditch Loss (%)
3.5% <---- On-Farm Lateral Loss (%)
10.0% <---- Tail Water (%)
16.9% <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%)
22.6% <---- Initial Deep Percolation (%)
15.0% <---- Starting Soil Moisture Storage Content (%)
4.9 <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
1950	305	43	22	127	221	12	209	7	46	20	65%	**160**	108	48	28	0	4	159	159	61%	139
1951	294	27	21	117	203	11	192	7	42	19	65%	**160**	108	12	17	0	3	123	123	61%	165
1952	340	5	30	127	219	12	206	7	45	20	65%	**160**	108	31	26	0	4	143	143	61%	262
1953	281	0	27	103	178	10	168	6	37	16	65%	**160**	87	22	22	0	3	112	112	61%	249
1954	153	0	30	56	97	5	91	3	20	9	65%	**160**	39	17	20	0	1	57	57	61%	345
1955	222	6	28	83	144	8	136	5	30	13	65%	**160**	80	12	8	0	2	94	94	61%	289
1956	216	0	27	79	137	8	129	5	28	12	65%	**161**	64	20	20	0	2	86	86	61%	276
1957	423	8	19	158	273	15	258	9	56	25	65%	**161**	134	29	34	0	5	168	168	61%	98
1958	212	78	24	105	184	10	174	6	38	17	65%	**161**	111	7	2	0	4	122	122	61%	200
1959	290	38	25	120	208	11	197	7	43	19	65%	**161**	88	22	40	0	3	113	113	61%	231
1960	281	3	27	104	180	10	170	6	37	16	65%	**161**	78	43	32	0	3	125	125	61%	241
1961	357	5	20	133	229	13	217	8	47	21	65%	**161**	106	40	35	0	4	149	149	61%	127
1962	362	31	25	144	249	14	236	8	51	23	65%	**162**	137	18	16	0	4	160	160	61%	180
1963	225	4	31	84	145	8	137	5	30	13	65%	**162**	52	37	37	0	2	91	91	61%	324
1964	208	0	27	76	132	7	124	4	27	12	65%	**162**	60	21	21	0	2	83	83	61%	281
1965	372	48	20	154	267	15	252	9	55	24	65%	**162**	116	33	48	0	4	154	154	61%	124
1966	244	48	24	106	185	10	175	6	38	17	65%	**162**	104	24	10	0	3	131	131	61%	194
1967	313	47	24	131	228	13	216	8	47	21	65%	**163**	124	17	16	0	4	144	144	61%	180
1968	345	12	23	131	226	12	213	7	46	21	65%	**163**	103	36	36	0	3	142	142	61%	167
1969	380	11	19	143	248	14	234	8	51	23	65%	**163**	118	32	34	0	4	154	154	61%	114
1970	366	39	24	148	257	14	243	9	53	23	65%	**163**	139	17	19	0	5	161	161	61%	169
1971	309	43	24	128	223	12	211	7	46	20	65%	**163**	113	23	24	0	4	140	140	61%	186
1972	270	32	25	110	191	11	181	6	39	17	65%	**163**	96	25	21	0	3	125	125	61%	219
1973	333	33	24	134	232	13	220	8	48	21	65%	**164**	116	27	27	0	4	147	147	61%	187
1974	199	29	29	83	145	8	137	5	30	13	65%	**164**	58	26	31	0	2	86	86	61%	308
1975	321	0	25	118	203	11	192	7	42	19	65%	**164**	97	32	28	0	3	133	133	61%	219
1976	202	18	26	80	139	8	132	5	29	13	65%	**164**	69	11	17	0	2	82	82	61%	270
1977	176	18	28	71	123	7	116	4	25	11	65%	**163**	64	18	11	0	2	83	83	61%	305
1978	243	0	24	89	154	8	145	5	32	14	65%	**163**	71	23	23	0	3	97	97	61%	231
1979	280	36	22	115	200	11	189	7	41	18	65%	**162**	100	18	23	0	4	122	122	61%	178
1980	314	92	27	147	258	14	244	9	53	24	65%	**162**	123	41	36	0	5	168	168	61%	198
1981	153	98	31	91	161	9	152	5	33	15	65%	**161**	92	7	7	0	3	102	102	61%	314
1982	401	34	23	159	276	15	261	9	57	25	65%	**161**	142	10	27	0	5	157	157	61%	155
1983	464	93	27	203	354	19	334	12	73	32	65%	**160**	204	31	14	0	7	242	242	61%	127
1984	505	66	26	209	363	20	343	12	75	33	65%	**157**	190	15	33	0	7	212	212	61%	136
1985	479	118	27	217	380	21	359	13	78	35	65%	**153**	211	28	23	0	7	246	246	61%	107
1986	301	1	25	111	191	11	180	6	39	17	65%	**153**	100	16	17	0	4	120	120	61%	206
1987	413	0	27	152	262	14	247	9	54	24	65%	**153**	152	21	9	0	5	178	178	61%	172
1988	298	113	28	149	262	14	248	9	54	24	65%	**153**	145	16	16	0	5	166	166	61%	198
1989	218	80	26	108	190	10	179	6	39	17	65%	**153**	112	5	5	0	3	120	120	61%	214
1990	261	48	27	113	197	11	186	6	40	18	65%	**153**	118	3	3	0	4	125	125	61%	220
1991	234	65	26	109	190	10	180	6	39	17	65%	**153**	100	17	17	0	3	120	120	61%	209
1992	246	56	21	110	192	11	181	6	40	18	65%	**152**	111	7	7	0	4	121	121	61%	154
1993	314	70	21	140	245	13	231	8	50	22	65%	**152**	117	15	33	0	4	137	137	61%	140
1994	285	98	26	139	244	13	230	8	50	22	65%	**152**	132	32	18	0	4	168	168	61%	172
1995	450	51	21	183	318	18	301	11	66	29	65%	**152**	141	51	55	0	6	197	197	61%	76
1996	341	109	21	164	287	16	271	9	59	26	65%	**152**	156	26	21	0	5	187	187	61%	84
1997	414	67	24	176	306	17	289	10	63	28	65%	**152**	170	7	18	0	6	183	183	61%	128
1998	354	70	26	154	269	15	255	9	56	25	65%	**151**	150	13	15	0	5	169	169	61%	163
1999	420	46	21	170	295	16	279	10	61	27	65%	**151**	152	42	29	0	6	199	199	61%	74
2000	387	83	29	171	299	16	283	10	62	27	65%	**151**	138	37	46	0	5	180	180	61%	193
2001	219	91	28	112	197	11	187	7	41	18	65%	**151**	103	30	18	0	4	137	137	61%	219
2002	84	36	35	44	77	4	73	3	16	7	65%	**151**	42	3	5	0	1	47	47	61%	398

Table 32

Arkansas River Farms No. 37 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year (1)	River Headgate Diversions (2)	Reservoir Releases (3)	Crop Irrigation Reqt (In) (4)	Ditch Loss (5)	Farm Turnout Delivery (6)	Off-Farm Lateral Loss (7)	Farm Delivery (8)	On-Farm Lateral Loss (9)	Initial Deep Percolation (10)	Tail water (11)	Max Farm Efficiency (12)	Irrigated Acreage (13)	Applied Irrigation Water to Crop Consumptive Use (14)	Consumptive Use From Soil Moisture (15)	Applied Irrigation Water to Soil Moisture Storage (16)	Applied Irrigation Water to Additional Deep Perc (17)	SEV Losses (18)	Total Consumptive Use (19)	Prorated Total Consumptive Use (20)	Calculated Actual Farm Efficiency (21)	Crop Consumptive Use Shortage (22)
2003	189	0	37	69	119	7	113	4	25	11	65%	**151**	70	5	3	0	2	77	77	61%	391
2004	229	0	27	84	145	8	137	5	30	13	65%	**151**	88	1	1	0	3	92	92	61%	247
2005	306	0	33	112	193	11	183	6	40	18	65%	**151**	106	8	13	0	4	117	117	61%	304
2006	210	38	28	91	158	9	149	5	33	14	65%	**151**	84	8	13	0	3	94	94	61%	267
2007	353	81	26	158	276	15	261	9	57	25	65%	**151**	156	23	13	0	5	184	184	61%	147
2008	296	71	32	134	234	13	221	8	48	21	65%	**151**	133	2	11	0	4	139	139	61%	271
2009	275	57	26	121	211	12	199	7	43	19	65%	**151**	117	11	13	0	4	132	132	61%	196
2010	307	58	31	133	232	13	219	8	48	21	65%	**151**	127	27	15	0	4	158	158	61%	239
2011	235	35	39	99	172	9	162	6	35	16	65%	**151**	105	0	0	0	3	109	109	61%	380
2012	89	37	47	46	80	4	76	3	17	7	65%	**151**	42	7	7	0	1	51	51	61%	544
2013	209	0	42	77	132	7	125	4	27	12	65%	**151**	81	0	0	0	2	84	84	61%	449
2014	295	17	40	114	198	11	187	7	41	18	65%	**151**	117	1	4	0	4	122	122	61%	391
Avg	293	41	27	122	212	12	200	7	44	19	65%	**157**	110	20	20	0	4	134	134	61%	221
Max	505	118	47	217	380	21	359	13	78	35	65%	**164**	211	51	55	0	7	246	246	61%	544
Min	84	0	19	44	77	4	73	3	16	7	65%	**151**	39	0	0	0	1	47	47	61%	74
1979 to 2014																					
Avg	301	56	28	130	227	12	214	7	47	21	65%	**153**	123	16	16	0	4	143	143	61%	224
Max	505	118	47	217	380	21	359	13	78	35	65%	**162**	211	51	55	0	7	246	246	61%	544
Min	84	0	21	44	77	4	73	3	16	7	65%	**151**	42	0	0	0	1	47	47	61%	74

Total No. of Shares	144
Trade Shares	144
Total Consumptive Use	143
Trade Shares Pro Rata CU	143

Explanation of Columns

(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Table 33

Arkansas River Farms No. 37 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
1950	424	60	22	177	307	17	290	10	63	28	65%	**256**	151	70	38	0	5	226	215	61%	252
1951	408	37	21	163	282	16	267	9	58	26	65%	**253**	153	14	21	0	5	172	164	61%	284
1952	473	7	30	176	303	17	287	10	63	28	65%	**250**	152	41	34	0	5	198	189	61%	434
1953	391	0	27	143	247	14	234	8	51	23	65%	**247**	123	29	29	0	4	156	149	61%	402
1954	212	0	30	78	134	7	127	4	28	12	65%	**244**	55	22	27	0	2	79	76	61%	535
1955	308	8	28	116	200	11	189	7	41	18	65%	**244**	113	15	10	0	3	131	125	61%	451
1956	300	0	27	110	190	10	179	6	39	17	65%	**243**	91	25	25	0	3	119	114	61%	429
1957	588	11	19	220	379	21	358	13	78	35	65%	**243**	188	39	45	0	7	233	223	61%	168
1958	294	108	24	146	256	14	242	8	53	23	65%	**242**	154	10	3	0	5	169	161	61%	316
1959	403	53	25	167	289	16	274	10	60	26	65%	**242**	123	30	55	0	5	157	150	61%	359
1960	390	5	27	145	250	14	236	8	51	23	65%	**241**	110	59	44	0	4	173	165	61%	373
1961	496	7	20	184	318	18	301	11	66	29	65%	**240**	148	55	47	0	5	208	199	61%	203
1962	503	43	25	200	346	19	327	11	71	32	65%	**240**	191	24	22	0	6	221	211	61%	282
1963	312	5	31	117	201	11	190	7	41	18	65%	**239**	74	50	50	0	2	126	120	61%	487
1964	289	0	27	106	183	10	173	6	38	17	65%	**239**	84	28	28	0	3	115	110	61%	421
1965	517	67	20	213	371	20	351	12	76	34	65%	**238**	164	46	64	0	6	215	206	61%	193
1966	338	66	24	147	257	14	243	9	53	23	65%	**238**	145	31	13	0	5	181	172	61%	295
1967	434	65	24	182	317	17	300	10	65	29	65%	**237**	173	22	22	0	5	200	191	61%	273
1968	479	16	23	181	313	17	296	10	65	29	65%	**236**	144	48	48	0	5	197	188	61%	251
1969	527	15	19	199	344	19	325	11	71	31	65%	**236**	165	43	46	0	6	214	205	61%	173
1970	509	54	24	206	357	20	338	12	74	33	65%	**235**	194	24	26	0	6	224	214	61%	252
1971	429	59	24	178	310	17	293	10	64	28	65%	**235**	158	32	32	0	5	195	186	61%	274
1972	375	44	25	153	266	15	251	9	55	24	65%	**234**	134	34	29	0	4	173	165	61%	320
1973	463	46	24	186	323	18	305	11	67	29	65%	**233**	161	37	37	0	6	204	195	61%	273
1974	276	40	29	115	201	11	190	7	41	18	65%	**233**	81	36	42	0	3	120	114	61%	440
1975	445	0	25	163	282	16	266	9	58	26	65%	**232**	135	45	38	0	5	184	176	61%	314
1976	280	25	26	112	194	11	183	6	40	18	65%	**234**	96	15	23	0	3	113	108	61%	390
1977	244	25	28	98	170	9	161	6	35	16	65%	**236**	90	24	15	0	2	116	111	61%	447
1978	337	0	24	124	213	12	202	7	44	19	65%	**238**	100	31	31	0	3	134	128	61%	347
1979	388	49	22	160	278	15	263	9	57	25	65%	**240**	141	24	30	0	5	169	162	61%	275
1980	436	128	27	205	359	20	339	12	74	33	65%	**243**	170	56	50	0	7	234	223	61%	315
1981	213	137	31	126	223	12	211	7	46	20	65%	**245**	127	10	10	0	4	141	135	61%	490
1982	557	47	23	221	383	21	362	13	79	35	65%	**247**	203	13	32	0	7	222	212	61%	256
1983	644	129	27	282	491	27	464	16	101	45	65%	**249**	287	35	15	0	9	331	316	61%	240
1984	701	92	26	290	504	28	476	17	104	46	65%	**241**	266	18	43	0	10	294	281	61%	240
1985	666	164	27	302	528	29	499	17	109	48	65%	**234**	296	38	28	0	10	344	328	61%	195
1986	418	1	25	154	265	15	251	9	55	24	65%	**235**	139	20	23	0	5	165	158	61%	333
1987	574	0	27	211	363	20	343	12	75	33	65%	**235**	211	30	12	0	7	247	236	61%	289
1988	414	157	28	207	364	20	344	12	75	33	65%	**235**	203	21	21	0	7	230	220	61%	328
1989	303	111	26	150	264	14	249	9	54	24	65%	**236**	158	4	4	0	5	167	159	61%	348
1990	362	67	27	157	273	15	258	9	56	25	65%	**236**	164	4	4	0	5	173	165	61%	359
1991	324	91	26	151	264	15	250	9	54	24	65%	**236**	138	24	24	0	5	167	159	61%	342
1992	341	78	21	153	267	15	252	9	55	24	65%	**237**	155	9	9	0	5	169	161	61%	259
1993	436	98	21	195	340	19	321	11	70	31	65%	**237**	162	21	46	0	6	190	181	61%	240
1994	395	136	26	193	338	19	320	11	70	31	65%	**237**	185	43	23	0	6	235	224	61%	295
1995	625	71	21	254	442	24	417	15	91	40	65%	**238**	199	68	72	0	8	275	263	61%	152
1996	474	151	21	227	398	22	376	13	82	36	65%	**238**	220	33	25	0	7	259	248	61%	165
1997	575	93	24	244	424	23	401	14	87	39	65%	**238**	238	6	23	0	8	252	240	61%	237
1998	491	98	26	215	374	21	354	12	77	34	65%	**239**	209	19	21	0	7	235	224	61%	287
1999	583	63	21	236	410	23	388	14	85	37	65%	**239**	213	58	39	0	8	279	267	61%	151
2000	538	116	29	238	416	23	393	14	86	38	65%	**239**	197	43	58	0	7	247	236	61%	341
2001	304	126	28	156	274	15	259	9	57	25	65%	**239**	147	38	22	0	5	190	181	61%	374
2002	117	50	35	61	107	6	101	4	22	10	65%	**239**	59	4	6	0	2	65	62	61%	641

Table 33

Arkansas River Farms No. 37 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	262	0	37	96	166	9	157	5	34	15	65%	**239**	97	7	5	0	3	107	102	61%	636
2004	318	0	27	117	202	11	190	7	42	18	65%	**239**	124	0	0	0	4	128	122	61%	410
2005	424	0	33	156	269	15	254	9	55	24	65%	**239**	147	10	18	0	5	162	155	61%	504
2006	292	53	28	126	219	12	207	7	45	20	65%	**239**	117	10	17	0	4	131	125	61%	441
2007	491	112	26	220	384	21	362	13	79	35	65%	**239**	222	28	13	0	7	258	246	61%	267
2008	411	99	32	186	325	18	307	11	67	30	65%	**239**	185	0	14	0	6	192	183	61%	459
2009	381	79	26	168	293	16	277	10	60	27	65%	**239**	163	15	17	0	6	183	175	61%	337
2010	426	80	31	185	322	18	304	11	66	29	65%	**239**	176	37	21	0	6	220	210	61%	410
2011	326	49	39	137	238	13	225	8	49	22	65%	**239**	146	0	0	0	5	151	144	61%	624
2012	123	51	47	63	111	6	105	4	23	10	65%	**239**	58	10	10	0	2	70	67	61%	873
2013	290	0	42	106	184	10	174	6	38	17	65%	**239**	113	0	0	0	3	116	111	61%	728
2014	409	24	40	159	274	15	259	9	57	25	65%	**239**	164	0	4	0	5	170	162	61%	643
Avg	407	56	27	169	294	16	278	10	61	27	65%	**239**	155	27	26	0	5	186	178	61%	356
Max	701	164	47	302	528	29	499	17	109	48	65%	**256**	296	70	72	0	10	344	328	61%	873
Min	117	0	19	61	107	6	101	4	22	10	65%	**232**	55	0	0	0	2	65	62	61%	151
1979 to 2014																					
Avg	418	78	28	181	315	17	298	10	65	29	65%	**239**	172	21	21	0	6	199	190	61%	375
Max	701	164	47	302	528	29	499	17	109	48	65%	**249**	296	68	72	0	10	344	328	61%	873
Min	117	0	21	61	107	6	101	4	22	10	65%	**234**	58	0	0	0	2	65	62	61%	151

Total No. of Shares	**200**
Trade Shares	**191**
Total Consumptive Use	**199**
Trade Shares Pro Rata CU	**190**

Explanation of Columns
(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Table 34
Arkansas River Farms No. 40 - Consumptive Use Analysis - Fort Lyon Canal Water Rights
Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres
(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year (1)	River Headgate Diversions (2)	Reservoir Releases (3)	Crop Irrigation Reqt (In) (4)	Ditch Loss (5)	Farm Turnout Delivery (6)	Off-Farm Lateral Loss (7)	Farm Delivery (8)	On-Farm Lateral Loss (9)	Initial Deep Percolation (10)	Tail water (11)	Max Farm Efficiency (12)	Irrigated Acreage (13)	Applied Irrigation Water to Crop Consumptive Use (14)	Consumptive Use From Soil Moisture (15)	Applied Irrigation Water to Soil Moisture Storage (16)	Applied Irrigation Water to Additional Deep Perc (17)	SEV Losses (18)	Total Consumptive Use (19)	Prorated Total Consumptive Use (20)	Calculated Actual Farm Efficiency (21)	Crop Consumptive Use Shortage (22)
1950	142	20	22	59	103	6	97	3	21	9	65%	**60**	49	21	14	0	4	74	74	61%	39
1951	137	12	21	55	95	5	89	3	19	9	65%	**60**	48	7	10	0	3	59	59	61%	52
1952	158	2	30	59	102	6	96	3	21	9	65%	**61**	50	15	13	0	4	69	69	61%	88
1953	131	0	27	48	83	5	78	3	17	8	65%	**62**	40	11	11	0	3	54	54	61%	87
1954	71	0	30	26	45	2	42	1	9	4	65%	**62**	17	9	10	0	1	27	27	61%	131
1955	103	3	28	39	67	4	63	2	14	6	65%	**62**	37	6	4	0	2	45	45	61%	105
1956	100	0	27	37	64	4	60	2	13	6	65%	**62**	29	10	10	0	2	41	41	61%	100
1957	197	4	19	74	127	7	120	4	26	12	65%	**62**	61	15	17	0	5	81	81	61%	25
1958	98	36	24	49	86	5	81	3	18	8	65%	**62**	52	3	1	0	4	59	59	61%	67
1959	135	18	25	56	97	5	92	3	20	9	65%	**61**	40	11	20	0	3	54	54	61%	79
1960	131	2	27	48	84	5	79	3	17	8	65%	**61**	36	21	16	0	3	59	59	61%	81
1961	166	2	20	62	107	6	101	4	22	10	65%	**61**	48	19	18	0	4	71	71	61%	36
1962	169	14	25	67	116	6	110	4	24	11	65%	**61**	63	10	9	0	4	77	77	61%	52
1963	105	2	31	39	67	4	64	2	14	6	65%	**60**	23	18	18	0	2	43	43	61%	113
1964	97	0	27	36	61	3	58	2	13	6	65%	**60**	27	11	11	0	2	40	40	61%	97
1965	173	23	20	71	124	7	117	4	26	11	65%	**60**	51	17	25	0	4	72	72	61%	34
1966	113	22	24	49	86	5	81	3	18	8	65%	**60**	47	14	6	0	3	64	64	61%	57
1967	145	22	24	61	106	6	100	4	22	10	65%	**59**	56	11	10	0	4	70	70	61%	51
1968	160	5	23	61	105	6	99	3	22	10	65%	**59**	46	18	18	0	3	68	68	61%	46
1969	177	5	19	67	115	6	109	4	24	11	65%	**59**	53	16	17	0	4	74	74	61%	25
1970	170	18	24	69	120	7	113	4	25	11	65%	**59**	64	9	10	0	5	77	77	61%	44
1971	144	20	24	60	104	6	98	3	21	9	65%	**58**	51	13	13	0	4	67	67	61%	52
1972	126	15	25	51	89	5	84	3	18	8	65%	**58**	44	12	10	0	3	60	60	61%	64
1973	155	15	24	62	108	6	102	4	22	10	65%	**58**	53	11	13	0	4	69	69	61%	52
1974	93	13	29	39	67	4	64	2	14	6	65%	**58**	26	15	15	0	2	44	44	61%	97
1975	149	0	25	55	94	5	89	3	19	9	65%	**57**	43	17	15	0	3	64	64	61%	62
1976	94	8	26	37	65	4	61	2	13	6	65%	**57**	31	6	9	0	2	39	39	61%	86
1977	82	8	28	33	57	3	54	2	12	5	65%	**58**	28	10	7	0	2	40	40	61%	98
1978	113	0	24	41	71	4	68	2	15	7	65%	**58**	33	11	11	0	3	46	46	61%	71
1979	130	17	22	54	93	5	88	3	19	8	65%	**58**	45	10	12	0	4	59	59	61%	51
1980	146	43	27	69	120	7	114	4	25	11	65%	**58**	57	19	17	0	5	81	81	61%	53
1981	71	46	31	42	75	4	71	2	15	7	65%	**58**	43	3	3	0	3	49	49	61%	102
1982	187	16	23	74	128	7	121	4	26	12	65%	**58**	62	6	17	0	5	72	72	61%	43
1983	216	43	27	94	165	9	156	5	34	15	65%	**58**	89	23	12	0	7	119	119	61%	19
1984	235	31	26	97	169	9	159	6	35	15	65%	**60**	87	9	16	0	7	103	103	61%	35
1985	223	55	27	101	177	10	167	6	36	16	65%	**63**	96	14	13	0	7	118	118	61%	31
1986	140	0	25	52	89	5	84	3	18	8	65%	**63**	47	9	8	0	4	60	60	61%	76
1987	192	0	27	71	122	7	115	4	25	11	65%	**63**	69	10	6	0	5	84	84	61%	62
1988	139	53	28	69	122	7	115	4	25	11	65%	**63**	66	10	9	0	5	81	81	61%	70
1989	101	37	26	50	88	5	83	3	18	8	65%	**63**	51	3	3	0	3	58	58	61%	81
1990	121	23	27	52	91	5	86	3	19	8	65%	**63**	55	2	2	0	4	60	60	61%	84
1991	109	30	26	51	88	5	84	3	18	8	65%	**63**	46	8	8	0	3	58	58	61%	80
1992	114	26	21	51	89	5	84	3	18	8	65%	**63**	51	4	4	0	4	59	59	61%	57
1993	146	33	21	65	114	6	108	4	23	10	65%	**61**	53	8	17	0	5	66	66	61%	47
1994	132	45	26	65	113	6	107	4	23	10	65%	**63**	60	16	10	0	5	81	81	61%	62
1995	209	24	21	85	148	8	140	5	30	13	65%	**63**	64	24	27	0	6	94	94	61%	22
1996	159	51	21	76	133	7	126	4	27	12	65%	**63**	71	13	11	0	5	90	90	61%	25
1997	193	31	24	82	142	8	134	5	29	13	65%	**63**	78	5	9	0	6	89	89	61%	43
1998	165	33	26	72	125	7	118	4	26	11	65%	**63**	70	6	7	0	5	81	81	61%	59
1999	195	21	21	79	137	8	130	5	28	13	65%	**63**	70	19	14	0	6	95	95	61%	21
2000	180	39	29	80	139	8	132	5	29	13	65%	**63**	63	19	23	0	5	87	87	61%	71
2001	102	42	28	52	92	5	87	3	19	8	65%	**60**	47	15	10	0	4	65	65	61%	78
2002	39	17	35	20	36	2	34	1	7	3	65%	**60**	19	2	3	0	1	22	22	61%	155

Table 34

Arkansas River Farms No. 40 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	88	0	37	32	56	3	52	2	11	5	65%	**60**	33	2	2	0	2	37	37	61%	150
2004	107	0	27	39	68	4	64	2	14	6	65%	**60**	40	1	1	0	3	44	44	61%	92
2005	142	0	33	52	90	5	85	3	19	8	65%	**60**	49	4	6	0	4	56	56	61%	112
2006	98	18	28	42	73	4	69	2	15	7	65%	**60**	38	4	7	0	3	45	45	61%	99
2007	164	38	26	74	128	7	121	4	26	12	65%	**60**	71	12	8	0	5	88	88	61%	47
2008	138	33	32	62	109	6	103	4	22	10	65%	**60**	61	3	6	0	4	68	68	61%	97
2009	128	26	26	56	98	5	93	3	20	9	65%	**60**	54	6	6	0	4	64	64	61%	69
2010	143	27	31	62	108	6	102	4	22	10	65%	**60**	59	13	7	0	4	76	76	61%	84
2011	109	16	39	46	80	4	75	3	16	7	65%	**60**	49	0	0	0	3	53	53	61%	143
2012	41	17	47	21	37	2	35	1	8	3	65%	**60**	19	3	3	0	1	24	24	61%	212
2013	97	0	42	36	62	3	58	2	13	6	65%	**60**	38	0	0	0	2	40	40	61%	172
2014	137	8	40	53	92	5	87	3	19	8	65%	**60**	54	0	2	0	4	58	58	61%	147
Avg	136	19	27	57	99	5	93	3	20	9	65%	**60**	50	10	10	0	4	64	64	61%	75
Max	235	55	47	101	177	10	167	6	36	16	65%	**63**	96	24	27	0	7	119	119	61%	212
Min	39	0	19	20	36	2	34	1	7	3	65%	**57**	17	0	0	0	1	22	22	61%	19
1979 to 2014																					
Avg	140	26	28	61	105	6	100	3	22	10	65%	**61**	56	8	9	0	4	69	69	61%	79
Max	235	55	47	101	177	10	167	6	36	16	65%	**63**	96	24	27	0	7	119	119	61%	212
Min	39	0	21	20	36	2	34	1	7	3	65%	**58**	19	0	0	0	1	22	22	61%	19

Total No. of Shares	**67**
Trade Shares	**67**
Total Consumptive Use	**69**
Trade Shares Pro Rata CU	**69**

Explanation of Columns

(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Table 35

Arkansas River Farms No. 41 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
1950	169	24	22	71	123	7	116	4	25	11	65%	**115**	61	29	15	0	4	94	93	61%	122
1951	163	15	21	65	113	6	107	4	23	10	65%	**115**	62	5	7	0	4	71	70	61%	138
1952	189	3	30	70	121	7	115	4	25	11	65%	**115**	61	15	13	0	4	81	80	61%	210
1953	156	0	27	57	99	5	94	3	20	9	65%	**115**	50	10	10	0	4	64	64	61%	196
1954	85	0	30	31	54	3	51	2	11	5	65%	**115**	23	9	10	0	2	33	32	61%	256
1955	123	3	28	46	80	4	76	3	17	7	65%	**115**	46	5	3	0	3	54	53	61%	221
1956	120	0	27	44	76	4	72	3	16	7	65%	**115**	38	9	9	0	3	49	48	61%	210
1957	235	4	19	88	152	8	143	5	31	14	65%	**115**	76	15	17	0	6	97	96	61%	95
1958	118	43	24	58	102	6	97	3	21	9	65%	**115**	62	4	1	0	4	70	69	61%	161
1959	161	21	25	67	116	6	109	4	24	11	65%	**115**	50	11	21	0	4	65	64	61%	181
1960	156	2	27	58	100	6	94	3	21	9	65%	**115**	45	23	16	0	3	71	70	61%	190
1961	198	3	20	74	127	7	120	4	26	12	65%	**114**	61	21	17	0	4	86	85	61%	111
1962	201	17	25	80	138	8	131	5	29	13	65%	**114**	77	8	8	0	5	90	89	61%	152
1963	125	2	31	47	80	4	76	3	17	7	65%	**114**	31	19	19	0	2	52	51	61%	243
1964	116	0	27	42	73	4	69	2	15	7	65%	**114**	35	10	10	0	2	47	47	61%	211
1965	207	27	20	85	148	8	140	5	31	14	65%	**114**	67	17	24	0	5	90	88	61%	109
1966	135	26	24	59	103	6	97	3	21	9	65%	**114**	59	11	4	0	4	74	73	61%	157
1967	174	26	24	73	127	7	120	4	26	12	65%	**114**	71	7	7	0	4	82	81	61%	148
1968	191	6	23	73	125	7	118	4	26	11	65%	**114**	60	17	17	0	4	81	80	61%	138
1969	211	6	19	80	138	8	130	5	28	13	65%	**114**	68	15	16	0	5	88	87	61%	102
1970	204	22	24	82	143	8	135	5	29	13	65%	**114**	78	9	9	0	6	93	91	61%	141
1971	172	24	24	71	124	7	117	4	26	11	65%	**114**	65	11	11	0	4	81	80	61%	150
1972	150	18	25	61	106	6	101	4	22	10	65%	**114**	54	13	11	0	4	71	70	61%	171
1973	185	18	24	74	129	7	122	4	27	12	65%	**114**	66	14	14	0	5	85	84	61%	151
1974	111	16	29	46	80	4	76	3	17	7	65%	**114**	33	14	16	0	3	49	49	61%	227
1975	178	0	25	65	113	6	107	4	23	10	65%	**114**	56	16	13	0	4	76	75	61%	171
1976	112	10	26	45	77	4	73	3	16	7	65%	**114**	39	5	9	0	3	47	46	61%	199
1977	98	10	28	39	68	4	64	2	14	6	65%	**113**	37	9	5	0	2	47	47	61%	223
1978	135	0	24	49	85	5	81	3	18	8	65%	**113**	40	12	12	0	3	55	55	61%	173
1979	155	20	22	64	111	6	105	4	23	10	65%	**112**	57	8	11	0	5	70	70	61%	139
1980	174	51	27	82	143	8	136	5	30	13	65%	**111**	68	22	20	0	6	96	95	61%	158
1981	85	55	31	50	89	5	84	3	18	8	65%	**111**	51	4	4	0	4	59	58	61%	229
1982	223	19	23	88	153	8	145	5	32	14	65%	**110**	84	5	11	0	6	94	93	61%	122
1983	258	52	27	113	197	11	186	7	41	18	65%	**110**	115	11	6	0	8	135	133	61%	121
1984	280	37	26	116	201	11	190	7	42	18	65%	**112**	107	7	17	0	8	122	121	61%	130
1985	266	65	27	121	211	12	199	7	43	19	65%	**115**	120	14	10	0	9	143	141	61%	126
1986	167	1	25	62	106	6	100	4	22	10	65%	**115**	56	8	9	0	4	68	68	61%	178
1987	230	0	27	84	145	8	137	5	30	13	65%	**115**	84	12	5	0	6	102	101	61%	163
1988	166	63	28	83	146	8	138	5	30	13	65%	**115**	82	7	7	0	6	95	94	61%	179
1989	121	44	26	60	105	6	100	3	22	10	65%	**115**	64	1	1	0	4	69	68	61%	183
1990	145	27	27	63	109	6	103	4	22	10	65%	**114**	66	1	1	0	5	72	71	61%	189
1991	130	36	26	60	106	6	100	3	22	10	65%	**114**	55	10	10	0	4	69	68	61%	179
1992	137	31	21	61	107	6	101	4	22	10	65%	**114**	62	3	3	0	4	70	69	61%	139
1993	175	39	21	78	136	7	128	4	28	12	65%	**114**	65	9	19	0	5	79	78	61%	130
1994	158	54	26	77	135	7	128	4	28	12	65%	**114**	75	17	8	0	5	98	96	61%	159
1995	250	28	21	102	177	10	167	6	36	16	65%	**114**	82	26	26	0	7	115	113	61%	93
1996	190	60	21	91	159	9	151	5	33	15	65%	**114**	89	10	9	0	6	105	104	61%	100
1997	230	37	24	98	170	9	160	6	35	15	65%	**113**	96	2	9	0	7	104	103	61%	132
1998	196	39	26	86	150	8	141	5	31	14	65%	**113**	83	7	8	0	6	97	96	61%	154
1999	233	25	21	95	164	9	155	5	34	15	65%	**113**	86	23	15	0	7	116	114	61%	91
2000	215	46	29	95	166	9	157	5	34	15	65%	**113**	82	14	20	0	6	102	101	61%	179
2001	122	50	28	62	110	6	104	4	23	10	65%	**113**	61	13	7	0	5	78	77	61%	189
2002	47	20	35	24	43	2	40	1	9	4	65%	**113**	24	1	2	0	1	27	26	61%	307

Table 35

Arkansas River Farms No. 41 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	105	0	37	38	66	4	63	2	14	6	65%	**113**	39	3	2	0	3	44	44	61%	307
2004	127	0	27	47	81	4	76	3	17	7	65%	**113**	50	0	0	0	3	53	52	61%	202
2005	170	0	33	62	107	6	101	4	22	10	65%	**113**	59	3	7	0	4	67	66	61%	249
2006	117	21	28	50	88	5	83	3	18	8	65%	**113**	47	4	7	0	3	54	54	61%	217
2007	196	45	26	88	153	8	145	5	32	14	65%	**113**	91	9	3	0	6	107	105	61%	144
2008	165	40	32	74	130	7	123	4	27	12	65%	**113**	74	0	6	0	5	79	78	61%	230
2009	153	32	26	67	117	6	111	4	24	11	65%	**113**	65	6	6	0	5	76	75	61%	171
2010	170	32	31	74	129	7	122	4	27	12	65%	**113**	71	15	8	0	5	91	89	61%	208
2011	131	20	39	55	95	5	90	3	20	9	65%	**113**	59	0	0	0	4	63	62	61%	305
2012	49	21	47	25	45	2	42	1	9	4	65%	**113**	23	4	4	0	2	29	29	61%	416
2013	116	0	42	43	73	4	69	2	15	7	65%	**113**	45	0	0	0	3	48	47	61%	351
2014	164	10	40	63	110	6	104	4	23	10	65%	**113**	66	0	1	0	5	71	70	61%	314
Avg	163	23	27	68	118	6	111	4	24	11	65%	**114**	63	10	10	0	5	77	76	61%	182
Max	280	65	47	121	211	12	199	7	43	19	65%	**115**	120	29	26	0	9	143	141	61%	416
Min	47	0	19	24	43	2	40	1	9	4	65%	**110**	23	0	0	0	1	27	26	61%	91
1979 to 2014																					
Avg	167	31	28	72	126	7	119	4	26	11	65%	**113**	70	8	8	0	5	82	81	61%	191
Max	280	65	47	121	211	12	199	7	43	19	65%	**115**	120	26	26	0	9	143	141	61%	416
Min	47	0	21	24	43	2	40	1	9	4	65%	**110**	23	0	0	0	1	27	26	61%	91

Total No. of Shares	**80**
Trade Shares	**79**
Total Consumptive Use	**82**
Trade Shares Pro Rata CU	**81**

Explanation of Columns
(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Table 36

Arkansas River Farms No. 42 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
1950	352	50	22	146	255	14	241	8	53	23	65%	**181**	124	55	33	0	4	183	183	61%	154
1951	339	31	21	135	234	13	222	8	48	21	65%	**181**	124	15	20	0	4	142	142	61%	184
1952	392	6	30	146	252	14	238	8	52	23	65%	**181**	125	36	30	0	4	165	165	61%	292
1953	324	0	27	119	205	11	194	7	42	19	65%	**181**	100	26	26	0	3	129	129	61%	278
1954	176	0	30	65	111	6	105	4	23	10	65%	**181**	45	19	23	0	2	66	66	61%	389
1955	256	6	28	96	166	9	157	5	34	15	65%	**181**	93	14	10	0	3	109	109	61%	323
1956	249	0	27	91	157	9	149	5	32	14	65%	**181**	74	23	23	0	2	99	99	61%	309
1957	488	9	19	182	315	17	297	10	65	29	65%	**181**	154	34	39	0	6	193	193	61%	106
1958	244	90	24	121	212	12	201	7	44	19	65%	**181**	128	8	3	0	4	140	140	61%	222
1959	334	44	25	138	240	13	227	8	50	22	65%	**181**	101	26	47	0	4	130	130	61%	256
1960	324	4	27	120	207	11	196	7	43	19	65%	**181**	90	50	37	0	3	144	144	61%	267
1961	411	6	20	153	264	15	250	9	54	24	65%	**181**	122	46	41	0	4	172	172	61%	138
1962	418	36	25	166	287	16	272	10	59	26	65%	**181**	157	22	19	0	5	184	184	61%	195
1963	259	5	31	97	167	9	158	6	34	15	65%	**181**	60	43	43	0	2	105	105	61%	359
1964	240	0	27	88	152	8	143	5	31	14	65%	**181**	69	24	24	0	2	95	95	61%	311
1965	429	56	20	177	308	17	291	10	63	28	65%	**181**	133	39	56	0	5	177	177	61%	134
1966	281	55	24	122	213	12	202	7	44	19	65%	**181**	119	29	12	0	4	151	151	61%	211
1967	360	54	24	151	263	15	249	9	54	24	65%	**181**	142	21	20	0	4	167	167	61%	195
1968	397	13	23	150	260	14	246	9	54	24	65%	**181**	118	42	42	0	4	164	164	61%	179
1969	438	13	19	165	285	16	270	9	59	26	65%	**181**	136	37	39	0	5	178	178	61%	120
1970	422	45	24	171	297	16	280	10	61	27	65%	**181**	160	20	22	0	5	186	186	61%	180
1971	356	49	24	148	257	14	243	9	53	23	65%	**181**	130	27	28	0	4	161	161	61%	200
1972	311	37	25	127	221	12	209	7	45	20	65%	**181**	111	29	25	0	4	144	144	61%	237
1973	384	38	24	154	268	15	253	9	55	24	65%	**181**	133	30	31	0	5	169	169	61%	201
1974	229	33	29	96	167	9	157	6	34	15	65%	**181**	67	31	36	0	3	100	100	61%	335
1975	370	0	25	136	234	13	221	8	48	21	65%	**181**	111	38	33	0	4	153	153	61%	235
1976	232	21	26	93	161	9	152	5	33	15	65%	**181**	79	13	20	0	3	94	94	61%	294
1977	203	20	28	82	141	8	134	5	29	13	65%	**181**	73	21	14	0	2	96	96	61%	335
1978	280	0	24	103	177	10	167	6	36	16	65%	**181**	82	27	27	0	3	112	112	61%	253
1979	322	41	22	133	231	13	218	8	48	21	65%	**181**	115	21	27	0	4	140	140	61%	194
1980	362	106	27	170	298	16	281	10	61	27	65%	**181**	142	47	41	0	5	194	194	61%	215
1981	177	114	31	105	185	10	175	6	38	17	65%	**181**	106	8	8	0	3	117	117	61%	349
1982	462	39	23	183	318	18	300	11	65	29	65%	**181**	162	12	33	0	6	180	180	61%	172
1983	535	107	27	234	408	22	385	13	84	37	65%	**181**	234	38	17	0	8	279	279	61%	137
1984	582	77	26	240	418	23	395	14	86	38	65%	**132**	214	22	43	0	8	244	244	61%	50
1985	553	136	27	251	438	24	414	14	90	40	65%	**82**	178	8	63	28	8	194	194	55%	0
1986	347	1	25	128	220	12	208	7	45	20	65%	**87**	109	72	22	5	4	185	185	59%	1
1987	476	0	27	175	302	17	285	10	62	27	65%	**92**	145	44	40	0	6	195	195	61%	17
1988	344	130	28	172	302	17	286	10	62	28	65%	**96**	143	53	42	0	5	202	202	61%	29
1989	251	92	26	125	219	12	207	7	45	20	65%	**101**	123	21	12	0	4	147	147	61%	75
1990	301	56	27	130	227	12	214	7	47	21	65%	**106**	131	6	8	0	4	142	142	61%	99
1991	269	75	26	125	219	12	207	7	45	20	65%	**110**	112	22	23	0	4	138	138	61%	102
1992	283	65	21	127	221	12	209	7	46	20	65%	**115**	126	13	10	0	4	143	143	61%	67
1993	362	81	21	161	282	16	266	9	58	26	65%	**120**	127	26	47	0	5	158	158	61%	62
1994	328	113	26	160	281	15	265	9	58	26	65%	**124**	142	45	30	0	5	193	193	61%	87
1995	519	59	21	211	367	20	346	12	76	33	65%	**129**	152	63	73	0	7	222	222	61%	12
1996	394	125	21	188	330	18	312	11	68	30	65%	**134**	171	44	32	0	6	221	221	61%	20
1997	477	77	24	202	352	19	333	12	73	32	65%	**138**	192	16	24	0	7	214	214	61%	71
1998	408	81	26	178	311	17	293	10	64	28	65%	**143**	173	16	18	0	6	195	195	61%	120
1999	484	53	21	196	341	19	322	11	70	31	65%	**148**	173	49	36	0	7	228	228	61%	40
2000	446	96	29	198	345	19	326	11	71	31	65%	**153**	155	48	57	0	6	209	209	61%	167
2001	252	105	28	129	228	12	215	8	47	21	65%	**157**	117	37	23	0	4	158	158	61%	213
2002	97	42	35	50	89	5	84	3	18	8	65%	**157**	48	4	6	0	1	54	54	61%	410

Table 36

Arkansas River Farms No. 42 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	217	0	37	80	138	8	130	5	28	13	65%	**157**	81	6	4	0	3	89	89	61%	399
2004	264	0	27	97	167	9	158	6	34	15	65%	**157**	100	3	3	0	3	106	106	61%	248
2005	352	0	33	129	223	12	211	7	46	20	65%	**157**	121	9	16	0	4	135	135	61%	304
2006	242	44	28	104	182	10	172	6	37	17	65%	**157**	96	10	16	0	3	109	109	61%	268
2007	407	93	26	182	318	18	301	11	66	29	65%	**157**	177	28	18	0	6	211	211	61%	135
2008	341	82	32	154	269	15	255	9	56	25	65%	**157**	152	5	13	0	5	162	162	61%	266
2009	317	66	26	139	243	13	230	8	50	22	65%	**157**	134	14	15	0	5	152	152	61%	190
2010	354	67	31	153	267	15	252	9	55	24	65%	**157**	146	31	18	0	5	182	182	61%	232
2011	271	41	39	114	198	11	187	7	41	18	65%	**157**	122	0	0	0	4	125	125	61%	384
2012	102	43	47	52	92	5	87	3	19	8	65%	**157**	48	8	8	0	2	58	58	61%	561
2013	241	0	42	88	152	8	144	5	31	14	65%	**157**	94	0	0	0	3	96	96	61%	459
2014	340	20	40	132	228	13	215	8	47	21	65%	**157**	134	1	6	0	5	140	140	61%	394
Avg	338	47	27	141	244	13	231	8	50	22	65%	**159**	124	26	26	1	4	154	154	61%	207
Max	582	136	47	251	438	24	414	14	90	40	65%	**181**	234	72	73	28	8	279	279	61%	561
Min	97	0	19	50	89	5	84	3	18	8	65%	**82**	45	0	0	0	1	54	54	55%	0
1979 to 2014																					
Avg	347	65	28	150	261	14	247	9	54	24	65%	**142**	136	24	24	1	5	164	164	61%	182
Max	582	136	47	251	438	24	414	14	90	40	65%	**181**	234	72	73	28	8	279	279	61%	561
Min	97	0	21	50	89	5	84	3	18	8	65%	**82**	48	0	0	0	1	54	54	55%	0

Explanation of Columns

(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Total No. of Shares	**166**
Trade Shares	**166**
Total Consumptive Use	**164**
Trade Shares Pro Rata CU	**164**

Table 37

Arkansas River Farms No. 53 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
1950	360	51	22	150	261	14	247	9	54	24	65%	**154**	125	54	35	0	4	184	184	61%	105
1951	347	31	21	138	240	13	227	8	49	22	65%	**154**	122	19	25	0	4	145	145	61%	134
1952	402	6	30	149	258	14	244	9	53	24	65%	**154**	126	39	32	0	4	169	169	61%	221
1953	332	0	27	122	210	12	199	7	43	19	65%	**154**	100	29	29	0	3	133	133	61%	216
1954	180	0	30	66	114	6	108	4	24	10	65%	**154**	44	22	26	0	2	68	68	61%	321
1955	262	7	28	99	170	9	161	6	35	16	65%	**154**	93	16	12	0	3	111	111	61%	256
1956	255	0	27	93	161	9	152	5	33	15	65%	**153**	73	26	26	0	2	101	101	61%	245
1957	499	9	19	187	322	18	304	11	66	29	65%	**153**	154	37	44	0	6	197	197	61%	56
1958	250	92	24	124	218	12	206	7	45	20	65%	**152**	131	9	3	0	4	144	144	61%	161
1959	342	45	25	142	246	14	232	8	51	22	65%	**152**	101	29	51	0	4	134	134	61%	191
1960	331	4	27	123	212	12	201	7	44	19	65%	**151**	90	53	40	0	3	147	147	61%	196
1961	421	6	20	157	271	15	256	9	56	25	65%	**151**	121	48	45	0	4	174	174	61%	85
1962	428	36	25	170	294	16	278	10	61	27	65%	**150**	159	27	22	0	5	191	191	61%	125
1963	265	5	31	99	171	9	162	6	35	16	65%	**150**	59	46	46	0	2	107	107	61%	277
1964	246	0	27	90	155	9	147	5	32	14	65%	**149**	68	28	28	0	2	98	98	61%	238
1965	440	57	20	181	315	17	298	10	65	29	65%	**149**	129	42	65	0	5	176	176	61%	80
1966	288	56	24	125	219	12	206	7	45	20	65%	**148**	119	36	16	0	4	158	158	61%	139
1967	369	55	24	155	269	15	255	9	56	25	65%	**148**	140	28	25	0	4	173	173	61%	123
1968	407	14	23	154	266	15	252	9	55	24	65%	**147**	116	47	47	0	4	168	168	61%	112
1969	448	13	19	169	292	16	276	10	60	27	65%	**146**	135	42	44	0	5	182	182	61%	60
1970	433	46	24	175	304	17	287	10	63	28	65%	**146**	161	23	25	0	5	189	189	61%	107
1971	365	50	24	151	263	15	249	9	54	24	65%	**145**	128	33	34	0	4	165	165	61%	126
1972	319	38	25	130	226	12	214	7	47	21	65%	**145**	112	32	27	0	4	148	148	61%	158
1973	394	39	24	158	274	15	259	9	57	25	65%	**144**	135	28	34	0	5	168	168	61%	129
1974	235	34	29	98	171	9	161	6	35	16	65%	**144**	67	38	38	0	3	108	108	61%	239
1975	379	0	25	139	240	13	226	8	49	22	65%	**143**	110	43	38	0	4	157	157	61%	152
1976	238	21	26	95	165	9	155	5	34	15	65%	**142**	78	16	23	0	3	96	96	61%	209
1977	207	21	28	83	145	8	137	5	30	13	65%	**141**	71	25	18	0	2	98	98	61%	237
1978	286	0	24	105	181	10	171	6	37	17	65%	**139**	83	29	29	0	3	114	114	61%	168
1979	330	42	22	136	236	13	223	8	49	22	65%	**138**	114	25	31	0	5	143	143	61%	113
1980	370	109	27	174	305	17	288	10	63	28	65%	**137**	145	49	42	0	6	199	199	61%	112
1981	181	116	31	107	190	10	180	6	39	17	65%	**135**	108	8	8	0	4	120	120	61%	230
1982	474	40	23	188	326	18	308	11	67	30	65%	**134**	154	15	46	0	6	174	174	61%	88
1983	547	110	27	239	418	23	395	14	86	38	65%	**133**	221	64	36	0	8	293	293	61%	15
1984	596	78	26	246	428	24	404	14	88	39	65%	**138**	220	25	43	0	8	253	253	61%	55
1985	566	139	27	257	448	25	424	15	92	41	65%	**144**	240	37	36	0	9	285	285	61%	47
1986	355	1	25	131	226	12	213	7	46	21	65%	**143**	119	26	20	0	4	149	149	61%	157
1987	488	0	27	179	309	17	292	10	64	28	65%	**143**	171	26	19	0	6	203	203	61%	126
1988	352	134	28	176	310	17	293	10	64	28	65%	**143**	163	35	28	0	6	203	203	61%	138
1989	257	94	26	128	224	12	212	7	46	20	65%	**143**	129	8	8	0	4	142	142	61%	172
1990	308	57	27	133	232	13	219	8	48	21	65%	**143**	138	5	5	0	5	147	147	61%	177
1991	276	77	26	128	225	12	212	7	46	20	65%	**143**	116	20	22	0	4	141	141	61%	168
1992	290	66	21	130	227	12	214	7	47	21	65%	**143**	130	11	9	0	4	145	145	61%	114
1993	371	83	21	165	289	16	273	10	60	26	65%	**142**	133	23	44	0	5	161	161	61%	99
1994	336	115	26	164	288	16	272	10	59	26	65%	**142**	149	43	28	0	5	197	197	61%	123
1995	531	60	21	216	375	21	355	12	77	34	65%	**142**	160	63	71	0	7	230	230	61%	28
1996	403	128	21	193	338	19	320	11	70	31	65%	**142**	177	39	31	0	6	222	222	61%	33
1997	489	79	24	207	361	20	341	12	74	33	65%	**142**	197	16	25	0	7	219	219	61%	74
1998	417	83	26	182	318	18	301	11	66	29	65%	**142**	177	16	18	0	6	199	199	61%	113
1999	496	54	21	201	349	19	330	12	72	32	65%	**142**	177	49	38	0	7	232	232	61%	25
2000	457	99	29	202	353	19	334	12	73	32	65%	**141**	156	53	61	0	6	215	215	61%	135
2001	258	107	28	132	233	13	220	8	48	21	65%	**141**	117	40	26	0	4	161	161	61%	173
2002	99	43	35	52	91	5	86	3	19	8	65%	**141**	49	5	7	0	1	55	55	61%	362

Table 37

Arkansas River Farms No. 53 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	223	0	37	82	141	8	133	5	29	13	65%	**141**	83	6	4	0	3	91	91	61%	348
2004	271	0	27	99	171	9	162	6	35	16	65%	**141**	101	4	4	0	3	109	109	61%	210
2005	361	0	33	132	228	13	216	8	47	21	65%	**141**	124	10	17	0	4	138	138	61%	257
2006	248	45	28	107	186	10	176	6	38	17	65%	**141**	97	11	17	0	3	111	111	61%	228
2007	417	96	26	187	326	18	308	11	67	30	65%	**141**	178	31	22	0	6	215	215	61%	97
2008	350	84	32	158	276	15	261	9	57	25	65%	**141**	154	8	16	0	5	167	167	61%	219
2009	324	67	26	143	249	14	235	8	51	23	65%	**141**	137	15	16	0	5	156	156	61%	153
2010	362	68	31	157	273	15	258	9	56	25	65%	**141**	149	32	19	0	5	187	187	61%	186
2011	277	42	39	116	203	11	191	7	42	18	65%	**141**	124	0	0	0	4	128	128	61%	330
2012	105	44	47	54	95	5	89	3	19	9	65%	**141**	49	9	9	0	2	60	60	61%	498
2013	247	0	42	91	156	9	147	5	32	14	65%	**141**	96	0	0	0	3	99	99	61%	401
2014	348	20	40	135	233	13	220	8	48	21	65%	**141**	137	1	7	0	5	143	143	61%	338
Avg	346	48	27	144	250	14	237	8	52	23	65%	**144**	127	27	27	0	4	158	158	61%	169
Max	596	139	47	257	448	25	424	15	92	41	65%	**154**	240	64	71	0	9	293	293	61%	498
Min	99	0	19	52	91	5	86	3	19	8	65%	**133**	44	0	0	0	1	55	55	61%	15
1979 to 2014																					
Avg	355	66	28	154	268	15	253	9	55	24	65%	**141**	141	23	23	0	5	169	169	61%	170
Max	596	139	47	257	448	25	424	15	92	41	65%	**144**	240	64	71	0	9	293	293	61%	498
Min	99	0	21	52	91	5	86	3	19	8	65%	**133**	49	0	0	0	1	55	55	61%	15

Explanation of Columns
(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Total No. of Shares	**170**
Trade Shares	**170**
Total Consumptive Use	**169**
Trade Shares Pro Rata CU	**169**

Table 38

Arkansas River Farms No. 54B - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year (1)	River Headgate Diversions (2)	Reservoir Releases (3)	Crop Irrigation Reqt (In) (4)	Ditch Loss (5)	Farm Turnout Delivery (6)	Off-Farm Lateral Loss (7)	Farm Delivery (8)	On-Farm Lateral Loss (9)	Initial Deep Percolation (10)	Tail water (11)	Max Farm Efficiency (12)	Irrigated Acreage (13)	Applied Irrigation Water to Crop Consumptive Use (14)	Consumptive Use From Soil Moisture (15)	Applied Irrigation Water to Soil Moisture Storage (16)	Applied Irrigation Water to Additional Deep Perc (17)	SEV Losses (18)	Total Consumptive Use (19)	Prorated Total Consumptive Use (20)	Calculated Actual Farm Efficiency (21)	Crop Consumptive Use Shortage (22)
1950	169	24	22	71	123	7	116	4	25	11	65%	**152**	62	33	14	0	2	96	96	61%	185
1951	163	15	21	65	113	6	107	4	23	10	65%	**153**	64	3	5	0	2	70	70	61%	204
1952	189	3	30	70	121	7	115	4	25	11	65%	**153**	63	13	11	0	2	78	78	61%	308
1953	156	0	27	57	99	5	94	3	20	9	65%	**154**	52	8	8	0	2	62	62	61%	285
1954	85	0	30	31	54	3	51	2	11	5	65%	**155**	23	8	10	0	1	32	32	61%	358
1955	123	3	28	46	80	4	76	3	17	7	65%	**155**	48	3	2	0	1	52	52	61%	318
1956	120	0	27	44	76	4	72	3	16	7	65%	**156**	39	8	8	0	1	48	48	61%	302
1957	235	4	19	88	152	8	143	5	31	14	65%	**156**	77	14	16	0	3	94	94	61%	161
1958	118	43	24	58	102	6	97	3	21	9	65%	**156**	62	3	1	0	2	67	67	61%	244
1959	161	21	25	67	116	6	109	4	24	11	65%	**156**	52	9	20	0	2	63	63	61%	269
1960	156	2	27	58	100	6	94	3	21	9	65%	**156**	47	20	14	0	2	69	69	61%	284
1961	198	3	20	74	127	7	120	4	26	12	65%	**156**	62	20	16	0	2	84	84	61%	182
1962	201	17	25	80	138	8	131	5	29	13	65%	**157**	78	7	7	0	2	87	87	61%	239
1963	125	2	31	47	80	4	76	3	17	7	65%	**157**	34	15	15	0	1	50	50	61%	351
1964	116	0	27	42	73	4	69	2	15	7	65%	**157**	37	8	8	0	1	46	46	61%	305
1965	207	27	20	85	148	8	140	5	31	14	65%	**157**	70	14	21	0	2	87	87	61%	181
1966	135	26	24	59	103	6	97	3	21	9	65%	**157**	59	11	4	0	2	72	72	61%	242
1967	174	26	24	73	127	7	120	4	26	12	65%	**157**	72	6	6	0	2	80	80	61%	233
1968	191	6	23	73	125	7	118	4	26	11	65%	**158**	63	14	14	0	2	79	79	61%	219
1969	211	6	19	80	138	8	130	5	28	13	65%	**158**	72	11	12	0	2	86	86	61%	172
1970	204	22	24	82	143	8	135	5	29	13	65%	**158**	80	7	8	0	3	89	89	61%	228
1971	172	24	24	71	124	7	117	4	26	11	65%	**158**	69	8	7	0	2	79	79	61%	236
1972	150	18	25	61	106	6	101	4	22	10	65%	**158**	55	12	10	0	2	68	68	61%	264
1973	185	18	24	74	129	7	122	4	27	12	65%	**158**	67	12	12	0	2	82	82	61%	240
1974	111	16	29	46	80	4	76	3	17	7	65%	**159**	34	13	16	0	1	48	48	61%	333
1975	178	0	25	65	113	6	107	4	23	10	65%	**159**	60	12	9	0	2	74	74	61%	265
1976	112	10	26	45	77	4	73	3	16	7	65%	**158**	41	3	7	0	1	45	45	61%	294
1977	98	10	28	39	68	4	64	2	14	6	65%	**158**	37	8	5	0	1	46	46	61%	329
1978	135	0	24	49	85	5	81	3	18	8	65%	**157**	42	10	10	0	1	54	54	61%	262
1979	155	20	22	64	111	6	105	4	23	10	65%	**157**	59	7	9	0	2	68	68	61%	220
1980	174	51	27	82	143	8	136	5	30	13	65%	**156**	68	22	20	0	3	93	93	61%	259
1981	85	55	31	50	89	5	84	3	18	8	65%	**156**	51	4	4	0	2	57	57	61%	344
1982	223	19	23	88	153	8	145	5	32	14	65%	**155**	90	4	4	0	3	97	97	61%	202
1983	258	52	27	113	197	11	186	7	41	18	65%	**155**	117	4	4	0	4	124	124	61%	229
1984	280	37	26	116	201	11	190	7	42	18	65%	**157**	108	6	16	0	4	118	118	61%	227
1985	266	65	27	121	211	12	199	7	43	19	65%	**159**	122	12	8	0	4	138	138	61%	225
1986	167	1	25	62	106	6	100	4	22	10	65%	**158**	56	8	9	0	2	66	66	61%	269
1987	230	0	27	84	145	8	137	5	30	13	65%	**158**	84	12	5	0	3	99	99	61%	259
1988	166	63	28	83	146	8	138	5	30	13	65%	**157**	82	7	7	0	3	92	92	61%	278
1989	121	44	26	60	105	6	100	3	22	10	65%	**156**	65	0	0	0	2	67	67	61%	273
1990	145	27	27	63	109	6	103	4	22	10	65%	**155**	66	1	1	0	2	69	69	61%	280
1991	130	36	26	60	106	6	100	3	22	10	65%	**155**	55	10	10	0	2	67	67	61%	265
1992	137	31	21	61	107	6	101	4	22	10	65%	**154**	63	2	2	0	2	67	67	61%	210
1993	175	39	21	78	136	7	128	4	28	12	65%	**153**	65	9	19	0	2	76	76	61%	200
1994	158	54	26	77	135	7	128	4	28	12	65%	**152**	77	16	6	0	2	96	96	61%	244
1995	250	28	21	102	177	10	167	6	36	16	65%	**152**	85	23	23	0	3	112	112	61%	159
1996	190	60	21	91	159	9	151	5	33	15	65%	**151**	91	7	7	0	3	101	101	61%	167
1997	230	37	24	98	170	9	160	6	35	15	65%	**150**	97	1	8	0	3	100	100	61%	206
1998	196	39	26	86	150	8	141	5	31	14	65%	**149**	83	7	8	0	3	94	94	61%	231
1999	233	25	21	95	164	9	155	5	34	15	65%	**149**	86	23	15	0	3	112	112	61%	154
2000	215	46	29	95	166	9	157	5	34	15	65%	**148**	84	12	18	0	3	99	99	61%	264
2001	122	50	28	62	110	6	104	4	23	10	65%	**147**	64	10	4	0	2	76	76	61%	269
2002	47	20	35	24	43	2	40	1	9	4	65%	**147**	25	0	1	0	1	26	26	61%	407

Table 38

Arkansas River Farms No. 54B - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year (1)	River Headgate Diversions (2)	Reservoir Releases (3)	Crop Irrigation Reqt (In) (4)	Ditch Loss (5)	Farm Turnout Delivery (6)	Off-Farm Lateral Loss (7)	Farm Delivery (8)	On-Farm Lateral Loss (9)	Initial Deep Percolation (10)	Tail water (11)	Max Farm Efficiency (12)	Irrigated Acreage (13)	Applied Irrigation Water to Crop Consumptive Use (14)	Consumptive Use From Soil Moisture (15)	Applied Irrigation Water to Soil Moisture Storage (16)	Applied Irrigation Water to Additional Deep Perc (17)	SEV Losses (18)	Total Consumptive Use (19)	Prorated Total Consumptive Use (20)	Calculated Actual Farm Efficiency (21)	Crop Consumptive Use Shortage (22)
2003	105	0	37	38	66	4	63	2	14	6	65%	**147**	39	3	2	0	1	43	43	61%	413
2004	127	0	27	47	81	4	76	3	17	7	65%	**147**	50	0	0	0	2	51	51	61%	279
2005	170	0	33	62	107	6	101	4	22	10	65%	**147**	60	3	6	0	2	65	65	61%	344
2006	117	21	28	50	88	5	83	3	18	8	65%	**147**	48	3	6	0	2	52	52	61%	299
2007	196	45	26	88	153	8	145	5	32	14	65%	**147**	94	6	0	0	3	103	103	61%	218
2008	165	40	32	74	130	7	123	4	27	12	65%	**147**	74	0	6	0	2	77	77	61%	322
2009	153	32	26	67	117	6	111	4	24	11	65%	**147**	65	6	6	0	2	73	73	61%	245
2010	170	32	31	74	129	7	122	4	27	12	65%	**147**	71	14	8	0	2	88	88	61%	298
2011	131	20	39	55	95	5	90	3	20	9	65%	**147**	59	0	0	0	2	60	60	61%	415
2012	49	21	47	25	45	2	42	1	9	4	65%	**147**	23	4	4	0	1	28	28	61%	551
2013	116	0	42	43	73	4	69	2	15	7	65%	**147**	45	0	0	0	1	46	46	61%	472
2014	164	10	40	63	110	6	104	4	23	10	65%	**147**	67	0	0	0	2	69	69	61%	429
Avg	163	23	27	68	118	6	111	4	24	11	65%	**154**	64	9	8	0	2	75	75	61%	271
Max	280	65	47	121	211	12	199	7	43	19	65%	**159**	122	33	23	0	4	138	138	61%	551
Min	47	0	19	24	43	2	40	1	9	4	65%	**147**	23	0	0	0	1	26	26	61%	154
1979 to 2014																					
Avg	167	31	28	72	126	7	119	4	26	11	65%	**151**	70	7	7	0	2	80	80	61%	281
Max	280	65	47	121	211	12	199	7	43	19	65%	**159**	122	23	23	0	4	138	138	61%	551
Min	47	0	21	24	43	2	40	1	9	4	65%	**147**	23	0	0	0	1	26	26	61%	154

Explanation of Columns

(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Total No. of Shares	**80**
Trade Shares	**80**
Total Consumptive Use	**80**
Trade Shares Pro Rata CU	**80**

Table 39

Arkansas River Farms No. 57 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)

3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
1950	176	25	22	73	127	7	120	4	26	12	65%	**64**	60	26	18	0	4	91	91	61%	31
1951	170	15	21	68	117	6	111	4	24	11	65%	**66**	58	10	14	0	4	73	73	61%	49
1952	196	3	30	73	126	7	119	4	26	11	65%	**69**	61	19	16	0	5	85	85	61%	91
1953	162	0	27	60	103	6	97	3	21	9	65%	**71**	49	14	14	0	4	67	67	61%	97
1954	88	0	30	32	56	3	53	2	11	5	65%	**74**	21	11	13	0	2	34	34	61%	153
1955	128	3	28	48	83	5	79	3	17	8	65%	**74**	45	8	6	0	3	56	56	61%	122
1956	124	0	27	46	79	4	74	3	16	7	65%	**73**	35	13	13	0	3	51	51	61%	116
1957	244	5	19	91	157	9	149	5	32	14	65%	**73**	75	18	21	0	6	100	100	61%	25
1958	122	45	24	60	106	6	100	4	22	10	65%	**73**	64	4	1	0	5	73	73	61%	76
1959	167	22	25	69	120	7	114	4	25	11	65%	**72**	49	14	25	0	4	67	67	61%	90
1960	162	2	27	60	104	6	98	3	21	9	65%	**72**	44	26	20	0	3	74	74	61%	92
1961	206	3	20	77	132	7	125	4	27	12	65%	**72**	59	24	22	0	5	87	87	61%	39
1962	209	18	25	83	144	8	136	5	30	13	65%	**72**	77	13	11	0	5	96	96	61%	57
1963	130	2	31	48	84	5	79	3	17	8	65%	**71**	29	23	23	0	2	54	54	61%	130
1964	120	0	27	44	76	4	72	3	16	7	65%	**71**	33	14	14	0	2	49	49	61%	112
1965	215	28	20	89	154	8	145	5	32	14	65%	**71**	62	21	32	0	5	89	89	61%	36
1966	140	27	24	61	107	6	101	4	22	10	65%	**70**	58	18	8	0	4	80	80	61%	64
1967	180	27	24	76	132	7	124	4	27	12	65%	**70**	68	14	12	0	5	87	87	61%	56
1968	199	7	23	75	130	7	123	4	27	12	65%	**70**	56	23	23	0	4	84	84	61%	51
1969	219	6	19	83	143	8	135	5	29	13	65%	**69**	66	21	22	0	5	92	92	61%	26
1970	211	22	24	85	148	8	140	5	31	14	65%	**69**	78	11	13	0	6	95	95	61%	48
1971	178	25	24	74	129	7	121	4	26	12	65%	**69**	62	17	17	0	5	84	84	61%	57
1972	156	18	25	64	110	6	104	4	23	10	65%	**68**	55	16	13	0	4	74	74	61%	72
1973	192	19	24	77	134	7	127	4	28	12	65%	**68**	66	14	17	0	5	85	85	61%	58
1974	115	17	29	48	83	5	79	3	17	8	65%	**68**	32	19	19	0	3	54	54	61%	111
1975	185	0	25	68	117	6	111	4	24	11	65%	**67**	53	21	19	0	4	79	79	61%	69
1976	116	10	26	46	80	4	76	3	17	7	65%	**67**	38	8	11	0	3	49	49	61%	98
1977	101	10	28	41	71	4	67	2	15	6	65%	**67**	34	13	9	0	2	49	49	61%	113
1978	140	0	24	51	89	5	84	3	18	8	65%	**67**	40	14	14	0	3	58	58	61%	80
1979	161	21	22	66	115	6	109	4	24	11	65%	**67**	56	12	15	0	5	73	73	61%	55
1980	181	53	27	85	149	8	141	5	31	14	65%	**67**	71	24	21	0	6	100	100	61%	56
1981	88	57	31	52	93	5	88	3	19	8	65%	**67**	53	4	4	0	4	61	61	61%	115
1982	231	19	23	92	159	9	150	5	33	14	65%	**67**	75	7	22	0	6	89	89	61%	46
1983	267	54	27	117	204	11	193	7	42	19	65%	**67**	109	30	17	0	8	148	148	61%	12
1984	291	38	26	120	209	12	197	7	43	19	65%	**65**	107	12	21	0	9	128	128	61%	23
1985	276	68	27	125	219	12	207	7	45	20	65%	**64**	115	18	20	0	9	142	142	61%	11
1986	173	1	25	64	110	6	104	4	23	10	65%	**64**	58	14	10	0	5	76	76	61%	63
1987	238	0	27	87	151	8	142	5	31	14	65%	**64**	81	14	12	0	6	101	101	61%	50
1988	172	65	28	86	151	8	143	5	31	14	65%	**64**	78	19	15	0	6	103	103	61%	54
1989	126	46	26	62	109	6	103	4	23	10	65%	**64**	63	6	5	0	4	72	72	61%	71
1990	150	28	27	65	113	6	107	4	23	10	65%	**64**	67	3	3	0	5	74	74	61%	74
1991	135	38	26	63	110	6	104	4	23	10	65%	**65**	56	10	11	0	4	71	71	61%	71
1992	142	32	21	63	111	6	105	4	23	10	65%	**65**	63	6	5	0	5	73	73	61%	47
1993	181	41	21	81	141	8	133	5	29	13	65%	**65**	64	12	22	0	6	82	82	61%	40
1994	164	56	26	80	140	8	133	5	29	13	65%	**65**	72	22	15	0	6	99	99	61%	49
1995	259	29	21	106	183	10	173	6	38	17	65%	**64**	76	31	36	0	7	115	115	61%	6
1996	197	63	21	94	165	9	156	5	34	15	65%	**64**	85	22	17	0	6	113	113	61%	6
1997	239	39	24	101	176	10	166	6	36	16	65%	**64**	95	9	14	0	7	111	111	61%	25
1998	204	40	26	89	155	9	147	5	32	14	65%	**64**	87	8	9	0	7	101	101	61%	43
1999	242	26	21	98	170	9	161	6	35	16	65%	**63**	86	24	19	0	7	117	117	61%	3
2000	223	48	29	99	172	9	163	6	36	16	65%	**63**	75	27	31	0	6	109	109	61%	51
2001	126	52	28	65	114	6	108	4	23	10	65%	**63**	57	20	13	0	5	81	81	61%	70
2002	49	21	35	25	44	2	42	1	9	4	65%	**63**	24	3	4	0	2	28	28	61%	158

Table 39

Arkansas River Farms No. 57 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	109	0	37	40	69	4	65	2	14	6	65%	63	40	3	2	0	3	46	46	61%	150
2004	132	0	27	49	84	5	79	3	17	8	65%	62	49	3	3	0	3	55	55	61%	88
2005	176	0	33	65	111	6	105	4	23	10	65%	62	60	5	8	0	5	70	70	61%	107
2006	121	22	28	52	91	5	86	3	19	8	65%	62	47	6	9	0	4	56	56	61%	95
2007	204	47	26	91	159	9	150	5	33	15	65%	62	85	17	13	0	6	108	108	61%	33
2008	171	41	32	77	135	7	127	4	28	12	65%	62	74	5	8	0	5	85	85	61%	88
2009	158	33	26	70	121	7	115	4	25	11	65%	62	66	7	8	0	5	79	79	61%	60
2010	177	33	31	77	134	7	126	4	28	12	65%	62	73	16	9	0	5	94	94	61%	74
2011	135	20	39	57	99	5	93	3	20	9	65%	62	61	0	0	0	4	65	65	61%	140
2012	51	21	47	26	46	3	44	2	10	4	65%	62	24	4	4	0	2	30	30	61%	217
2013	120	0	42	44	76	4	72	3	16	7	65%	62	47	0	0	0	3	50	50	61%	172
2014	170	10	40	66	114	6	108	4	23	10	65%	62	66	1	4	0	5	72	72	61%	143
Avg	169	23	27	70	122	7	115	4	25	11	65%	67	61	14	14	0	5	80	80	61%	74
Max	291	68	47	125	219	12	207	7	45	20	65%	74	115	31	36	0	9	148	148	61%	217
Min	49	0	19	25	44	2	42	1	9	4	65%	62	21	0	0	0	2	28	28	61%	3
1979 to 2014																					
Avg	173	32	28	75	131	7	123	4	27	12	65%	64	68	12	12	0	5	85	85	61%	71
Max	291	68	47	125	219	12	207	7	45	20	65%	67	115	31	36	0	9	148	148	61%	217
Min	49	0	21	25	44	2	42	1	9	4	65%	62	24	0	0	0	2	28	28	61%	3

Total No. of Shares	83
Trade Shares	83
Total Consumptive Use	85
Trade Shares Pro Rata CU	85

Explanation of Columns
(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Table 40

Arkansas River Farms No. 58 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year (1)	River Headgate Diversions (2)	Reservoir Releases (3)	Crop Irrigation Reqt (In) (4)	Ditch Loss (5)	Farm Turnout Delivery (6)	Off-Farm Lateral Loss (7)	Farm Delivery (8)	On-Farm Lateral Loss (9)	Initial Deep Percolation (10)	Tail water (11)	Max Farm Efficiency (12)	Irrigated Acreage (13)	Applied Irrigation Water to Crop Consumptive Use (14)	Consumptive Use From Soil Moisture (15)	Applied Irrigation Water to Soil Moisture Storage (16)	Applied Irrigation Water to Additional Deep Perc (17)	SEV Losses (18)	Total Consumptive Use (19)	Prorated Total Consumptive Use (20)	Calculated Actual Farm Efficiency (21)	Crop Consumptive Use Shortage (22)
1950	256	36	22	107	186	10	175	6	38	17	65%	**109**	89	39	25	0	3	131	125	61%	73
1951	247	22	21	99	171	9	161	6	35	16	65%	**108**	87	14	18	0	3	103	99	61%	91
1952	286	4	30	106	184	10	173	6	38	17	65%	**106**	90	28	23	0	3	120	115	61%	148
1953	236	0	27	87	150	8	141	5	31	14	65%	**105**	71	21	21	0	2	94	90	61%	143
1954	128	0	30	47	81	4	77	3	17	7	65%	**103**	31	16	19	0	1	48	46	61%	212
1955	187	5	28	70	121	7	114	4	25	11	65%	**104**	66	11	9	0	2	79	76	61%	169
1956	181	0	27	67	115	6	108	4	24	10	65%	**104**	51	19	19	0	2	72	69	61%	164
1957	356	7	19	133	229	13	217	8	47	21	65%	**105**	109	27	31	0	4	140	135	61%	34
1958	178	65	24	88	155	9	146	5	32	14	65%	**105**	93	6	2	0	3	103	98	61%	109
1959	244	32	25	101	175	10	165	6	36	16	65%	**106**	71	21	36	0	3	95	91	61%	132
1960	236	3	27	88	151	8	143	5	31	14	65%	**106**	64	38	29	0	2	105	100	61%	137
1961	300	4	20	112	193	11	182	6	40	18	65%	**107**	86	34	32	0	3	124	119	61%	60
1962	304	26	25	121	209	12	198	7	43	19	65%	**107**	113	19	16	0	4	136	130	61%	90
1963	189	3	31	71	122	7	115	4	25	11	65%	**108**	42	33	33	0	1	76	73	61%	200
1964	175	0	27	64	111	6	105	4	23	10	65%	**108**	48	20	20	0	2	70	67	61%	174
1965	313	41	20	129	224	12	212	7	46	20	65%	**109**	92	30	46	0	4	126	120	61%	61
1966	205	40	24	89	156	9	147	5	32	14	65%	**109**	85	25	11	0	3	113	108	61%	106
1967	263	39	24	110	192	11	181	6	40	17	65%	**110**	101	19	17	0	3	123	118	61%	97
1968	290	10	23	110	190	10	179	6	39	17	65%	**110**	84	33	33	0	3	119	114	61%	90
1969	319	9	19	120	208	11	197	7	43	19	65%	**110**	97	29	31	0	3	130	124	61%	53
1970	308	33	24	124	216	12	204	7	45	20	65%	**111**	116	16	17	0	4	135	130	61%	90
1971	260	36	24	108	187	10	177	6	39	17	65%	**111**	92	22	23	0	3	117	112	61%	106
1972	227	27	25	93	161	9	152	5	33	15	65%	**112**	80	22	18	0	3	105	101	61%	131
1973	280	28	24	113	195	11	185	6	40	18	65%	**112**	96	21	24	0	4	121	116	61%	110
1974	167	24	29	70	121	7	115	4	25	11	65%	**113**	48	26	27	0	2	75	72	61%	196
1975	269	0	25	99	171	9	161	6	35	16	65%	**113**	79	30	26	0	3	112	107	61%	132
1976	169	15	26	68	117	6	111	4	24	11	65%	**118**	57	10	15	0	2	69	66	61%	184
1977	148	15	28	59	103	6	97	3	21	9	65%	**122**	52	16	11	0	1	70	67	61%	220
1978	204	0	24	75	129	7	122	4	27	12	65%	**126**	60	20	20	0	2	81	78	61%	173
1979	235	30	22	97	168	9	159	6	35	15	65%	**130**	84	15	19	0	3	102	98	61%	139
1980	264	77	27	124	217	12	205	7	45	20	65%	**135**	103	34	30	0	4	142	136	61%	163
1981	129	83	31	76	135	7	128	4	28	12	65%	**139**	77	6	6	0	3	86	82	61%	273
1982	337	28	23	134	232	13	219	8	48	21	65%	**143**	121	8	21	0	4	133	128	61%	144
1983	390	78	27	170	297	16	281	10	61	27	65%	**147**	173	23	9	0	6	202	194	61%	137
1984	424	56	26	175	305	17	288	10	63	28	65%	**146**	161	11	26	0	6	178	171	61%	144
1985	403	99	27	183	319	18	302	11	66	29	65%	**144**	179	23	17	0	6	208	200	61%	123
1986	253	1	25	93	161	9	152	5	33	15	65%	**144**	84	12	14	0	3	100	96	61%	205
1987	347	0	27	127	220	12	208	7	45	20	65%	**144**	128	18	7	0	4	150	143	61%	178
1988	251	95	28	125	220	12	208	7	45	20	65%	**143**	123	13	13	0	4	139	134	61%	200
1989	183	67	26	91	159	9	151	5	33	15	65%	**143**	95	3	3	0	3	101	97	61%	211
1990	219	41	27	95	165	9	156	5	34	15	65%	**143**	99	2	2	0	3	105	100	61%	217
1991	196	55	26	91	160	9	151	5	33	15	65%	**142**	84	15	15	0	3	101	97	61%	205
1992	206	47	21	92	161	9	152	5	33	15	65%	**142**	93	6	6	0	3	102	98	61%	154
1993	264	59	21	118	206	11	194	7	42	19	65%	**142**	98	13	28	0	4	115	110	61%	142
1994	239	82	26	117	205	11	193	7	42	19	65%	**141**	112	26	14	0	4	142	136	61%	174
1995	378	43	21	154	267	15	253	9	55	24	65%	**141**	120	41	44	0	5	166	159	61%	87
1996	287	91	21	137	241	13	228	8	50	22	65%	**140**	132	20	16	0	4	157	150	61%	94
1997	348	56	24	147	257	14	243	8	53	23	65%	**140**	144	4	14	0	5	153	146	61%	135
1998	297	59	26	130	226	12	214	7	47	21	65%	**140**	126	11	13	0	4	142	136	61%	164
1999	353	38	21	143	248	14	235	8	51	23	65%	**139**	129	35	24	0	5	168	161	61%	83
2000	325	70	29	144	251	14	238	8	52	23	65%	**139**	118	28	36	0	4	150	144	61%	193
2001	184	76	28	94	166	9	157	5	34	15	65%	**139**	88	24	14	0	3	115	110	61%	212
2002	71	31	35	37	65	4	61	2	13	6	65%	**139**	36	3	4	0	1	39	38	61%	370

Table 40

Arkansas River Farms No. 58 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	158	0	37	58	100	6	95	3	21	9	65%	**139**	59	4	3	0	2	65	62	61%	366
2004	193	0	27	71	122	7	115	4	25	11	65%	**139**	75	0	0	0	2	77	74	61%	234
2005	257	0	33	94	163	9	154	5	33	15	65%	**139**	89	6	11	0	3	98	94	61%	288
2006	177	32	28	76	133	7	125	4	27	12	65%	**139**	71	6	11	0	2	79	76	61%	253
2007	297	68	26	133	232	13	219	8	48	21	65%	**139**	133	18	9	0	4	155	149	61%	149
2008	249	60	32	112	196	11	186	6	40	18	65%	**139**	112	1	9	0	4	116	112	61%	261
2009	231	48	26	101	177	10	167	6	36	16	65%	**139**	98	9	10	0	3	111	106	61%	191
2010	258	49	31	112	195	11	184	6	40	18	65%	**139**	107	23	13	0	4	133	127	61%	232
2011	197	30	39	83	144	8	136	5	30	13	65%	**139**	89	0	0	0	3	91	88	61%	358
2012	74	31	47	38	67	4	64	2	14	6	65%	**139**	35	6	6	0	1	42	41	61%	504
2013	176	0	42	64	111	6	105	4	23	10	65%	**139**	68	0	0	0	2	70	67	61%	419
2014	247	14	40	96	166	9	157	5	34	15	65%	**139**	99	0	3	0	3	103	98	61%	368
Avg	246	34	27	102	178	10	168	6	37	16	65%	**127**	92	17	17	0	3	113	108	61%	176
Max	424	99	47	183	319	18	302	11	66	29	65%	**147**	179	41	46	0	6	208	200	61%	504
Min	71	0	19	37	65	4	61	2	13	6	65%	**103**	31	0	0	0	1	39	38	61%	34
1979 to 2014																					
Avg	253	47	28	109	190	10	180	6	39	17	65%	**140**	104	13	13	0	4	120	115	61%	216
Max	424	99	47	183	319	18	302	11	66	29	65%	**147**	179	41	44	0	6	208	200	61%	504
Min	71	0	21	37	65	4	61	2	13	6	65%	**130**	35	0	0	0	1	39	38	61%	83

Total No. of Shares	**121**
Trade Shares	**116**
Total Consumptive Use	**120**
Trade Shares Pro Rata CU	**115**

Explanation of Columns
(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Table 41

Arkansas River Farms No. 59 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year (1)	River Headgate Diversions (2)	Reservoir Releases (3)	Crop Irrigation Reqt (In) (4)	Ditch Loss (5)	Farm Turnout Delivery (6)	Off-Farm Lateral Loss (7)	Farm Delivery (8)	On-Farm Lateral Loss (9)	Initial Deep Percolation (10)	Tail water (11)	Max Farm Efficiency (12)	Irrigated Acreage (13)	Applied Irrigation Water to Crop Consumptive Use (14)	Consumptive Use From Soil Moisture (15)	Applied Irrigation Water to Soil Moisture Storage (16)	Applied Irrigation Water to Additional Deep Perc (17)	SEV Losses (18)	Total Consumptive Use (19)	Prorated Total Consumptive Use (20)	Calculated Actual Farm Efficiency (21)	Crop Consumptive Use Shortage (22)
1950	305	43	22	127	221	12	209	7	46	20	65%	69	99	28	37	0	8	135	122	61%	0
1951	294	27	21	117	203	11	192	7	42	19	65%	69	90	33	35	0	7	131	118	61%	0
1952	340	5	30	127	219	12	206	7	45	20	65%	70	104	49	30	0	8	161	146	61%	21
1953	281	0	27	103	178	10	168	6	37	16	65%	70	80	30	30	0	6	116	105	61%	48
1954	153	0	30	56	97	5	91	3	20	9	65%	71	33	23	26	0	3	59	53	61%	121
1955	222	6	28	83	144	8	136	5	30	13	65%	70	74	18	15	0	5	97	88	61%	75
1956	216	0	27	79	137	8	129	5	28	12	65%	70	56	28	28	0	5	88	80	61%	74
1957	423	8	19	158	273	15	258	9	56	25	65%	70	105	9	63	0	11	125	113	61%	0
1958	212	78	24	105	184	10	174	6	38	17	65%	70	107	32	6	0	8	147	132	61%	0
1959	290	38	25	120	208	11	197	7	43	19	65%	70	80	58	48	0	7	145	131	61%	10
1960	281	3	27	104	180	10	170	6	37	16	65%	70	72	49	38	0	6	128	115	61%	36
1961	357	5	20	133	229	13	217	8	47	21	65%	70	90	28	51	0	8	126	114	61%	0
1962	362	31	25	144	249	14	236	8	51	23	65%	70	116	28	34	3	10	154	139	60%	0
1963	225	4	31	84	145	8	137	5	30	13	65%	70	46	58	23	21	4	107	97	47%	74
1964	208	0	27	76	132	7	124	4	27	12	65%	69	49	32	32	0	4	85	77	61%	74
1965	372	48	20	154	267	15	252	9	55	24	65%	69	88	29	76	0	9	126	114	61%	0
1966	244	48	24	106	185	10	175	6	38	17	65%	69	89	48	22	3	7	144	130	60%	0
1967	313	47	24	131	228	13	216	8	47	21	65%	69	103	34	37	0	8	144	130	61%	0
1968	345	12	23	131	226	12	213	7	46	21	65%	69	89	41	37	13	7	137	123	56%	0
1969	380	11	19	143	248	14	234	8	51	23	65%	69	96	15	43	13	9	120	109	56%	0
1970	366	39	24	148	257	14	243	9	53	23	65%	69	114	23	26	18	10	147	133	54%	0
1971	309	43	24	128	223	12	211	7	46	20	65%	69	100	35	11	26	8	143	129	50%	0
1972	270	32	25	110	191	11	181	6	39	17	65%	68	87	56	31	0	7	149	135	61%	0
1973	333	33	24	134	232	13	220	8	48	21	65%	68	107	27	36	0	10	143	129	61%	4
1974	199	29	29	83	145	8	137	5	30	13	65%	68	54	42	35	0	5	101	91	61%	67
1975	321	0	25	118	203	11	192	7	42	19	65%	68	84	45	40	0	7	137	123	61%	15
1976	202	18	26	80	139	8	132	5	29	13	65%	68	62	18	24	0	5	84	76	61%	65
1977	176	18	28	71	123	7	116	4	25	11	65%	67	52	30	24	0	4	85	77	61%	78
1978	243	0	24	89	154	8	145	5	32	14	65%	67	64	30	30	0	5	100	90	61%	40
1979	280	36	22	115	200	11	189	7	41	18	65%	66	92	25	30	0	8	125	113	61%	4
1980	314	92	27	147	258	14	244	9	53	24	65%	66	117	30	41	0	10	158	143	61%	0
1981	153	98	31	91	161	9	152	5	33	15	65%	66	90	24	9	0	7	121	109	61%	54
1982	401	34	23	159	276	15	261	9	57	25	65%	65	107	18	63	0	11	135	122	61%	0
1983	464	93	27	203	354	19	334	12	73	32	65%	65	143	4	12	62	15	161	146	44%	0
1984	505	66	26	209	363	20	343	12	75	33	65%	65	141	0	0	82	15	156	141	39%	0
1985	479	118	27	217	380	21	359	13	78	35	65%	65	143	2	2	88	16	162	146	38%	0
1986	301	1	25	111	191	11	180	6	39	17	65%	65	90	46	23	4	8	144	130	59%	0
1987	413	0	27	152	262	14	247	9	54	24	65%	65	115	31	44	2	11	156	141	61%	0
1988	298	113	28	149	262	14	248	9	54	24	65%	65	112	40	23	26	10	162	146	51%	0
1989	218	80	26	108	190	10	179	6	39	17	65%	65	96	44	20	0	7	148	133	61%	0
1990	261	48	27	113	197	11	186	6	40	18	65%	65	107	13	13	0	8	129	116	61%	24
1991	234	65	26	109	190	10	180	6	39	17	65%	65	90	23	27	0	7	120	109	61%	26
1992	246	56	21	110	192	11	181	6	40	18	65%	65	93	23	25	0	8	124	112	61%	0
1993	314	70	21	140	245	13	231	8	50	22	65%	65	94	22	56	0	10	126	114	61%	0
1994	285	98	26	139	244	13	230	8	50	22	65%	65	114	30	24	11	10	154	139	57%	0
1995	450	51	21	183	318	18	301	11	66	29	65%	65	107	8	24	63	13	128	115	41%	0
1996	341	109	21	164	287	16	271	9	59	26	65%	65	108	7	7	62	11	126	113	40%	0
1997	414	67	24	176	306	17	289	10	63	28	65%	65	130	2	2	56	13	145	131	43%	0
1998	354	70	26	154	269	15	255	9	56	25	65%	66	127	14	14	24	11	153	138	52%	0
1999	420	46	21	170	295	16	279	10	61	27	65%	66	114	2	2	65	12	128	116	39%	0
2000	387	83	29	171	299	16	283	10	62	27	65%	66	119	40	13	51	11	171	154	44%	0
2001	219	91	28	112	197	11	187	7	41	18	65%	66	93	56	29	0	8	157	141	61%	5
2002	84	36	35	44	77	4	73	3	16	7	65%	66	39	7	9	0	3	48	44	61%	147

Table 41

Arkansas River Farms No. 59 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	189	0	37	69	119	7	113	4	25	11	65%	66	66	9	7	0	5	80	72	61%	128
2004	229	0	27	84	145	8	137	5	30	13	65%	66	77	10	12	0	6	93	84	61%	59
2005	306	0	33	112	193	11	183	6	40	18	65%	66	95	20	24	0	8	123	111	61%	67
2006	210	38	28	91	158	9	149	5	33	14	65%	66	77	12	19	0	6	96	87	61%	66
2007	353	81	26	158	276	15	261	9	57	25	65%	66	116	26	49	4	11	153	138	60%	0
2008	296	71	32	134	234	13	221	8	48	21	65%	66	121	48	22	0	10	179	162	61%	7
2009	275	57	26	121	211	12	199	7	43	19	65%	66	102	26	28	0	9	137	123	61%	13
2010	307	58	31	133	232	13	219	8	48	21	65%	66	117	36	25	0	9	163	147	61%	17
2011	235	35	39	99	172	9	162	6	35	16	65%	66	105	1	1	0	7	113	102	61%	106
2012	89	37	47	46	80	4	76	3	17	7	65%	66	42	7	7	0	3	52	47	61%	209
2013	209	0	42	77	132	7	125	4	27	12	65%	66	79	1	3	0	5	85	77	61%	151
2014	295	17	40	114	198	11	187	7	41	18	65%	66	112	4	9	0	9	125	113	61%	105
Avg	293	41	27	122	212	12	200	7	44	19	65%	67	94	26	26	11	8	128	115	58%	31
Max	505	118	47	217	380	21	359	13	78	35	65%	71	143	58	76	88	16	179	162	61%	209
Min	84	0	19	44	77	4	73	3	16	7	65%	65	33	0	0	0	3	48	44	38%	0
1979 to 2014																					
Avg	301	56	28	130	227	12	214	7	47	21	65%	65	103	20	20	17	9	132	119	56%	33
Max	505	118	47	217	380	21	359	13	78	35	65%	66	143	56	63	88	16	179	162	61%	209
Min	84	0	21	44	77	4	73	3	16	7	65%	65	39	0	0	0	3	48	44	38%	0

Explanation of Columns
(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Total No. of Shares	**144**
Trade Shares	**130**
Total Consumptive Use	**132**
Trade Shares Pro Rata CU	**119**

Table 42

Arkansas River Farms No. 60 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
1950	282	40	22	117	204	11	193	7	42	19	65%	**114**	97	42	28	0	7	147	147	61%	71
1951	272	25	21	108	188	10	177	6	39	17	65%	**115**	95	15	21	0	7	117	117	61%	94
1952	314	4	30	117	202	11	191	7	42	18	65%	**115**	98	31	25	0	7	136	136	61%	159
1953	260	0	27	95	165	9	155	5	34	15	65%	**116**	78	23	23	0	6	107	107	61%	158
1954	141	0	30	52	89	5	84	3	18	8	65%	**116**	34	17	21	0	3	54	54	61%	239
1955	205	5	28	77	133	7	126	4	27	12	65%	**116**	72	13	9	0	5	90	90	61%	190
1956	199	0	27	73	126	7	119	4	26	11	65%	**116**	57	21	21	0	4	82	82	61%	183
1957	391	7	19	146	252	14	238	8	52	23	65%	**116**	120	30	35	0	10	160	160	61%	38
1958	195	72	24	97	170	9	161	6	35	16	65%	**116**	102	7	2	0	7	117	117	61%	120
1959	268	36	25	111	192	11	182	6	40	18	65%	**116**	78	23	40	0	7	108	108	61%	143
1960	259	3	27	96	166	9	157	5	34	15	65%	**116**	70	42	32	0	6	118	118	61%	148
1961	330	5	20	123	212	12	200	7	44	19	65%	**116**	95	38	35	0	7	140	140	61%	63
1962	335	29	25	133	230	13	218	8	47	21	65%	**115**	124	21	17	0	9	154	154	61%	94
1963	208	4	31	77	134	7	126	4	28	12	65%	**115**	46	36	36	0	4	86	86	61%	212
1964	192	0	27	71	122	7	115	4	25	11	65%	**115**	53	22	22	0	4	78	78	61%	183
1965	344	45	20	142	247	14	233	8	51	22	65%	**115**	100	33	51	0	9	142	142	61%	61
1966	225	44	24	98	171	9	162	6	35	16	65%	**115**	93	28	12	0	7	127	127	61%	107
1967	289	43	24	121	211	12	199	7	43	19	65%	**115**	110	22	20	0	7	139	139	61%	96
1968	318	11	23	121	208	12	197	7	43	19	65%	**115**	91	37	37	0	7	135	135	61%	88
1969	351	10	19	132	229	13	216	8	47	21	65%	**115**	106	33	34	0	8	147	147	61%	47
1970	338	36	24	137	238	13	224	8	49	22	65%	**115**	126	18	19	0	9	153	153	61%	85
1971	285	39	24	118	206	11	195	7	42	19	65%	**115**	100	26	26	0	7	133	133	61%	101
1972	249	29	25	102	177	10	167	6	36	16	65%	**115**	88	25	21	0	6	119	119	61%	127
1973	308	30	24	124	215	12	203	7	44	20	65%	**115**	105	22	26	0	9	136	136	61%	104
1974	184	27	29	77	134	7	126	4	28	12	65%	**115**	52	30	30	0	5	86	86	61%	192
1975	296	0	25	109	187	10	177	6	39	17	65%	**114**	86	34	29	0	7	126	126	61%	124
1976	186	17	26	74	129	7	122	4	27	12	65%	**115**	61	12	18	0	5	78	78	61%	171
1977	162	16	28	65	113	6	107	4	23	10	65%	**115**	56	20	14	0	3	79	79	61%	197
1978	224	0	24	82	142	8	134	5	29	13	65%	**115**	65	22	22	0	5	92	92	61%	143
1979	258	33	22	106	185	10	175	6	38	17	65%	**115**	90	19	24	0	8	116	116	61%	102
1980	290	85	27	136	238	13	225	8	49	22	65%	**115**	113	38	33	0	10	161	161	61%	106
1981	142	91	31	84	149	8	140	5	31	14	65%	**115**	85	7	7	0	6	97	97	61%	204
1982	370	31	23	147	255	14	241	8	52	23	65%	**115**	123	11	34	0	10	144	144	61%	87
1983	428	86	27	187	327	18	309	11	67	30	65%	**116**	177	45	23	0	14	236	236	61%	39
1984	466	61	26	193	335	18	316	11	69	31	65%	**108**	172	18	34	0	14	204	204	61%	44
1985	443	109	27	201	351	19	332	12	72	32	65%	**98**	181	31	35	0	15	226	226	61%	10
1986	278	1	25	102	176	10	167	6	36	16	65%	**100**	92	24	16	0	7	123	123	61%	94
1987	382	0	27	140	242	13	228	8	50	22	65%	**102**	129	23	19	0	10	162	162	61%	78
1988	276	105	28	138	242	13	229	8	50	22	65%	**104**	125	31	24	0	10	165	165	61%	88
1989	201	74	26	100	175	10	166	6	36	16	65%	**106**	101	8	7	0	7	116	116	61%	120
1990	241	45	27	104	182	10	172	6	37	17	65%	**108**	108	4	4	0	8	119	119	61%	129
1991	216	60	26	100	176	10	166	6	36	16	65%	**109**	91	16	17	0	7	114	114	61%	126
1992	227	52	21	102	177	10	168	6	37	16	65%	**111**	102	8	7	0	7	117	117	61%	89
1993	290	65	21	129	226	12	213	7	47	21	65%	**113**	104	18	35	0	9	131	131	61%	80
1994	263	90	26	128	225	12	213	7	46	21	65%	**113**	117	33	22	0	9	159	159	61%	99
1995	416	47	21	169	294	16	278	10	61	27	65%	**113**	126	49	55	0	12	187	187	61%	24
1996	315	100	21	151	265	15	250	9	55	24	65%	**113**	139	30	24	0	10	179	179	61%	29
1997	383	62	24	162	282	16	267	9	58	26	65%	**113**	154	12	19	0	12	177	177	61%	62
1998	327	65	26	143	249	14	235	8	51	23	65%	**113**	139	12	14	0	11	162	162	61%	93
1999	388	42	21	157	273	15	258	9	56	25	65%	**113**	138	38	29	0	11	188	188	61%	23
2000	358	77	29	158	276	15	261	9	57	25	65%	**113**	123	41	47	0	10	174	174	61%	111
2001	202	84	28	104	182	10	172	6	38	17	65%	**113**	92	31	20	0	8	130	130	61%	141
2002	78	34	35	40	71	4	67	2	15	6	65%	**113**	38	4	5	0	2	45	45	61%	290

Table 42

Arkansas River Farms No. 60 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	174	0	37	64	110	6	104	4	23	10	65%	**113**	65	5	3	0	5	74	74	61%	280
2004	212	0	27	78	134	7	127	4	28	12	65%	**113**	79	3	3	0	6	88	88	61%	170
2005	282	0	33	104	179	10	169	6	37	16	65%	**113**	97	8	13	0	7	112	112	61%	208
2006	194	35	28	84	146	8	138	5	30	13	65%	**113**	76	9	13	0	6	90	90	61%	184
2007	326	75	26	146	255	14	241	8	53	23	65%	**113**	140	24	17	0	10	174	174	61%	81
2008	274	66	32	124	216	12	204	7	44	20	65%	**113**	121	6	12	0	9	135	135	61%	178
2009	254	53	26	112	195	11	184	6	40	18	65%	**113**	107	11	13	0	8	126	126	61%	124
2010	283	53	31	123	214	12	202	7	44	20	65%	**113**	117	25	15	0	9	151	151	61%	152
2011	217	33	39	91	159	9	150	5	33	14	65%	**113**	97	0	0	0	7	104	104	61%	266
2012	82	34	47	42	74	4	70	2	15	7	65%	**113**	39	7	7	0	3	48	48	61%	399
2013	193	0	42	71	122	7	115	4	25	11	65%	**113**	75	0	0	0	5	80	80	61%	322
2014	272	16	40	105	182	10	172	6	38	17	65%	**113**	107	1	5	0	8	116	116	61%	273
Avg	271	38	27	113	196	11	185	6	40	18	65%	**113**	99	21	21	0	8	128	128	61%	133
Max	466	109	47	201	351	19	332	12	72	32	65%	**116**	181	49	55	0	15	236	236	61%	399
Min	78	0	19	40	71	4	67	2	15	6	65%	**98**	34	0	0	0	2	45	45	61%	10
1979 to 2014																					
Avg	278	52	28	120	209	12	198	7	43	19	65%	**111**	110	18	18	0	8	137	137	61%	136
Max	466	109	47	201	351	19	332	12	72	32	65%	**116**	181	49	55	0	15	236	236	61%	399
Min	78	0	21	40	71	4	67	2	15	6	65%	**98**	38	0	0	0	2	45	45	61%	10

Total No. of Shares	133
Trade Shares	133
Total Consumptive Use	137
Trade Shares Pro Rata CU	137

Explanation of Columns

(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Table 43

Arkansas River Farms No. 61 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year (1)	River Headgate Diversions (2)	Reservoir Releases (3)	Crop Irrigation Reqt (In) (4)	Ditch Loss (5)	Farm Turnout Delivery (6)	Off-Farm Lateral Loss (7)	Farm Delivery (8)	On-Farm Lateral Loss (9)	Initial Deep Percolation (10)	Tail water (11)	Max Farm Efficiency (12)	Irrigated Acreage (13)	Applied Irrigation Water to Crop Consumptive Use (14)	Consumptive Use From Soil Moisture (15)	Applied Irrigation Water to Soil Moisture Storage (16)	Applied Irrigation Water to Additional Deep Perc (17)	SEV Losses (18)	Total Consumptive Use (19)	Prorated Total Consumptive Use (20)	Calculated Actual Farm Efficiency (21)	Crop Consumptive Use Shortage (22)
1950	847	120	22	353	614	34	580	20	127	56	65%	**231**	285	121	92	0	22	428	426	61%	19
1951	817	74	21	326	565	31	534	19	116	52	65%	**228**	262	68	85	0	21	350	350	61%	76
1952	945	13	30	352	607	34	573	20	125	55	65%	**225**	290	100	83	0	22	412	411	61%	175
1953	782	0	27	287	495	27	468	16	102	45	65%	**223**	224	80	80	0	18	322	321	61%	195
1954	424	0	30	156	268	15	254	9	55	24	65%	**220**	94	61	71	0	8	163	163	61%	397
1955	617	16	28	232	400	22	378	13	83	37	65%	**221**	209	46	37	0	14	270	269	61%	269
1956	599	0	27	220	379	21	358	13	78	35	65%	**222**	159	74	74	0	13	246	245	61%	264
1957	1,175	22	19	439	758	42	716	25	156	69	65%	**222**	316	45	149	0	30	391	390	61%	0
1958	588	216	24	291	512	28	484	17	106	47	65%	**223**	303	115	12	0	22	440	438	61%	24
1959	805	107	25	333	579	32	547	19	119	53	65%	**224**	225	82	131	0	20	327	326	61%	167
1960	780	9	27	290	500	28	472	17	103	46	65%	**224**	204	135	103	0	17	355	354	61%	167
1961	991	14	20	369	637	35	602	21	131	58	65%	**225**	265	116	126	0	22	402	401	61%	0
1962	1,006	86	25	399	692	38	654	23	143	63	65%	**226**	347	101	78	0	26	475	473	61%	19
1963	625	11	31	233	402	22	380	13	83	37	65%	**226**	129	125	118	0	11	265	264	61%	324
1964	578	0	27	212	366	20	346	12	75	33	65%	**227**	143	82	82	0	11	236	235	61%	283
1965	1,034	134	20	427	742	41	701	25	153	68	65%	**228**	266	107	190	0	26	399	398	61%	12
1966	677	132	24	295	514	28	486	17	106	47	65%	**228**	261	119	54	0	20	401	400	61%	72
1967	868	130	24	364	634	35	599	21	131	58	65%	**229**	301	103	88	0	22	426	425	61%	49
1968	957	32	23	363	627	35	592	21	129	57	65%	**230**	255	134	130	0	21	409	408	61%	42
1969	1,055	31	19	398	688	38	650	23	142	63	65%	**231**	290	83	132	0	25	398	397	61%	0
1970	1,018	108	24	412	714	39	675	24	147	65	65%	**231**	344	116	95	0	28	489	487	61%	1
1971	858	118	24	356	620	34	586	20	128	57	65%	**232**	284	110	96	0	22	416	415	61%	64
1972	750	88	25	306	532	29	503	18	110	48	65%	**233**	248	89	79	0	19	355	354	61%	148
1973	926	91	24	372	646	36	610	21	133	59	65%	**233**	310	64	87	0	26	400	399	61%	97
1974	553	80	29	231	402	22	379	13	83	37	65%	**234**	152	108	94	0	14	274	273	61%	299
1975	891	0	25	327	564	31	533	19	116	51	65%	**235**	248	112	98	0	20	379	378	61%	139
1976	560	50	26	223	387	21	366	13	80	35	65%	**233**	175	46	63	0	14	234	234	61%	276
1977	488	49	28	196	341	19	322	11	70	31	65%	**231**	151	76	59	0	10	237	236	61%	321
1978	674	0	24	247	427	24	403	14	88	39	65%	**229**	191	71	71	0	15	277	277	61%	197
1979	777	99	22	320	556	31	525	18	115	51	65%	**227**	260	65	81	0	23	349	348	61%	90
1980	871	255	27	410	717	39	678	24	148	65	65%	**225**	340	115	100	0	29	484	483	61%	48
1981	426	274	31	252	447	24	422	15	92	41	65%	**224**	254	21	20	0	18	293	292	61%	298
1982	1,114	93	23	442	766	42	724	25	158	70	65%	**222**	330	48	140	0	30	408	407	61%	45
1983	1,288	258	27	563	983	54	929	33	203	90	65%	**220**	460	37	120	24	41	538	537	59%	0
1984	1,402	184	26	579	1,007	56	952	33	208	92	65%	**195**	423	0	8	188	42	465	464	43%	0
1985	1,332	327	27	604	1,055	58	997	35	217	96	65%	**170**	377	6	6	265	44	427	426	36%	0
1986	835	3	25	308	531	29	501	18	109	48	65%	**172**	244	117	70	12	22	384	383	59%	0
1987	1,148	0	27	421	727	40	686	24	150	66	65%	**175**	315	79	108	23	29	423	422	58%	0
1988	829	314	28	415	728	40	688	24	150	66	65%	**177**	309	106	57	82	29	444	443	50%	0
1989	606	222	26	300	527	29	498	17	109	48	65%	**179**	267	122	57	0	21	409	408	61%	0
1990	725	134	27	313	546	30	516	18	112	50	65%	**182**	299	42	37	0	23	363	362	61%	66
1991	649	181	26	302	528	29	499	17	109	48	65%	**184**	252	64	72	0	20	336	335	61%	77
1992	683	156	21	305	533	29	504	18	110	49	65%	**187**	262	71	65	0	22	355	354	61%	0
1993	873	196	21	389	679	37	642	22	140	62	65%	**189**	269	69	148	0	27	365	364	61%	0
1994	791	271	26	386	677	37	639	22	139	62	65%	**192**	323	100	92	0	27	450	449	61%	0
1995	1,250	142	21	509	884	49	835	29	182	81	65%	**194**	310	32	106	126	35	377	376	47%	0
1996	948	302	21	454	796	44	753	26	164	73	65%	**196**	321	23	23	145	31	375	374	43%	0
1997	1,151	186	24	488	849	47	802	28	175	77	65%	**199**	385	15	15	121	35	436	435	47%	0
1998	982	195	26	429	748	41	707	25	154	68	65%	**201**	369	65	65	26	32	466	465	58%	0
1999	1,167	127	21	473	821	45	776	27	169	75	65%	**204**	352	8	8	144	35	395	394	44%	0
2000	1,075	232	29	476	831	46	785	27	171	76	65%	**206**	343	158	37	130	31	532	531	46%	0
2001	608	252	28	312	549	30	518	18	113	50	65%	**208**	261	127	76	0	23	411	410	61%	97
2002	234	101	35	121	213	12	202	7	44	19	65%	**208**	109	18	22	0	7	134	134	61%	486

Table 43

Arkansas River Farms No. 61 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	524	0	37	192	331	18	313	11	68	30	65%	**208**	193	15	11	0	14	222	221	61%	436
2004	637	0	27	234	403	22	381	13	83	37	65%	**208**	220	25	28	0	17	261	261	61%	220
2005	849	0	33	311	537	30	507	18	111	49	65%	**208**	275	43	55	0	22	340	339	61%	258
2006	583	106	28	251	438	24	414	14	90	40	65%	**208**	219	33	50	0	17	269	268	61%	243
2007	981	225	26	439	767	42	725	25	158	70	65%	**208**	343	108	129	0	31	482	481	61%	0
2008	823	198	32	372	649	36	614	21	134	59	65%	**208**	346	78	52	0	26	451	450	61%	137
2009	763	158	26	335	585	32	553	19	121	53	65%	**208**	297	58	62	0	24	379	378	61%	92
2010	852	161	31	369	643	35	608	21	133	59	65%	**208**	333	94	62	0	26	453	452	61%	115
2011	653	98	39	274	477	26	451	16	98	43	65%	**208**	291	1	1	0	21	313	313	61%	378
2012	246	103	47	126	223	12	210	7	46	20	65%	**208**	116	20	20	0	8	145	144	61%	683
2013	580	0	42	213	367	20	347	12	76	33	65%	**208**	222	3	3	0	15	239	239	61%	507
2014	818	48	40	317	549	30	519	18	113	50	65%	**208**	314	8	23	0	24	345	345	61%	381
Avg	815	113	27	339	589	32	556	19	121	54	65%	**213**	270	72	72	20	23	365	364	59%	135
Max	1,402	327	47	604	1,055	58	997	35	217	96	65%	**235**	460	158	190	265	44	538	537	61%	683
Min	234	0	19	121	213	12	202	7	44	19	65%	**170**	94	0	1	0	7	134	134	36%	0
1979 to 2014																					
Avg	835	156	28	361	630	35	595	21	130	57	65%	**201**	295	55	56	36	26	376	375	57%	129
Max	1,402	327	47	604	1,055	58	997	35	217	96	65%	**227**	460	158	148	265	44	538	537	61%	683
Min	234	0	21	121	213	12	202	7	44	19	65%	**170**	109	0	1	0	7	134	134	36%	0

Total No. of Shares	**400**
Trade Shares	**399**
Total Consumptive Use	**376**
Trade Shares Pro Rata CU	**375**

Explanation of Columns

(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Table 44

Arkansas River Farms No. 62 a & b - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year (1)	River Headgate Diversions (2)	Reservoir Releases (3)	Crop Irrigation Reqt (In) (4)	Ditch Loss (5)	Farm Turnout Delivery (6)	Off-Farm Lateral Loss (7)	Farm Delivery (8)	On-Farm Lateral Loss (9)	Initial Deep Percolation (10)	Tail water (11)	Max Farm Efficiency (12)	Irrigated Acreage (13)	Applied Irrigation Water to Crop Consumptive Use (14)	Consumptive Use From Soil Moisture (15)	Applied Irrigation Water to Soil Moisture Storage (16)	Applied Irrigation Water to Additional Deep Perc (17)	SEV Losses (18)	Total Consumptive Use (19)	Prorated Total Consumptive Use (20)	Calculated Actual Farm Efficiency (21)	Crop Consumptive Use Shortage (22)
1950	502	71	22	209	364	20	344	12	75	33	65%	**209**	174	76	49	0	6	255	255	61%	136
1951	484	44	21	193	335	18	316	11	69	31	65%	**209**	170	27	36	0	6	202	202	61%	175
1952	560	8	30	208	360	20	340	12	74	33	65%	**208**	176	54	45	0	6	236	236	61%	292
1953	463	0	27	170	293	16	277	10	60	27	65%	**208**	139	41	41	0	5	185	185	61%	285
1954	251	0	30	92	159	9	150	5	33	14	65%	**207**	61	31	37	0	2	94	94	61%	428
1955	365	9	28	137	237	13	224	8	49	22	65%	**207**	129	22	17	0	4	155	155	61%	341
1956	355	0	27	130	225	12	212	7	46	20	65%	**207**	101	37	37	0	3	141	141	61%	327
1957	696	13	19	260	449	25	424	15	93	41	65%	**207**	214	53	61	0	8	275	275	61%	70
1958	348	128	24	173	303	17	287	10	63	28	65%	**207**	183	13	4	0	6	201	201	61%	215
1959	477	63	25	197	343	19	324	11	71	31	65%	**207**	140	41	71	0	5	186	186	61%	258
1960	462	6	27	172	296	16	280	10	61	27	65%	**207**	126	75	56	0	5	205	205	61%	266
1961	587	9	20	219	377	21	357	12	78	34	65%	**207**	169	67	63	0	6	242	242	61%	114
1962	596	51	25	237	410	23	388	14	85	37	65%	**207**	221	38	31	0	7	266	266	61%	171
1963	370	6	31	138	238	13	225	8	49	22	65%	**207**	82	65	65	0	3	149	149	61%	383
1964	342	0	27	126	217	12	205	7	45	20	65%	**207**	94	39	39	0	3	136	136	61%	330
1965	613	80	20	253	440	24	415	15	91	40	65%	**207**	179	59	91	0	7	245	245	61%	112
1966	401	78	24	175	305	17	288	10	63	28	65%	**207**	165	50	22	0	5	221	221	61%	196
1967	515	77	24	216	376	21	355	12	77	34	65%	**207**	196	38	35	0	6	241	241	61%	175
1968	567	19	23	215	371	21	351	12	77	34	65%	**207**	163	65	65	0	6	234	234	61%	161
1969	625	18	19	236	407	23	385	13	84	37	65%	**207**	189	58	61	0	7	254	254	61%	89
1970	603	64	24	244	423	23	400	14	87	39	65%	**207**	226	31	34	0	8	265	265	61%	157
1971	508	70	24	211	367	20	347	12	76	33	65%	**207**	179	45	46	0	6	230	230	61%	186
1972	444	52	25	181	315	17	298	10	65	29	65%	**207**	157	44	37	0	5	206	206	61%	232
1973	549	54	24	220	383	21	361	13	79	35	65%	**207**	188	40	47	0	7	235	235	61%	191
1974	327	47	29	137	238	13	225	8	49	22	65%	**207**	93	52	53	0	4	149	149	61%	350
1975	528	0	25	194	334	18	316	11	69	30	65%	**207**	154	59	52	0	5	218	218	61%	227
1976	332	30	26	132	229	13	217	8	47	21	65%	**207**	109	21	32	0	4	134	134	61%	312
1977	289	29	28	116	202	11	191	7	42	18	65%	**207**	100	35	24	0	3	137	137	61%	358
1978	399	0	24	147	253	14	239	8	52	23	65%	**207**	116	40	40	0	4	159	159	61%	260
1979	460	59	22	189	329	18	311	11	68	30	65%	**207**	160	33	42	0	6	200	200	61%	185
1980	516	151	27	243	425	23	402	14	88	39	65%	**207**	202	68	59	0	8	277	277	61%	194
1981	252	162	31	149	265	14	250	9	55	24	65%	**207**	151	12	12	0	5	168	168	61%	369
1982	660	55	23	262	454	25	429	15	94	41	65%	**207**	219	19	59	0	8	247	247	61%	158
1983	763	153	27	334	582	32	550	19	120	53	65%	**207**	317	79	41	0	11	407	407	61%	73
1984	831	109	26	343	597	33	564	20	123	54	65%	**199**	307	32	60	0	11	350	350	61%	94
1985	789	194	27	358	625	34	591	21	129	57	65%	**191**	332	50	52	0	12	393	393	61%	50
1986	495	2	25	182	314	17	297	10	65	29	65%	**192**	165	38	28	0	6	209	209	61%	200
1987	680	0	27	250	431	24	407	14	89	39	65%	**192**	235	38	30	0	8	281	281	61%	161
1988	491	186	28	246	432	24	408	14	89	39	65%	**193**	225	52	41	0	8	284	284	61%	176
1989	359	131	26	178	312	17	295	10	64	28	65%	**194**	180	13	12	0	6	198	198	61%	227
1990	429	80	27	186	323	18	306	11	67	29	65%	**194**	192	7	7	0	6	205	205	61%	235
1991	384	107	26	179	313	17	296	10	65	29	65%	**195**	162	28	30	0	5	196	196	61%	226
1992	404	92	21	181	316	17	299	10	65	29	65%	**196**	181	15	13	0	6	202	202	61%	153
1993	517	116	21	231	403	22	380	13	83	37	65%	**196**	185	33	62	0	7	225	225	61%	133
1994	469	161	26	228	401	22	379	13	83	37	65%	**197**	207	60	39	0	7	275	275	61%	167
1995	741	84	21	301	523	29	495	17	108	48	65%	**197**	223	88	99	0	10	320	320	61%	37
1996	562	179	21	269	472	26	446	16	97	43	65%	**198**	247	55	43	0	8	310	310	61%	45
1997	682	110	24	289	503	28	475	17	104	46	65%	**199**	274	22	35	0	10	305	305	61%	105
1998	582	116	26	254	443	24	419	15	91	40	65%	**199**	247	22	25	0	9	278	278	61%	160
1999	691	75	21	280	486	27	459	16	100	44	65%	**200**	246	69	52	0	9	324	324	61%	39
2000	637	137	29	282	492	27	465	16	101	45	65%	**200**	219	73	84	0	8	300	300	61%	196
2001	360	149	28	185	325	18	307	11	67	30	65%	**201**	164	55	36	0	6	225	225	61%	250
2002	139	60	35	72	126	7	120	4	26	12	65%	**201**	68	7	10	0	2	77	77	61%	516

Table 44

Arkansas River Farms No. 62 a & b - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	310	0	37	114	196	11	186	6	40	18	65%	**201**	115	8	6	0	4	127	127	61%	498
2004	377	0	27	139	239	13	226	8	49	22	65%	**201**	141	6	6	0	5	151	151	61%	302
2005	503	0	33	185	318	18	301	11	66	29	65%	**201**	173	14	23	0	6	192	192	61%	369
2006	346	63	28	149	260	14	245	9	54	24	65%	**201**	135	15	24	0	5	155	155	61%	327
2007	582	133	26	260	455	25	429	15	94	41	65%	**201**	249	42	30	0	8	300	300	61%	143
2008	487	117	32	220	385	21	364	13	79	35	65%	**201**	215	11	21	0	7	233	233	61%	316
2009	452	94	26	199	347	19	328	11	71	32	65%	**201**	190	20	23	0	7	217	217	61%	221
2010	505	95	31	219	381	21	360	13	79	35	65%	**201**	208	45	26	0	7	260	260	61%	270
2011	387	58	39	162	283	16	267	9	58	26	65%	**201**	174	0	0	0	6	179	179	61%	474
2012	146	61	47	75	132	7	125	4	27	12	65%	**201**	69	12	12	0	2	83	83	61%	709
2013	344	0	42	126	218	12	206	7	45	20	65%	**201**	134	0	0	0	4	138	138	61%	573
2014	485	28	40	188	325	18	307	11	67	30	65%	**201**	191	2	9	0	6	199	199	61%	485
Avg	483	67	27	201	349	19	330	12	72	32	65%	**203**	177	38	38	0	6	221	221	61%	241
Max	831	194	47	358	625	34	591	21	129	57	65%	**209**	332	88	99	0	12	407	407	61%	709
Min	139	0	19	72	126	7	120	4	26	12	65%	**191**	61	0	0	0	2	77	77	61%	37
1979 to 2014																					
Avg	495	92	28	214	373	21	353	12	77	34	65%	**200**	197	32	32	0	7	236	236	61%	245
Max	831	194	47	358	625	34	591	21	129	57	65%	**207**	332	88	99	0	12	407	407	61%	709
Min	139	0	21	72	126	7	120	4	26	12	65%	**191**	68	0	0	0	2	77	77	61%	37

Explanation of Columns

(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Total No. of Shares	**237**
Trade Shares	**237**
Total Consumptive Use	**236**
Trade Shares Pro Rata CU	**236**

Table 45

Arkansas River Farms No. 63 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year (1)	River Headgate Diversions (2)	Reservoir Releases (3)	Crop Irrigation Reqt (In) (4)	Ditch Loss (5)	Farm Turnout Delivery (6)	Off-Farm Lateral Loss (7)	Farm Delivery (8)	On-Farm Lateral Loss (9)	Initial Deep Percolation (10)	Tail water (11)	Max Farm Efficiency (12)	Irrigated Acreage (13)	Applied Irrigation Water to Crop Consumptive Use (14)	Consumptive Use From Soil Moisture (15)	Applied Irrigation Water to Soil Moisture Storage (16)	Applied Irrigation Water to Additional Deep Perc (17)	SEV Losses (18)	Total Consumptive Use (19)	Prorated Total Consumptive Use (20)	Calculated Actual Farm Efficiency (21)	Crop Consumptive Use Shortage (22)
1950	1,320	186	22	550	956	53	904	32	197	87	65%	**783**	469	216	118	0	15	700	700	61%	758
1951	1,272	115	21	507	880	49	831	29	181	80	65%	**786**	476	45	65	0	15	535	535	61%	879
1952	1,472	21	30	548	945	52	893	31	195	86	65%	**790**	474	127	107	0	16	616	616	61%	1,376
1953	1,217	0	27	447	771	43	728	25	159	70	65%	**793**	386	87	87	0	13	486	486	61%	1,302
1954	660	0	30	242	418	23	395	14	86	38	65%	**797**	173	69	84	0	6	248	248	61%	1,754
1955	960	24	28	361	624	34	589	21	129	57	65%	**797**	354	44	29	0	10	408	408	61%	1,494
1956	933	0	27	343	591	33	558	20	122	54	65%	**797**	287	75	75	0	9	372	372	61%	1,425
1957	1,831	34	19	684	1,181	65	1,116	39	243	108	65%	**798**	587	119	138	0	21	727	727	61%	589
1958	915	336	24	454	797	44	754	26	164	73	65%	**798**	480	29	10	0	16	525	525	61%	1,070
1959	1,254	167	25	519	902	50	852	30	186	82	65%	**798**	386	89	167	0	14	490	490	61%	1,215
1960	1,215	15	27	451	778	43	735	26	160	71	65%	**799**	345	182	133	0	12	539	539	61%	1,270
1961	1,544	23	20	575	992	55	937	33	204	90	65%	**799**	467	168	142	0	16	651	651	61%	715
1962	1,567	134	25	622	1,079	60	1,019	36	222	98	65%	**799**	597	69	65	0	19	685	685	61%	989
1963	973	17	31	363	627	35	592	21	129	57	65%	**800**	234	151	151	0	8	393	393	61%	1,656
1964	900	0	27	330	570	31	538	19	117	52	65%	**800**	265	85	85	0	8	358	358	61%	1,437
1965	1,611	209	20	665	1,156	64	1,092	38	238	105	65%	**800**	519	138	191	0	19	676	676	61%	694
1966	1,054	206	24	459	801	44	757	26	165	73	65%	**800**	456	88	35	0	14	559	559	61%	1,042
1967	1,353	203	24	568	988	54	933	33	203	90	65%	**801**	546	61	61	0	16	622	622	61%	976
1968	1,491	51	23	565	976	54	922	32	201	89	65%	**801**	456	143	143	0	15	614	614	61%	903
1969	1,643	48	19	620	1,071	59	1,012	35	221	98	65%	**801**	522	129	136	0	18	668	668	61%	648
1970	1,585	169	24	641	1,113	61	1,051	37	229	101	65%	**802**	606	71	77	0	20	697	697	61%	922
1971	1,336	184	24	555	965	53	912	32	199	88	65%	**802**	498	93	95	0	16	607	607	61%	993
1972	1,168	138	25	477	828	46	783	27	171	76	65%	**802**	420	104	89	0	13	537	537	61%	1,149
1973	1,443	142	24	580	1,006	55	950	33	207	92	65%	**803**	507	111	111	0	19	636	636	61%	1,002
1974	861	125	29	360	626	34	591	21	129	57	65%	**803**	255	108	129	0	10	373	373	61%	1,557
1975	1,387	0	25	509	878	49	830	29	181	80	65%	**803**	429	131	110	0	14	574	574	61%	1,146
1976	872	79	26	348	603	33	570	20	124	55	65%	**803**	300	43	70	0	10	353	353	61%	1,370
1977	760	76	28	306	531	29	502	18	109	48	65%	**802**	283	70	43	0	7	360	360	61%	1,550
1978	1,050	0	24	385	665	37	628	22	137	61	65%	**802**	312	96	96	0	11	419	419	61%	1,198
1979	1,209	154	22	498	866	48	818	29	178	79	65%	**801**	442	70	90	0	17	528	528	61%	953
1980	1,357	398	27	638	1,117	61	1,056	37	230	102	65%	**801**	531	175	155	0	21	727	727	61%	1,083
1981	663	426	31	393	696	38	658	23	143	63	65%	**800**	397	31	31	0	13	441	441	61%	1,624
1982	1,735	146	23	688	1,193	66	1,127	39	246	109	65%	**800**	638	39	94	0	21	698	698	61%	852
1983	2,006	402	27	878	1,531	84	1,446	51	315	140	65%	**799**	894	102	46	0	29	1,025	1,025	61%	812
1984	2,184	287	26	902	1,569	86	1,482	52	323	143	65%	**779**	832	54	131	0	30	916	916	61%	806
1985	2,074	510	27	940	1,644	90	1,553	54	339	150	65%	**758**	923	117	87	0	32	1,071	1,071	61%	671
1986	1,301	4	25	479	826	46	781	27	170	75	65%	**760**	434	64	73	0	16	514	514	61%	1,096
1987	1,788	0	27	656	1,132	63	1,069	37	233	103	65%	**761**	657	93	38	0	21	771	771	61%	966
1988	1,291	490	28	646	1,134	62	1,072	38	234	103	65%	**762**	633	63	63	0	20	717	717	61%	1,089
1989	943	345	26	468	821	45	776	27	169	75	65%	**763**	492	12	12	0	15	519	519	61%	1,147
1990	1,129	209	27	488	850	47	803	28	175	78	65%	**764**	511	11	11	0	17	539	539	61%	1,184
1991	1,011	282	26	470	823	45	778	27	170	75	65%	**765**	431	75	75	0	14	520	520	61%	1,127
1992	1,063	243	21	475	830	46	785	27	171	76	65%	**766**	482	28	28	0	16	526	526	61%	859
1993	1,359	305	21	606	1,058	58	1,000	35	218	96	65%	**767**	505	67	144	0	19	592	592	61%	800
1994	1,232	422	26	600	1,054	58	996	35	217	96	65%	**769**	579	135	69	0	19	733	733	61%	984
1995	1,947	221	21	792	1,376	76	1,300	46	284	125	65%	**770**	624	210	221	0	25	858	858	61%	523
1996	1,477	471	21	707	1,240	68	1,172	41	256	113	65%	**771**	687	98	75	0	22	807	807	61%	566
1997	1,792	290	24	759	1,322	73	1,249	44	272	121	65%	**772**	742	15	70	0	25	782	782	61%	799
1998	1,530	304	26	668	1,166	64	1,101	39	240	106	65%	**773**	650	58	66	0	23	731	731	61%	959
1999	1,817	197	21	736	1,278	71	1,208	42	263	117	65%	**774**	667	180	118	0	25	872	872	61%	523
2000	1,675	361	29	742	1,294	71	1,223	43	267	118	65%	**775**	619	128	176	0	22	768	768	61%	1,139
2001	947	393	28	486	854	47	807	28	176	78	65%	**776**	460	115	65	0	16	591	591	61%	1,235
2002	364	157	35	189	332	18	314	11	69	30	65%	**776**	185	12	19	0	5	202	202	61%	2,086

Table 45

Arkansas River Farms No. 63 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	816	0	37	299	516	29	488	17	106	47	65%	**776**	302	22	15	0	10	334	334	61%	2,074
2004	992	0	27	364	628	35	593	21	129	57	65%	**776**	386	0	0	0	12	398	398	61%	1,345
2005	1,322	0	33	485	837	46	790	28	172	76	65%	**776**	460	29	54	0	16	505	505	61%	1,655
2006	909	165	28	392	683	38	645	23	141	62	65%	**776**	366	30	53	0	12	409	409	61%	1,448
2007	1,529	350	26	684	1,195	66	1,129	40	246	109	65%	**776**	696	85	38	0	22	803	803	61%	897
2008	1,281	309	32	579	1,011	56	956	33	208	92	65%	**776**	577	0	44	0	19	597	597	61%	1,512
2009	1,188	246	26	522	912	50	862	30	188	83	65%	**776**	508	45	52	0	17	571	571	61%	1,114
2010	1,327	250	31	575	1,002	55	947	33	207	91	65%	**776**	550	116	65	0	18	684	684	61%	1,355
2011	1,017	153	39	427	743	41	702	25	153	68	65%	**776**	456	0	0	0	15	471	471	61%	2,043
2012	383	160	47	197	347	19	328	11	71	32	65%	**776**	181	32	32	0	6	219	219	61%	2,839
2013	904	0	42	332	572	32	540	19	118	52	65%	**776**	351	0	0	0	10	362	362	61%	2,376
2014	1,274	74	40	494	855	47	808	28	176	78	65%	**776**	513	0	12	0	17	530	530	61%	2,103
Avg	1,269	176	27	527	917	51	867	30	189	84	65%	**786**	484	81	79	0	16	581	581	61%	1,196
Max	2,184	510	47	940	1,644	90	1,553	54	339	150	65%	**803**	923	216	221	0	32	1,071	1,071	61%	2,839
Min	364	0	19	189	332	18	314	11	69	30	65%	**758**	173	0	0	0	5	202	202	61%	523
1979 to 2014																					
Avg	1,301	242	28	563	981	54	927	32	202	89	65%	**776**	538	64	65	0	18	620	620	61%	1,240
Max	2,184	510	47	940	1,644	90	1,553	54	339	150	65%	**801**	923	210	221	0	32	1,071	1,071	61%	2,839
Min	364	0	21	189	332	18	314	11	69	30	65%	**758**	181	0	0	0	5	202	202	61%	523

Total No. of Shares	**623**
Trade Shares	**623**
Total Consumptive Use	**620**
Trade Shares Pro Rata CU	**620**

Explanation of Columns

(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Table 46

Arkansas River Farms No. 64 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year (1)	River Headgate Diversions (2)	Reservoir Releases (3)	Crop Irrigation Reqt (In) (4)	Ditch Loss (5)	Farm Turnout Delivery (6)	Off-Farm Lateral Loss (7)	Farm Delivery (8)	On-Farm Lateral Loss (9)	Initial Deep Percolation (10)	Tail water (11)	Max Farm Efficiency (12)	Irrigated Acreage (13)	Applied Irrigation Water to Crop Consumptive Use (14)	Consumptive Use From Soil Moisture (15)	Applied Irrigation Water to Soil Moisture Storage (16)	Applied Irrigation Water to Additional Deep Perc (17)	SEV Losses (18)	Total Consumptive Use (19)	Prorated Total Consumptive Use (20)	Calculated Actual Farm Efficiency (21)	Crop Consumptive Use Shortage (22)
1950	474	67	22	198	344	19	325	11	71	31	65%	**218**	166	72	45	0	6	244	244	61%	164
1951	458	41	21	182	316	17	299	10	65	29	65%	**218**	163	23	31	0	5	191	191	61%	202
1952	529	7	30	197	340	19	321	11	70	31	65%	**218**	167	50	42	0	6	223	223	61%	329
1953	438	0	27	161	277	15	262	9	57	25	65%	**218**	133	37	37	0	5	175	175	61%	318
1954	237	0	30	87	150	8	142	5	31	14	65%	**218**	59	28	33	0	2	89	89	61%	460
1955	345	9	28	130	224	12	212	7	46	20	65%	**218**	123	20	14	0	4	147	147	61%	375
1956	336	0	27	123	212	12	201	7	44	19	65%	**218**	97	33	33	0	3	134	134	61%	359
1957	658	12	19	246	425	23	401	14	87	39	65%	**218**	205	48	56	0	8	260	260	61%	101
1958	329	121	24	163	287	16	271	9	59	26	65%	**218**	173	12	4	0	6	190	190	61%	248
1959	451	60	25	186	324	18	306	11	67	30	65%	**218**	134	37	65	0	5	176	176	61%	291
1960	437	5	27	162	280	15	264	9	58	26	65%	**218**	120	69	52	0	4	194	194	61%	301
1961	555	8	20	207	357	20	337	12	73	33	65%	**218**	162	63	57	0	6	230	230	61%	144
1962	563	48	25	224	388	21	366	13	80	35	65%	**218**	211	32	27	0	7	250	250	61%	208
1963	350	6	31	131	225	12	213	7	46	21	65%	**218**	79	59	59	0	3	141	141	61%	418
1964	324	0	27	119	205	11	193	7	42	19	65%	**218**	91	34	34	0	3	129	129	61%	361
1965	579	75	20	239	415	23	393	14	86	38	65%	**218**	174	54	81	0	7	235	235	61%	140
1966	379	74	24	165	288	16	272	10	59	26	65%	**218**	158	43	19	0	5	207	207	61%	231
1967	486	73	24	204	355	20	335	12	73	32	65%	**218**	188	33	30	0	6	226	226	61%	210
1968	536	18	23	203	351	19	332	12	72	32	65%	**218**	156	59	59	0	5	221	221	61%	194
1969	591	17	19	223	385	21	364	13	79	35	65%	**218**	181	53	56	0	6	240	240	61%	120
1970	570	61	24	230	400	22	378	13	82	36	65%	**218**	215	29	31	0	7	251	251	61%	192
1971	480	66	24	200	347	19	328	11	72	32	65%	**218**	173	39	41	0	6	217	217	61%	219
1972	420	49	25	171	298	16	281	10	61	27	65%	**218**	149	40	34	0	5	194	194	61%	265
1973	519	51	24	208	362	20	342	12	75	33	65%	**218**	179	39	43	0	7	225	225	61%	222
1974	309	45	29	129	225	12	213	7	46	21	65%	**218**	89	46	49	0	4	138	138	61%	387
1975	499	0	25	183	316	17	298	10	65	29	65%	**218**	147	54	47	0	5	206	206	61%	262
1976	314	28	26	125	217	12	205	7	45	20	65%	**218**	105	18	28	0	4	127	127	61%	342
1977	273	27	28	110	191	11	180	6	39	17	65%	**218**	96	31	21	0	3	130	130	61%	390
1978	378	0	24	139	239	13	226	8	49	22	65%	**218**	110	37	37	0	4	151	151	61%	290
1979	435	55	22	179	311	17	294	10	64	28	65%	**218**	153	30	38	0	6	189	189	61%	215
1980	488	143	27	229	402	22	380	13	83	37	65%	**218**	191	64	56	0	7	262	262	61%	232
1981	238	153	31	141	250	14	237	8	52	23	65%	**218**	143	11	11	0	5	158	158	61%	405
1982	624	52	23	247	429	24	405	14	88	39	65%	**218**	213	17	51	0	8	238	238	61%	187
1983	721	145	27	316	550	30	520	18	113	50	65%	**218**	308	64	30	0	10	382	382	61%	122
1984	785	103	26	324	564	31	533	19	116	51	65%	**189**	290	28	56	0	11	329	329	61%	92
1985	746	183	27	338	591	33	558	20	122	54	65%	**160**	301	53	62	0	11	365	365	61%	7
1986	468	2	25	172	297	16	281	10	61	27	65%	**162**	155	42	28	0	6	202	202	61%	144
1987	643	0	27	236	407	22	384	13	84	37	65%	**165**	214	40	36	0	8	262	262	61%	117
1988	464	176	28	232	408	22	386	13	84	37	65%	**167**	207	55	43	0	7	270	270	61%	129
1989	339	124	26	168	295	16	279	10	61	27	65%	**169**	169	17	13	0	5	191	191	61%	181
1990	406	75	27	175	306	17	289	10	63	28	65%	**172**	181	7	7	0	6	193	193	61%	196
1991	363	102	26	169	296	16	280	10	61	27	65%	**174**	152	27	29	0	5	185	185	61%	192
1992	382	87	21	171	299	16	282	10	62	27	65%	**177**	171	15	13	0	6	191	191	61%	130
1993	489	110	21	218	380	21	360	13	78	35	65%	**179**	174	32	60	0	7	213	213	61%	114
1994	443	152	26	216	379	21	358	13	78	35	65%	**181**	195	58	38	0	7	260	260	61%	148
1995	700	79	21	285	495	27	467	16	102	45	65%	**184**	209	83	94	0	9	302	302	61%	31
1996	531	169	21	254	446	25	421	15	92	41	65%	**186**	233	54	41	0	8	294	294	61%	40
1997	644	104	24	273	475	26	449	16	98	43	65%	**189**	259	20	33	0	9	289	289	61%	100
1998	550	109	26	240	419	23	396	14	86	38	65%	**191**	234	21	24	0	8	263	263	61%	157
1999	653	71	21	265	460	25	434	15	95	42	65%	**193**	233	65	49	0	9	307	307	61%	44
2000	602	130	29	267	465	26	440	15	96	42	65%	**196**	208	67	78	0	8	283	283	61%	201
2001	341	141	28	175	307	17	290	10	63	28	65%	**198**	156	51	33	0	6	213	213	61%	255
2002	131	56	35	68	120	7	113	4	25	11	65%	**198**	65	6	9	0	2	73	73	61%	511

Table 46

Arkansas River Farms No. 64 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	293	0	37	108	186	10	175	6	38	17	65%	**198**	109	8	5	0	3	120	120	61%	495
2004	357	0	27	131	226	12	213	7	47	21	65%	**198**	134	5	5	0	4	143	143	61%	303
2005	475	0	33	174	301	17	284	10	62	27	65%	**198**	163	13	21	0	6	182	182	61%	371
2006	327	59	28	141	245	14	232	8	51	22	65%	**198**	128	14	22	0	4	147	147	61%	328
2007	550	126	26	246	430	24	406	14	89	39	65%	**198**	237	39	27	0	8	284	284	61%	152
2008	461	111	32	208	364	20	344	12	75	33	65%	**198**	204	9	19	0	7	219	219	61%	321
2009	427	89	26	188	328	18	310	11	68	30	65%	**198**	180	19	21	0	6	205	205	61%	226
2010	477	90	31	207	360	20	341	12	74	33	65%	**198**	197	43	24	0	7	246	246	61%	276
2011	365	55	39	153	267	15	252	9	55	24	65%	**198**	164	0	0	0	5	169	169	61%	473
2012	138	58	47	71	125	7	118	4	26	11	65%	**198**	65	11	11	0	2	79	79	61%	702
2013	325	0	42	119	206	11	194	7	42	19	65%	**198**	126	0	0	0	4	130	130	61%	569
2014	458	27	40	178	307	17	290	10	63	28	65%	**198**	180	2	8	0	6	188	188	61%	485
Avg	456	63	27	190	330	18	312	11	68	30	65%	**203**	168	35	35	0	6	209	209	61%	252
Max	785	183	47	338	591	33	558	20	122	54	65%	**218**	308	83	94	0	11	382	382	61%	702
Min	131	0	19	68	120	7	113	4	25	11	65%	**160**	59	0	0	0	2	73	73	61%	7
1979 to 2014																					
Avg	468	87	28	202	353	19	333	12	73	32	65%	**192**	186	30	30	0	7	223	223	61%	240
Max	785	183	47	338	591	33	558	20	122	54	65%	**218**	308	83	94	0	11	382	382	61%	702
Min	131	0	21	68	120	7	113	4	25	11	65%	**160**	65	0	0	0	2	73	73	61%	7

Explanation of Columns
(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Total No. of Shares	**224**
Trade Shares	**224**
Total Consumptive Use	**223**
Trade Shares Pro Rata CU	**223**

Table 47

Arkansas River Farms No. 65 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
1950	305	43	22	127	221	12	209	7	46	20	65%	**148**	107	47	29	0	4	158	158	61%	118
1951	294	27	21	117	203	11	192	7	42	19	65%	**148**	106	14	19	0	3	123	123	61%	144
1952	340	5	30	127	219	12	206	7	45	20	65%	**148**	108	32	26	0	4	143	143	61%	231
1953	281	0	27	103	178	10	168	6	37	16	65%	**148**	86	23	23	0	3	112	112	61%	222
1954	153	0	30	56	97	5	91	3	20	9	65%	**148**	39	17	21	0	1	57	57	61%	316
1955	222	6	28	83	144	8	136	5	30	13	65%	**149**	80	12	9	0	2	94	94	61%	261
1956	216	0	27	79	137	8	129	5	28	12	65%	**149**	63	21	21	0	2	86	86	61%	250
1957	423	8	19	158	273	15	258	9	56	25	65%	**149**	133	30	35	0	5	167	167	61%	80
1958	212	78	24	105	184	10	174	6	38	17	65%	**149**	111	7	2	0	4	122	122	61%	178
1959	290	38	25	120	208	11	197	7	43	19	65%	**150**	87	23	41	0	3	113	113	61%	207
1960	281	3	27	104	180	10	170	6	37	16	65%	**150**	78	44	33	0	3	125	125	61%	216
1961	357	5	20	133	229	13	217	8	47	21	65%	**150**	105	40	36	0	4	149	149	61%	109
1962	362	31	25	144	249	14	236	8	51	23	65%	**150**	136	20	17	0	4	160	160	61%	156
1963	225	4	31	84	145	8	137	5	30	13	65%	**151**	51	37	37	0	2	91	91	61%	296
1964	208	0	27	76	132	7	124	4	27	12	65%	**151**	59	22	22	0	2	83	83	61%	256
1965	372	48	20	154	267	15	252	9	55	24	65%	**151**	114	34	50	0	4	152	152	61%	107
1966	244	48	24	106	185	10	175	6	38	17	65%	**152**	103	26	11	0	3	132	132	61%	172
1967	313	47	24	131	228	13	216	8	47	21	65%	**152**	122	19	18	0	4	145	145	61%	159
1968	345	12	23	131	226	12	213	7	46	21	65%	**152**	102	37	37	0	3	142	142	61%	147
1969	380	11	19	143	248	14	234	8	51	23	65%	**152**	117	33	35	0	4	154	154	61%	97
1970	366	39	24	148	257	14	243	9	53	23	65%	**153**	139	18	19	0	5	161	161	61%	148
1971	309	43	24	128	223	12	211	7	46	20	65%	**153**	112	24	25	0	4	140	140	61%	166
1972	270	32	25	110	191	11	181	6	39	17	65%	**153**	96	25	21	0	3	125	125	61%	198
1973	333	33	24	134	232	13	220	8	48	21	65%	**153**	116	26	27	0	4	146	146	61%	168
1974	199	29	29	83	145	8	137	5	30	13	65%	**154**	58	27	31	0	2	87	87	61%	283
1975	321	0	25	118	203	11	192	7	42	19	65%	**154**	96	33	29	0	3	133	133	61%	198
1976	202	18	26	80	139	8	132	5	29	13	65%	**153**	68	11	17	0	2	82	82	61%	248
1977	176	18	28	71	123	7	116	4	25	11	65%	**153**	63	18	12	0	2	83	83	61%	281
1978	243	0	24	89	154	8	145	5	32	14	65%	**152**	71	23	23	0	3	97	97	61%	210
1979	280	36	22	115	200	11	189	7	41	18	65%	**151**	99	19	23	0	4	122	122	61%	159
1980	314	92	27	147	258	14	244	9	53	24	65%	**151**	123	41	36	0	5	168	168	61%	173
1981	153	98	31	91	161	9	152	5	33	15	65%	**150**	92	7	7	0	3	102	102	61%	286
1982	401	34	23	159	276	15	261	9	57	25	65%	**149**	139	11	30	0	5	154	154	61%	136
1983	464	93	27	203	354	19	334	12	73	32	65%	**149**	200	37	17	0	7	244	244	61%	99
1984	505	66	26	209	363	20	343	12	75	33	65%	**152**	190	15	33	0	7	212	212	61%	126
1985	479	118	27	217	380	21	359	13	78	35	65%	**156**	211	29	22	0	7	248	248	61%	111
1986	301	1	25	111	191	11	180	6	39	17	65%	**155**	100	16	17	0	4	120	120	61%	210
1987	413	0	27	152	262	14	247	9	54	24	65%	**155**	152	21	9	0	5	178	178	61%	176
1988	298	113	28	149	262	14	248	9	54	24	65%	**154**	145	16	16	0	5	166	166	61%	200
1989	218	80	26	108	190	10	179	6	39	17	65%	**154**	112	4	4	0	3	120	120	61%	216
1990	261	48	27	113	197	11	186	6	40	18	65%	**153**	118	3	3	0	4	125	125	61%	221
1991	234	65	26	109	190	10	180	6	39	17	65%	**152**	100	17	17	0	3	120	120	61%	208
1992	246	56	21	110	192	11	181	6	40	18	65%	**152**	111	7	7	0	4	121	121	61%	153
1993	314	70	21	140	245	13	231	8	50	22	65%	**151**	117	15	33	0	4	137	137	61%	138
1994	285	98	26	139	244	13	230	8	50	22	65%	**151**	131	32	18	0	4	168	168	61%	169
1995	450	51	21	183	318	18	301	11	66	29	65%	**150**	140	51	55	0	6	197	197	61%	74
1996	341	109	21	164	287	16	271	9	59	26	65%	**150**	155	27	21	0	5	187	187	61%	80
1997	414	67	24	176	306	17	289	10	63	28	65%	**149**	169	8	18	0	6	183	183	61%	123
1998	354	70	26	154	269	15	255	9	56	25	65%	**149**	150	13	15	0	5	169	169	61%	157
1999	420	46	21	170	295	16	279	10	61	27	65%	**148**	152	42	30	0	6	199	199	61%	69
2000	387	83	29	171	299	16	283	10	62	27	65%	**147**	137	38	46	0	5	180	180	61%	184
2001	219	91	28	112	197	11	187	7	41	18	65%	**147**	102	30	19	0	4	137	137	61%	210
2002	84	36	35	44	77	4	73	3	16	7	65%	**147**	42	4	5	0	1	47	47	61%	386

Table 47

Arkansas River Farms No. 65 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	189	0	37	69	119	7	113	4	25	11	65%	**147**	70	5	3	0	2	77	77	61%	379
2004	229	0	27	84	145	8	137	5	30	13	65%	**147**	88	2	2	0	3	92	92	61%	238
2005	306	0	33	112	193	11	183	6	40	18	65%	**147**	105	8	13	0	4	117	117	61%	293
2006	210	38	28	91	158	9	149	5	33	14	65%	**147**	84	8	13	0	3	94	94	61%	257
2007	353	81	26	158	276	15	261	9	57	25	65%	**147**	156	23	14	0	5	184	184	61%	139
2008	296	71	32	134	234	13	221	8	48	21	65%	**147**	133	3	11	0	4	140	140	61%	260
2009	275	57	26	121	211	12	199	7	43	19	65%	**147**	116	11	13	0	4	132	132	61%	188
2010	307	58	31	133	232	13	219	8	48	21	65%	**147**	127	27	16	0	4	158	158	61%	229
2011	235	35	39	99	172	9	162	6	35	16	65%	**147**	105	0	0	0	3	109	109	61%	367
2012	89	37	47	46	80	4	76	3	17	7	65%	**147**	42	7	7	0	1	51	51	61%	528
2013	209	0	42	77	132	7	125	4	27	12	65%	**147**	81	0	0	0	2	84	84	61%	435
2014	295	17	40	114	198	11	187	7	41	18	65%	**147**	117	1	4	0	4	122	122	61%	377
Avg	293	41	27	122	212	12	200	7	44	19	65%	**150**	110	21	20	0	4	134	134	61%	206
Max	505	118	47	217	380	21	359	13	78	35	65%	**156**	211	51	55	0	7	248	248	61%	528
Min	84	0	19	44	77	4	73	3	16	7	65%	**147**	39	0	0	0	1	47	47	61%	69
1979 to 2014																					
Avg	301	56	28	130	227	12	214	7	47	21	65%	**150**	123	17	17	0	4	143	143	61%	215
Max	505	118	47	217	380	21	359	13	78	35	65%	**156**	211	51	55	0	7	248	248	61%	528
Min	84	0	21	44	77	4	73	3	16	7	65%	**147**	42	0	0	0	1	47	47	61%	69

Explanation of Columns

(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Total No. of Shares	**144**
Trade Shares	**144**
Total Consumptive Use	**143**
Trade Shares Pro Rata CU	**143**

Table 48

Arkansas River Farms No. 85 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year (1)	River Headgate Diversions (2)	Reservoir Releases (3)	Crop Irrigation Reqt (In) (4)	Ditch Loss (5)	Farm Turnout Delivery (6)	Off-Farm Lateral Loss (7)	Farm Delivery (8)	On-Farm Lateral Loss (9)	Initial Deep Percolation (10)	Tail water (11)	Max Farm Efficiency (12)	Irrigated Acreage (13)	Applied Irrigation Water to Crop Consumptive Use (14)	Consumptive Use From Soil Moisture (15)	Applied Irrigation Water to Soil Moisture Storage (16)	Applied Irrigation Water to Additional Deep Perc (17)	SEV Losses (18)	Total Consumptive Use (19)	Prorated Total Consumptive Use (20)	Calculated Actual Farm Efficiency (21)	Crop Consumptive Use Shortage (22)
1950	305	43	22	127	221	12	209	7	46	20	65%	**175**	108	49	28	0	4	161	158	61%	165
1951	294	27	21	117	203	11	192	7	42	19	65%	**172**	109	11	16	0	3	124	121	61%	186
1952	340	5	30	127	219	12	206	7	45	20	65%	**169**	109	30	25	0	4	143	140	61%	285
1953	281	0	27	103	178	10	168	6	37	16	65%	**166**	88	22	22	0	3	112	110	61%	263
1954	153	0	30	56	97	5	91	3	20	9	65%	**163**	39	17	20	0	1	57	56	61%	353
1955	222	6	28	83	144	8	136	5	30	13	65%	**163**	81	11	8	0	2	94	92	61%	295
1956	216	0	27	79	137	8	129	5	28	12	65%	**162**	64	19	19	0	2	86	84	61%	280
1957	423	8	19	158	273	15	258	9	56	25	65%	**162**	134	29	34	0	5	168	164	61%	100
1958	212	78	24	105	184	10	174	6	38	17	65%	**161**	111	7	2	0	4	122	119	61%	202
1959	290	38	25	120	208	11	197	7	43	19	65%	**161**	88	22	40	0	3	113	111	61%	231
1960	281	3	27	104	180	10	170	6	37	16	65%	**160**	78	43	32	0	3	124	122	61%	239
1961	357	5	20	133	229	13	217	8	47	21	65%	**160**	106	40	35	0	4	149	146	61%	125
1962	362	31	25	144	249	14	236	8	51	23	65%	**160**	137	18	16	0	4	160	156	61%	175
1963	225	4	31	84	145	8	137	5	30	13	65%	**159**	52	37	37	0	2	91	89	61%	317
1964	208	0	27	76	132	7	124	4	27	12	65%	**159**	60	21	21	0	2	83	81	61%	273
1965	372	48	20	154	267	15	252	9	55	24	65%	**158**	115	34	49	0	4	153	150	61%	118
1966	244	48	24	106	185	10	175	6	38	17	65%	**158**	103	24	10	0	3	131	128	61%	185
1967	313	47	24	131	228	13	216	8	47	21	65%	**157**	123	18	17	0	4	145	142	61%	169
1968	345	12	23	131	226	12	213	7	46	21	65%	**157**	102	36	36	0	3	142	139	61%	155
1969	380	11	19	143	248	14	234	8	51	23	65%	**156**	118	33	34	0	4	154	151	61%	103
1970	366	39	24	148	257	14	243	9	53	23	65%	**156**	139	18	19	0	5	161	158	61%	154
1971	309	43	24	128	223	12	211	7	46	20	65%	**155**	112	24	25	0	4	140	137	61%	170
1972	270	32	25	110	191	11	181	6	39	17	65%	**155**	96	25	21	0	3	125	122	61%	201
1973	333	33	24	134	232	13	220	8	48	21	65%	**154**	116	26	27	0	4	146	143	61%	169
1974	199	29	29	83	145	8	137	5	30	13	65%	**154**	58	27	31	0	2	87	85	61%	283
1975	321	0	25	118	203	11	192	7	42	19	65%	**153**	96	33	29	0	3	133	130	61%	196
1976	202	18	26	80	139	8	132	5	29	13	65%	**154**	68	11	17	0	2	82	80	61%	248
1977	176	18	28	71	123	7	116	4	25	11	65%	**154**	63	18	12	0	2	83	82	61%	283
1978	243	0	24	89	154	8	145	5	32	14	65%	**154**	71	23	23	0	3	97	95	61%	215
1979	280	36	22	115	200	11	189	7	41	18	65%	**154**	100	18	23	0	4	122	119	61%	164
1980	314	92	27	147	258	14	244	9	53	24	65%	**155**	123	41	36	0	5	168	165	61%	182
1981	153	98	31	91	161	9	152	5	33	15	65%	**155**	92	7	7	0	3	102	100	61%	299
1982	401	34	23	159	276	15	261	9	57	25	65%	**155**	141	10	29	0	5	156	152	61%	146
1983	464	93	27	203	354	19	334	12	73	32	65%	**156**	202	34	15	0	7	243	238	61%	116
1984	505	66	26	209	363	20	343	12	75	33	65%	**152**	190	15	33	0	7	212	207	61%	126
1985	479	118	27	217	380	21	359	13	78	35	65%	**149**	210	29	24	0	7	246	240	61%	98
1986	301	1	25	111	191	11	180	6	39	17	65%	**149**	100	17	17	0	4	121	118	61%	195
1987	413	0	27	152	262	14	247	9	54	24	65%	**148**	152	21	9	0	5	178	174	61%	161
1988	298	113	28	149	262	14	248	9	54	24	65%	**148**	144	17	17	0	5	166	163	61%	185
1989	218	80	26	108	190	10	179	6	39	17	65%	**147**	112	5	5	0	3	120	118	61%	202
1990	261	48	27	113	197	11	186	6	40	18	65%	**147**	118	3	3	0	4	125	122	61%	207
1991	234	65	26	109	190	10	180	6	39	17	65%	**146**	100	17	17	0	3	120	118	61%	195
1992	246	56	21	110	192	11	181	6	40	18	65%	**146**	111	7	7	0	4	121	119	61%	142
1993	314	70	21	140	245	13	231	8	50	22	65%	**145**	117	16	34	0	4	137	134	61%	127
1994	285	98	26	139	244	13	230	8	50	22	65%	**145**	130	33	19	0	4	168	164	61%	156
1995	450	51	21	183	318	18	301	11	66	29	65%	**144**	139	51	56	0	6	196	192	61%	63
1996	341	109	21	164	287	16	271	9	59	26	65%	**144**	155	28	22	0	5	187	183	61%	70
1997	414	67	24	176	306	17	289	10	63	28	65%	**143**	169	9	19	0	6	184	180	61%	111
1998	354	70	26	154	269	15	255	9	56	25	65%	**143**	150	13	15	0	5	169	165	61%	144
1999	420	46	21	170	295	16	279	10	61	27	65%	**142**	151	42	30	0	6	199	194	61%	59
2000	387	83	29	171	299	16	283	10	62	27	65%	**142**	136	39	47	0	5	180	177	61%	170
2001	219	91	28	112	197	11	187	7	41	18	65%	**141**	102	31	19	0	4	137	134	61%	197
2002	84	36	35	44	77	4	73	3	16	7	65%	**141**	42	4	5	0	1	47	46	61%	370

Table 48

Arkansas River Farms No. 85 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	189	0	37	69	119	7	113	4	25	11	65%	**141**	70	5	3	0	2	77	76	61%	362
2004	229	0	27	84	145	8	137	5	30	13	65%	**141**	87	2	2	0	3	92	90	61%	226
2005	306	0	33	112	193	11	183	6	40	18	65%	**141**	105	8	13	0	4	117	114	61%	277
2006	210	38	28	91	158	9	149	5	33	14	65%	**141**	83	8	14	0	3	94	92	61%	244
2007	353	81	26	158	276	15	261	9	57	25	65%	**141**	155	24	15	0	5	183	180	61%	127
2008	296	71	32	134	234	13	221	8	48	21	65%	**141**	132	3	11	0	4	140	137	61%	245
2009	275	57	26	121	211	12	199	7	43	19	65%	**141**	116	12	13	0	4	132	129	61%	176
2010	307	58	31	133	232	13	219	8	48	21	65%	**141**	127	27	16	0	4	158	155	61%	214
2011	235	35	39	99	172	9	162	6	35	16	65%	**141**	105	0	0	0	3	109	107	61%	349
2012	89	37	47	46	80	4	76	3	17	7	65%	**141**	42	7	7	0	1	51	49	61%	506
2013	209	0	42	77	132	7	125	4	27	12	65%	**141**	81	0	0	0	2	84	82	61%	415
2014	295	17	40	114	198	11	187	7	41	18	65%	**141**	117	1	5	0	4	121	119	61%	359
Avg	293	41	27	122	212	12	200	7	44	19	65%	**152**	110	20	20	0	4	134	131	61%	208
Max	505	118	47	217	380	21	359	13	78	35	65%	**175**	210	51	56	0	7	246	240	61%	506
Min	84	0	19	44	77	4	73	3	16	7	65%	**141**	39	0	0	0	1	47	46	61%	59
1979 to 2014																					
Avg	301	56	28	130	227	12	214	7	47	21	65%	**145**	122	17	17	0	4	143	140	61%	205
Max	505	118	47	217	380	21	359	13	78	35	65%	**156**	210	51	56	0	7	246	240	61%	506
Min	84	0	21	44	77	4	73	3	16	7	65%	**141**	42	0	0	0	1	47	46	61%	59

Total No. of Shares	**144**
Trade Shares	**141**
Total Consumptive Use	**143**
Trade Shares Pro Rata CU	**140**

Explanation of Columns

(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Table 49

Arkansas River Farms No. 110 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year (1)	River Headgate Diversions (2)	Reservoir Releases (3)	Crop Irrigation Reqt (In) (4)	Ditch Loss (5)	Farm Turnout Delivery (6)	Off-Farm Lateral Loss (7)	Farm Delivery (8)	On-Farm Lateral Loss (9)	Initial Deep Percolation (10)	Tail water (11)	Max Farm Efficiency (12)	Irrigated Acreage (13)	Applied Irrigation Water to Crop Consumptive Use (14)	Consumptive Use From Soil Moisture (15)	Applied Irrigation Water to Soil Moisture Storage (16)	Applied Irrigation Water to Additional Deep Perc (17)	SEV Losses (18)	Total Consumptive Use (19)	Prorated Total Consumptive Use (20)	Calculated Actual Farm Efficiency (21)	Crop Consumptive Use Shortage (22)
1950	322	45	22	134	233	13	220	8	48	21	65%	**228**	116	56	28	0	4	175	175	61%	248
1951	310	28	21	124	215	12	203	7	44	20	65%	**228**	119	8	13	0	4	131	131	61%	278
1952	359	5	30	134	231	13	218	8	48	21	65%	**227**	117	29	24	0	4	150	150	61%	424
1953	297	0	27	109	188	10	178	6	39	17	65%	**227**	96	19	19	0	3	119	119	61%	394
1954	161	0	30	59	102	6	96	3	21	9	65%	**227**	43	16	20	0	1	60	60	61%	511
1955	234	6	28	88	152	8	144	5	31	14	65%	**228**	88	9	5	0	3	100	100	61%	443
1956	228	0	27	84	144	8	136	5	30	13	65%	**228**	72	16	16	0	2	91	91	61%	422
1957	447	8	19	167	288	16	272	10	59	26	65%	**228**	144	28	32	0	5	178	178	61%	197
1958	223	82	24	111	195	11	184	6	40	18	65%	**228**	117	7	2	0	4	128	128	61%	327
1959	306	41	25	127	220	12	208	7	45	20	65%	**228**	96	20	39	0	3	119	119	61%	367
1960	296	4	27	110	190	10	179	6	39	17	65%	**228**	86	42	30	0	3	131	131	61%	385
1961	377	5	20	140	242	13	229	8	50	22	65%	**228**	116	40	33	0	4	160	160	61%	230
1962	382	33	25	152	263	15	249	9	54	24	65%	**228**	147	14	14	0	5	166	166	61%	312
1963	237	4	31	89	153	8	144	5	32	14	65%	**229**	59	34	34	0	2	96	96	61%	490
1964	220	0	27	81	139	8	131	5	29	13	65%	**229**	67	19	19	0	2	87	87	61%	426
1965	393	51	20	162	282	16	266	9	58	26	65%	**229**	129	32	44	0	5	165	165	61%	226
1966	257	50	24	112	195	11	185	6	40	18	65%	**229**	112	20	8	0	3	136	136	61%	321
1967	330	49	24	138	241	13	228	8	50	22	65%	**229**	135	13	13	0	4	152	152	61%	305
1968	364	12	23	138	238	13	225	8	49	22	65%	**229**	115	31	31	0	4	150	150	61%	284
1969	401	12	19	151	261	14	247	9	54	24	65%	**229**	130	28	30	0	4	163	163	61%	213
1970	387	41	24	156	271	15	257	9	56	25	65%	**229**	149	16	17	0	5	170	170	61%	293
1971	326	45	24	135	235	13	223	8	49	21	65%	**230**	124	20	20	0	4	149	149	61%	309
1972	285	34	25	116	202	11	191	7	42	18	65%	**230**	103	24	21	0	3	131	131	61%	352
1973	352	35	24	141	245	14	232	8	51	22	65%	**230**	125	25	25	0	5	155	155	61%	313
1974	210	30	29	88	153	8	144	5	31	14	65%	**230**	63	26	31	0	2	91	91	61%	461
1975	338	0	25	124	214	12	202	7	44	20	65%	**230**	108	29	24	0	3	140	140	61%	352
1976	213	19	26	85	147	8	139	5	30	13	65%	**230**	75	9	16	0	2	86	86	61%	407
1977	186	19	28	75	130	7	122	4	27	12	65%	**230**	70	17	10	0	2	88	88	61%	459
1978	256	0	24	94	162	9	153	5	33	15	65%	**229**	77	22	22	0	3	102	102	61%	360
1979	295	38	22	121	211	12	200	7	44	19	65%	**229**	111	15	19	0	4	129	129	61%	294
1980	331	97	27	156	273	15	258	9	56	25	65%	**229**	130	42	38	0	5	177	177	61%	339
1981	162	104	31	96	170	9	161	6	35	15	65%	**229**	97	8	8	0	3	107	107	61%	482
1982	423	36	23	168	291	16	275	10	60	27	65%	**228**	163	9	16	0	5	177	177	61%	265
1983	489	98	27	214	373	21	353	12	77	34	65%	**228**	219	17	10	0	7	244	244	61%	280
1984	533	70	26	220	383	21	362	13	79	35	65%	**223**	204	13	32	0	7	224	224	61%	269
1985	506	124	27	229	401	22	379	13	83	37	65%	**219**	227	27	19	0	8	261	261	61%	239
1986	317	1	25	117	202	11	190	7	42	18	65%	**219**	106	16	18	0	4	125	125	61%	338
1987	436	0	27	160	276	15	261	9	57	25	65%	**220**	160	23	9	0	5	188	188	61%	313
1988	315	119	28	158	277	15	262	9	57	25	65%	**220**	156	14	14	0	5	175	175	61%	346
1989	230	84	26	114	200	11	189	7	41	18	65%	**221**	121	2	2	0	4	127	127	61%	355
1990	275	51	27	119	207	11	196	7	43	19	65%	**221**	125	3	3	0	4	131	131	61%	367
1991	247	69	26	115	201	11	190	7	41	18	65%	**222**	105	18	18	0	4	127	127	61%	350
1992	259	59	21	116	203	11	191	7	42	18	65%	**223**	119	6	6	0	4	128	128	61%	273
1993	332	74	21	148	258	14	244	9	53	24	65%	**223**	123	16	35	0	5	144	144	61%	259
1994	301	103	26	146	257	14	243	9	53	23	65%	**224**	143	32	15	0	5	180	180	61%	318
1995	475	54	21	193	336	19	317	11	69	31	65%	**224**	157	48	49	0	6	211	211	61%	190
1996	360	115	21	173	303	17	286	10	62	28	65%	**225**	169	19	17	0	5	193	193	61%	206
1997	437	71	24	185	323	18	305	11	66	29	65%	**225**	182	3	16	0	6	191	191	61%	270
1998	373	74	26	163	284	16	269	9	59	26	65%	**226**	159	14	16	0	6	178	178	61%	315
1999	443	48	21	180	312	17	295	10	64	28	65%	**227**	163	44	28	0	6	213	213	61%	194
2000	409	88	29	181	316	17	298	10	65	29	65%	**227**	156	25	38	0	5	187	187	61%	371
2001	231	96	28	118	208	11	197	7	43	19	65%	**228**	116	24	12	0	4	144	144	61%	390
2002	89	38	35	46	81	4	77	3	17	7	65%	**228**	46	2	4	0	1	49	49	61%	621

Table 49

Arkansas River Farms No. 110 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	199	0	37	73	126	7	119	4	26	11	65%	**228**	74	5	4	0	2	81	81	61%	624
2004	242	0	27	89	153	8	145	5	32	14	65%	**228**	94	0	0	0	3	97	97	61%	413
2005	322	0	33	118	204	11	193	7	42	19	65%	**228**	113	6	12	0	4	123	123	61%	510
2006	222	40	28	96	167	9	157	6	34	15	65%	**228**	90	7	12	0	3	100	100	61%	444
2007	373	85	26	167	292	16	275	10	60	27	65%	**228**	174	17	5	0	5	196	196	61%	302
2008	313	75	32	141	247	14	233	8	51	23	65%	**228**	141	0	11	0	5	146	146	61%	472
2009	290	60	26	127	222	12	210	7	46	20	65%	**228**	124	11	12	0	4	139	139	61%	354
2010	324	61	31	140	245	13	231	8	50	22	65%	**228**	135	28	16	0	4	167	167	61%	430
2011	248	37	39	104	181	10	171	6	37	17	65%	**228**	111	0	0	0	4	115	115	61%	622
2012	94	39	47	48	85	5	80	3	17	8	65%	**228**	44	8	8	0	1	53	53	61%	843
2013	221	0	42	81	140	8	132	5	29	13	65%	**228**	86	0	0	0	3	88	88	61%	714
2014	311	18	40	120	209	12	197	7	43	19	65%	**228**	126	0	2	0	4	130	130	61%	641
Avg	310	43	27	129	224	12	211	7	46	20	65%	**227**	120	18	18	0	4	142	142	61%	371
Max	533	124	47	229	401	22	379	13	83	37	65%	**230**	227	56	49	0	8	261	261	61%	843
Min	89	0	19	46	81	4	77	3	17	7	65%	**219**	43	0	0	0	1	49	49	61%	190
1979 to 2014																					
Avg	317	59	28	137	239	13	226	8	49	22	65%	**226**	133	14	14	0	4	151	151	61%	389
Max	533	124	47	229	401	22	379	13	83	37	65%	**229**	227	48	49	0	8	261	261	61%	843
Min	89	0	21	46	81	4	77	3	17	7	65%	**219**	44	0	0	0	1	49	49	61%	190

Total No. of Shares	**152**
Trade Shares	**152**
Total Consumptive Use	**151**
Trade Shares Pro Rata CU	**151**

Explanation of Columns

(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Table 50

Arkansas River Farms No. 114 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydrologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year (1)	River Headgate Diversions (2)	Reservoir Releases (3)	Crop Irrigation Reqt (In) (4)	Ditch Loss (5)	Farm Turnout Delivery (6)	Off-Farm Lateral Loss (7)	Farm Delivery (8)	On-Farm Lateral Loss (9)	Initial Deep Percolation (10)	Tail water (11)	Max Farm Efficiency (12)	Irrigated Acreage (13)	Applied Irrigation Water to Crop Consumptive Use (14)	Consumptive Use From Soil Moisture (15)	Applied Irrigation Water to Soil Moisture Storage (16)	Applied Irrigation Water to Additional Deep Perc (17)	SEV Losses (18)	Total Consumptive Use (19)	Prorated Total Consumptive Use (20)	Calculated Actual Farm Efficiency (21)	Crop Consumptive Use Shortage (22)
1950	305	43	22	127	221	12	209	7	46	20	65%	**234**	110	55	25	0	4	169	169	61%	266
1951	294	27	21	117	203	11	192	7	42	19	65%	**234**	114	7	11	0	3	125	125	61%	295
1952	340	5	30	127	219	12	206	7	45	20	65%	**234**	112	26	22	0	4	142	142	61%	448
1953	281	0	27	103	178	10	168	6	37	16	65%	**234**	92	17	17	0	3	112	112	61%	414
1954	153	0	30	56	97	5	91	3	20	9	65%	**234**	41	15	19	0	1	57	57	61%	530
1955	222	6	28	83	144	8	136	5	30	13	65%	**234**	84	8	4	0	2	94	94	61%	464
1956	216	0	27	79	137	8	129	5	28	12	65%	**234**	69	15	15	0	2	86	86	61%	441
1957	423	8	19	158	273	15	258	9	56	25	65%	**234**	137	26	30	0	5	169	169	61%	216
1958	212	78	24	105	184	10	174	6	38	17	65%	**234**	111	6	2	0	4	121	121	61%	346
1959	290	38	25	120	208	11	197	7	43	19	65%	**234**	91	19	37	0	3	113	113	61%	386
1960	281	3	27	104	180	10	170	6	37	16	65%	**234**	83	39	28	0	3	125	125	61%	405
1961	357	5	20	133	229	13	217	8	47	21	65%	**234**	110	37	31	0	4	151	151	61%	248
1962	362	31	25	144	249	14	236	8	51	23	65%	**234**	140	13	13	0	4	157	157	61%	331
1963	225	4	31	84	145	8	137	5	30	13	65%	**234**	58	31	31	0	2	91	91	61%	508
1964	208	0	27	76	132	7	124	4	27	12	65%	**234**	64	17	17	0	2	83	83	61%	442
1965	372	48	20	154	267	15	252	9	55	24	65%	**234**	123	29	41	0	4	156	156	61%	243
1966	244	48	24	106	185	10	175	6	38	17	65%	**234**	107	19	7	0	3	129	129	61%	338
1967	313	47	24	131	228	13	216	8	47	21	65%	**234**	128	12	12	0	4	144	144	61%	322
1968	345	12	23	131	226	12	213	7	46	21	65%	**234**	111	28	28	0	3	142	142	61%	300
1969	380	11	19	143	248	14	234	8	51	23	65%	**234**	125	25	27	0	4	154	154	61%	229
1970	366	39	24	148	257	14	243	9	53	23	65%	**234**	142	14	16	0	5	161	161	61%	310
1971	309	43	24	128	223	12	211	7	46	20	65%	**234**	119	18	18	0	4	141	141	61%	325
1972	270	32	25	110	191	11	181	6	39	17	65%	**234**	98	22	19	0	3	123	123	61%	368
1973	333	33	24	134	232	13	220	8	48	21	65%	**234**	119	23	23	0	4	147	147	61%	329
1974	199	29	29	83	145	8	137	5	30	13	65%	**234**	60	24	29	0	2	86	86	61%	475
1975	321	0	25	118	203	11	192	7	42	19	65%	**234**	104	26	21	0	3	133	133	61%	367
1976	202	18	26	80	139	8	132	5	29	13	65%	**234**	71	8	14	0	2	82	82	61%	420
1977	176	18	28	71	123	7	116	4	25	11	65%	**234**	66	15	9	0	2	83	83	61%	473
1978	243	0	24	89	154	8	145	5	32	14	65%	**234**	74	21	21	0	3	97	97	61%	374
1979	280	36	22	115	200	11	189	7	41	18	65%	**234**	106	13	17	0	4	123	123	61%	308
1980	314	92	27	147	258	14	244	9	53	24	65%	**233**	123	40	36	0	5	167	167	61%	359
1981	153	98	31	91	161	9	152	5	33	15	65%	**233**	92	7	7	0	3	102	102	61%	499
1982	401	34	23	159	276	15	261	9	57	25	65%	**233**	158	8	12	0	5	171	171	61%	280
1983	464	93	27	203	354	19	334	12	73	32	65%	**233**	208	13	9	0	7	228	228	61%	307
1984	505	66	26	209	363	20	343	12	75	33	65%	**229**	193	12	30	0	7	212	212	61%	293
1985	479	118	27	217	380	21	359	13	78	35	65%	**226**	216	24	17	0	7	248	248	61%	268
1986	301	1	25	111	191	11	180	6	39	17	65%	**225**	100	15	17	0	4	119	119	61%	356
1987	413	0	27	152	262	14	247	9	54	24	65%	**224**	152	21	9	0	5	178	178	61%	331
1988	298	113	28	149	262	14	248	9	54	24	65%	**223**	148	13	13	0	5	166	166	61%	360
1989	218	80	26	108	190	10	179	6	39	17	65%	**222**	116	1	1	0	3	120	120	61%	363
1990	261	48	27	113	197	11	186	6	40	18	65%	**221**	118	2	2	0	4	125	125	61%	372
1991	234	65	26	109	190	10	180	6	39	17	65%	**220**	100	17	17	0	3	120	120	61%	351
1992	246	56	21	110	192	11	181	6	40	18	65%	**218**	113	5	5	0	4	121	121	61%	272
1993	314	70	21	140	245	13	231	8	50	22	65%	**217**	117	15	33	0	4	137	137	61%	257
1994	285	98	26	139	244	13	230	8	50	22	65%	**216**	136	30	14	0	4	171	171	61%	312
1995	450	51	21	183	318	18	301	11	66	29	65%	**215**	149	45	46	0	6	200	200	61%	185
1996	341	109	21	164	287	16	271	9	59	26	65%	**214**	160	17	16	0	5	183	183	61%	198
1997	414	67	24	176	306	17	289	10	63	28	65%	**213**	173	3	15	0	6	181	181	61%	255
1998	354	70	26	154	269	15	255	9	56	25	65%	**212**	150	13	15	0	5	169	169	61%	295
1999	420	46	21	170	295	16	279	10	61	27	65%	**211**	155	41	27	0	6	202	202	61%	178
2000	387	83	29	171	299	16	283	10	62	27	65%	**210**	148	24	36	0	5	177	177	61%	340
2001	219	91	28	112	197	11	187	7	41	18	65%	**209**	110	23	12	0	4	136	136	61%	355
2002	84	36	35	44	77	4	73	3	16	7	65%	**209**	44	2	4	0	1	47	47	61%	570

Table 50

Arkansas River Farms No. 114 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	189	0	37	69	119	7	113	4	25	11	65%	**209**	70	5	3	0	2	77	77	61%	572
2004	229	0	27	84	145	8	137	5	30	13	65%	**209**	89	0	0	0	3	92	92	61%	378
2005	306	0	33	112	193	11	183	6	40	18	65%	**209**	107	6	12	0	4	117	117	61%	465
2006	210	38	28	91	158	9	149	5	33	14	65%	**209**	85	6	12	0	3	94	94	61%	406
2007	353	81	26	158	276	15	261	9	57	25	65%	**209**	164	16	6	0	5	186	186	61%	272
2008	296	71	32	134	234	13	221	8	48	21	65%	**209**	133	0	10	0	4	138	138	61%	430
2009	275	57	26	121	211	12	199	7	43	19	65%	**209**	118	10	12	0	4	132	132	61%	322
2010	307	58	31	133	232	13	219	8	48	21	65%	**209**	128	26	15	0	4	158	158	61%	391
2011	235	35	39	99	172	9	162	6	35	16	65%	**209**	105	0	0	0	3	109	109	61%	569
2012	89	37	47	46	80	4	76	3	17	7	65%	**209**	42	7	7	0	1	51	51	61%	774
2013	209	0	42	77	132	7	125	4	27	12	65%	**209**	81	0	0	0	2	84	84	61%	655
2014	295	17	40	114	198	11	187	7	41	18	65%	**209**	119	0	2	0	4	123	123	61%	586
Avg	293	41	27	122	212	12	200	7	44	19	65%	**225**	114	17	17	0	4	134	134	61%	371
Max	505	118	47	217	380	21	359	13	78	35	65%	**234**	216	55	46	0	7	248	248	61%	774
Min	84	0	19	44	77	4	73	3	16	7	65%	**209**	41	0	0	0	1	47	47	61%	178
1979 to 2014																					
Avg	301	56	28	130	227	12	214	7	47	21	65%	**217**	126	13	14	0	4	143	143	61%	375
Max	505	118	47	217	380	21	359	13	78	35	65%	**234**	216	45	46	0	7	248	248	61%	774
Min	84	0	21	44	77	4	73	3	16	7	65%	**209**	42	0	0	0	1	47	47	61%	178

Total No. of Shares	**144**
Trade Shares	**144**
Total Consumptive Use	**143**
Trade Shares Pro Rata CU	**143**

Explanation of Columns

(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Table 51

Arkansas River Farms No. 118 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
1950	487	69	22	203	353	19	334	12	73	32	65%	**186**	168	72	49	0	6	246	246	61%	103
1951	470	42	21	187	325	18	307	11	67	30	65%	**186**	162	28	37	0	5	196	196	61%	141
1952	543	8	30	202	349	19	330	12	72	32	65%	**186**	170	54	45	0	6	229	229	61%	242
1953	449	0	27	165	285	16	269	9	59	26	65%	**186**	134	41	41	0	5	179	179	61%	241
1954	244	0	30	89	154	9	146	5	32	14	65%	**186**	58	31	37	0	2	91	91	61%	377
1955	355	9	28	133	230	13	218	8	47	21	65%	**186**	124	23	17	0	4	151	151	61%	295
1956	345	0	27	126	218	12	206	7	45	20	65%	**186**	96	37	37	0	3	137	137	61%	283
1957	676	13	19	252	436	24	412	14	90	40	65%	**186**	207	52	61	0	8	267	267	61%	43
1958	338	124	24	168	294	16	278	10	61	27	65%	**186**	177	12	4	0	6	195	195	61%	178
1959	463	61	25	191	333	18	315	11	69	30	65%	**186**	135	41	70	0	5	181	181	61%	218
1960	448	5	27	166	287	16	272	10	59	26	65%	**186**	121	73	55	0	4	199	199	61%	224
1961	570	8	20	212	366	20	346	12	75	33	65%	**186**	163	66	62	0	6	234	234	61%	86
1962	578	49	25	230	398	22	376	13	82	36	65%	**186**	213	39	31	0	7	259	259	61%	133
1963	359	6	31	134	231	13	219	8	48	21	65%	**186**	78	64	64	0	3	145	145	61%	333
1964	332	0	27	122	210	12	199	7	43	19	65%	**186**	90	39	39	0	3	132	132	61%	286
1965	595	77	20	245	427	24	403	14	88	39	65%	**186**	171	58	91	0	7	236	236	61%	85
1966	389	76	24	170	296	16	279	10	61	27	65%	**186**	159	51	23	0	5	215	215	61%	158
1967	499	75	24	210	365	20	344	12	75	33	65%	**186**	188	40	36	0	6	234	234	61%	139
1968	550	19	23	209	360	20	341	12	74	33	65%	**186**	155	66	66	0	5	227	227	61%	127
1969	606	18	19	229	395	22	374	13	81	36	65%	**186**	182	58	61	0	6	246	246	61%	62
1970	585	62	24	237	411	23	388	14	85	37	65%	**186**	216	31	36	0	7	255	255	61%	123
1971	493	68	24	205	356	20	337	12	73	32	65%	**186**	171	48	47	0	6	225	225	61%	148
1972	431	51	25	176	306	17	289	10	63	28	65%	**186**	151	44	37	0	5	200	200	61%	193
1973	533	53	24	214	371	20	351	12	77	34	65%	**186**	182	37	46	0	7	226	226	61%	156
1974	318	46	29	133	231	13	218	8	48	21	65%	**186**	90	53	52	0	4	147	147	61%	301
1975	512	0	25	188	324	18	306	11	67	30	65%	**186**	148	59	52	0	5	212	212	61%	188
1976	322	29	26	128	223	12	210	7	46	20	65%	**186**	105	22	32	0	4	130	130	61%	270
1977	281	28	28	113	196	11	185	6	40	18	65%	**186**	95	35	25	0	3	133	133	61%	311
1978	388	0	24	142	245	14	232	8	51	22	65%	**186**	112	39	39	0	4	155	155	61%	222
1979	446	57	22	184	320	18	302	11	66	29	65%	**186**	154	34	42	0	6	194	194	61%	152
1980	501	147	27	235	412	23	390	14	85	38	65%	**186**	196	66	57	0	8	269	269	61%	153
1981	245	157	31	145	257	14	243	9	53	23	65%	**186**	147	11	11	0	5	163	163	61%	319
1982	641	54	23	254	440	24	416	15	91	40	65%	**186**	209	20	61	0	8	237	237	61%	127
1983	741	149	27	324	565	31	534	19	116	52	65%	**186**	301	84	46	0	11	396	396	61%	35
1984	806	106	26	333	579	32	547	19	119	53	65%	**178**	296	34	59	0	11	342	342	61%	57
1985	766	188	27	347	607	33	573	20	125	55	65%	**171**	313	54	60	0	12	379	379	61%	17
1986	480	2	25	177	305	17	288	10	63	28	65%	**171**	159	41	28	0	6	206	206	61%	159
1987	660	0	27	242	418	23	395	14	86	38	65%	**171**	221	41	36	0	8	269	269	61%	125
1988	476	181	28	238	419	23	396	14	86	38	65%	**172**	213	56	44	0	8	276	276	61%	133
1989	348	128	26	173	303	17	287	10	62	28	65%	**172**	173	17	13	0	5	196	196	61%	182
1990	417	77	27	180	314	17	297	10	65	29	65%	**172**	185	7	8	0	6	198	198	61%	193
1991	373	104	26	174	304	17	287	10	63	28	65%	**173**	156	28	30	0	5	190	190	61%	184
1992	392	90	21	176	307	17	290	10	63	28	65%	**173**	175	16	13	0	6	197	197	61%	118
1993	502	113	21	224	391	22	369	13	81	36	65%	**173**	177	35	63	0	7	218	218	61%	99
1994	455	156	26	222	389	21	368	13	80	35	65%	**174**	198	61	41	0	7	266	266	61%	125
1995	719	82	21	293	508	28	480	17	105	46	65%	**174**	209	87	103	0	9	305	305	61%	10
1996	545	174	21	261	458	25	433	15	94	42	65%	**174**	233	64	48	0	8	306	306	61%	8
1997	662	107	24	280	488	27	461	16	101	45	65%	**175**	261	26	39	0	9	296	296	61%	65
1998	565	112	26	247	430	24	407	14	89	39	65%	**175**	239	23	25	0	8	271	271	61%	115
1999	671	73	21	272	472	26	446	16	97	43	65%	**175**	238	67	52	0	9	313	313	61%	6
2000	618	133	29	274	478	26	452	16	98	44	65%	**176**	209	75	85	0	8	292	292	61%	143
2001	350	145	28	179	315	17	298	10	65	29	65%	**176**	157	55	37	0	6	218	218	61%	198
2002	134	58	35	70	123	7	116	4	25	11	65%	**176**	66	7	10	0	2	75	75	61%	445

Table 51

Arkansas River Farms No. 118 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year (1)	River Headgate Diversions (2)	Reservoir Releases (3)	Crop Irrigation Reqt (In) (4)	Ditch Loss (5)	Farm Turnout Delivery (6)	Off-Farm Lateral Loss (7)	Farm Delivery (8)	On-Farm Lateral Loss (9)	Initial Deep Percolation (10)	Tail water (11)	Max Farm Efficiency (12)	Irrigated Acreage (13)	Applied Irrigation Water to Crop Consumptive Use (14)	Consumptive Use From Soil Moisture (15)	Applied Irrigation Water to Soil Moisture Storage (16)	Applied Irrigation Water to Additional Deep Perc (17)	SEV Losses (18)	Total Consumptive Use (19)	Prorated Total Consumptive Use (20)	Calculated Actual Farm Efficiency (21)	Crop Consumptive Use Shortage (22)
2003	301	0	37	111	191	11	180	6	39	17	65%	**176**	112	8	5	0	4	123	123	61%	424
2004	366	0	27	134	232	13	219	8	48	21	65%	**176**	135	7	7	0	4	147	147	61%	250
2005	488	0	33	179	309	17	292	10	64	28	65%	**176**	167	14	23	0	6	187	187	61%	305
2006	335	61	28	145	252	14	238	8	52	23	65%	**176**	130	16	24	0	5	151	151	61%	272
2007	564	129	26	253	441	24	417	15	91	40	65%	**176**	236	46	35	0	8	290	290	61%	99
2008	473	114	32	214	373	21	353	12	77	34	65%	**176**	206	14	23	0	7	227	227	61%	254
2009	439	91	26	193	337	19	318	11	69	31	65%	**176**	184	20	23	0	6	211	211	61%	174
2010	490	92	31	212	370	20	350	12	76	34	65%	**176**	202	44	25	0	7	253	253	61%	212
2011	375	56	39	158	274	15	259	9	57	25	65%	**176**	168	0	0	0	5	174	174	61%	398
2012	142	59	47	73	128	7	121	4	26	12	65%	**176**	67	12	12	0	2	81	81	61%	613
2013	334	0	42	122	211	12	200	7	44	19	65%	**176**	130	0	0	0	4	134	134	61%	488
2014	470	27	40	182	316	17	298	10	65	29	65%	**176**	184	2	10	0	6	192	192	61%	407
Avg	468	65	27	195	339	19	320	11	70	31	65%	**180**	170	39	38	0	6	214	214	61%	196
Max	806	188	47	347	607	33	573	20	125	55	65%	**186**	313	87	103	0	12	396	396	61%	613
Min	134	0	19	70	123	7	116	4	25	11	65%	**171**	58	0	0	0	2	75	75	61%	6
1979 to 2014																					
Avg	480	89	28	208	362	20	342	12	75	33	65%	**176**	189	33	33	0	7	229	229	61%	196
Max	806	188	47	347	607	33	573	20	125	55	65%	**186**	313	87	103	0	12	396	396	61%	613
Min	134	0	21	70	123	7	116	4	25	11	65%	**171**	66	0	0	0	2	75	75	61%	6

Total No. of Shares	**230**
Trade Shares	**230**
Total Consumptive Use	**229**
Trade Shares Pro Rata CU	**229**

Explanation of Columns

(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Table 52

Arkansas River Farms No. 127 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
1950	153	22	22	64	111	6	104	4	23	10	65%	**90**	54	25	14	0	2	81	81	61%	88
1951	147	13	21	59	102	6	96	3	21	9	65%	**90**	55	5	8	0	2	62	62	61%	101
1952	170	2	30	63	109	6	103	4	23	10	65%	**90**	55	15	12	0	2	71	71	61%	157
1953	141	0	27	52	89	5	84	3	18	8	65%	**90**	45	10	10	0	1	56	56	61%	148
1954	76	0	30	28	48	3	46	2	10	4	65%	**90**	20	8	10	0	1	29	29	61%	199
1955	111	3	28	42	72	4	68	2	15	7	65%	**90**	41	5	3	0	1	47	47	61%	169
1956	108	0	27	40	68	4	65	2	14	6	65%	**90**	33	9	9	0	1	43	43	61%	161
1957	212	4	19	79	136	8	129	5	28	12	65%	**90**	68	14	16	0	2	84	84	61%	65
1958	106	39	24	52	92	5	87	3	19	8	65%	**90**	55	3	1	0	2	61	61	61%	120
1959	145	19	25	60	104	6	98	3	21	10	65%	**90**	45	10	19	0	2	57	57	61%	137
1960	140	2	27	52	90	5	85	3	19	8	65%	**90**	40	21	15	0	1	62	62	61%	143
1961	178	3	20	66	115	6	108	4	24	10	65%	**90**	54	20	17	0	2	75	75	61%	80
1962	181	15	25	72	125	7	118	4	26	11	65%	**90**	69	8	8	0	2	79	79	61%	110
1963	112	2	31	42	72	4	68	2	15	7	65%	**90**	27	18	18	0	1	45	45	61%	187
1964	104	0	27	38	66	4	62	2	14	6	65%	**90**	31	10	10	0	1	41	41	61%	162
1965	186	24	20	77	134	7	126	4	28	12	65%	**90**	60	16	22	0	2	78	78	61%	77
1966	122	24	24	53	93	5	87	3	19	8	65%	**90**	53	10	4	0	2	65	65	61%	116
1967	156	23	24	66	114	6	108	4	24	10	65%	**90**	63	7	7	0	2	72	72	61%	109
1968	172	6	23	65	113	6	107	4	23	10	65%	**90**	52	17	17	0	2	71	71	61%	100
1969	190	6	19	72	124	7	117	4	26	11	65%	**90**	60	15	16	0	2	77	77	61%	71
1970	183	19	24	74	129	7	122	4	27	12	65%	**90**	70	8	9	0	2	81	81	61%	102
1971	154	21	24	64	112	6	105	4	23	10	65%	**90**	57	11	11	0	2	70	70	61%	110
1972	135	16	25	55	96	5	90	3	20	9	65%	**90**	48	12	10	0	2	62	62	61%	128
1973	167	16	24	67	116	6	110	4	24	11	65%	**90**	58	13	13	0	2	74	74	61%	111
1974	99	14	29	42	72	4	68	2	15	7	65%	**90**	29	13	15	0	1	43	43	61%	174
1975	160	0	25	59	101	6	96	3	21	9	65%	**90**	49	15	13	0	2	66	66	61%	127
1976	101	9	26	40	70	4	66	2	14	6	65%	**90**	35	5	8	0	1	41	41	61%	153
1977	88	9	28	35	61	3	58	2	13	6	65%	**90**	33	8	5	0	1	42	42	61%	174
1978	121	0	24	45	77	4	73	3	16	7	65%	**90**	36	11	11	0	1	48	48	61%	134
1979	140	18	22	58	100	6	95	3	21	9	65%	**90**	51	8	11	0	2	61	61	61%	106
1980	157	46	27	74	129	7	122	4	27	12	65%	**90**	61	20	18	0	2	84	84	61%	120
1981	77	49	31	45	80	4	76	3	17	7	65%	**90**	46	4	4	0	1	51	51	61%	182
1982	201	17	23	80	138	8	130	5	28	13	65%	**90**	73	5	11	0	2	80	80	61%	95
1983	232	46	27	101	177	10	167	6	36	16	65%	**90**	103	12	5	0	3	119	119	61%	89
1984	252	33	26	104	181	10	171	6	37	17	65%	**93**	96	6	15	0	3	106	106	61%	99
1985	240	59	27	109	190	10	179	6	39	17	65%	**95**	107	14	10	0	4	124	124	61%	94
1986	150	0	25	55	96	5	90	3	20	9	65%	**95**	50	7	8	0	2	59	59	61%	141
1987	207	0	27	76	131	7	124	4	27	12	65%	**94**	76	11	4	0	2	89	89	61%	126
1988	149	57	28	75	131	7	124	4	27	12	65%	**94**	73	7	7	0	2	83	83	61%	139
1989	109	40	26	54	95	5	90	3	20	9	65%	**93**	57	1	1	0	2	60	60	61%	144
1990	130	24	27	56	98	5	93	3	20	9	65%	**93**	59	1	1	0	2	62	62	61%	147
1991	117	33	26	54	95	5	90	3	20	9	65%	**92**	50	9	9	0	2	60	60	61%	139
1992	123	28	21	55	96	5	91	3	20	9	65%	**92**	56	3	3	0	2	61	61	61%	105
1993	157	35	21	70	122	7	116	4	25	11	65%	**91**	58	8	17	0	2	68	68	61%	97
1994	142	49	26	69	122	7	115	4	25	11	65%	**91**	67	15	8	0	2	85	85	61%	118
1995	225	26	21	92	159	9	150	5	33	15	65%	**90**	72	24	25	0	3	99	99	61%	63
1996	171	54	21	82	143	8	135	5	30	13	65%	**90**	79	11	9	0	3	93	93	61%	67
1997	207	33	24	88	153	8	144	5	31	14	65%	**89**	86	2	8	0	3	90	90	61%	93
1998	177	35	26	77	135	7	127	4	28	12	65%	**89**	75	7	8	0	3	84	84	61%	110
1999	210	23	21	85	148	8	140	5	30	13	65%	**88**	77	21	14	0	3	101	101	61%	59
2000	194	42	29	86	150	8	141	5	31	14	65%	**88**	71	15	21	0	3	89	89	61%	128
2001	109	45	28	56	99	5	93	3	20	9	65%	**88**	53	13	8	0	2	68	68	61%	138
2002	42	18	35	22	38	2	36	1	8	4	65%	**88**	21	1	2	0	1	23	23	61%	235

Table 52

Arkansas River Farms No. 127 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	94	0	37	35	60	3	56	2	12	5	65%	88	35	3	2	0	1	39	39	61%	233
2004	115	0	27	42	73	4	69	2	15	7	65%	88	45	0	0	0	1	46	46	61%	151
2005	153	0	33	56	97	5	91	3	20	9	65%	88	53	3	6	0	2	58	58	61%	185
2006	105	19	28	45	79	4	75	3	16	7	65%	88	42	4	6	0	1	47	47	61%	162
2007	177	40	26	79	138	8	130	5	28	13	65%	88	80	10	5	0	3	93	93	61%	99
2008	148	36	32	67	117	6	110	4	24	11	65%	88	67	0	5	0	2	69	69	61%	169
2009	137	28	26	60	105	6	100	3	22	10	65%	88	59	5	6	0	2	66	66	61%	124
2010	153	29	31	66	116	6	109	4	24	11	65%	88	64	13	8	0	2	79	79	61%	151
2011	117	18	39	49	86	5	81	3	18	8	65%	88	53	0	0	0	2	54	54	61%	229
2012	44	19	47	23	40	2	38	1	8	4	65%	88	21	4	4	0	1	25	25	61%	319
2013	104	0	42	38	66	4	62	2	14	6	65%	88	41	0	0	0	1	42	42	61%	267
2014	147	9	40	57	99	5	93	3	20	9	65%	88	59	0	1	0	2	61	61	61%	236
Avg	147	20	27	61	106	6	100	4	22	10	65%	90	56	9	9	0	2	67	67	61%	137
Max	252	59	47	109	190	10	179	6	39	17	65%	95	107	25	25	0	4	124	124	61%	319
Min	42	0	19	22	38	2	36	1	8	4	65%	88	20	0	0	0	1	23	23	61%	59
1979 to 2014																					
Avg	150	28	28	65	113	6	107	4	23	10	65%	90	62	7	7	0	2	72	72	61%	143
Max	252	59	47	109	190	10	179	6	39	17	65%	95	107	24	25	0	4	124	124	61%	319
Min	42	0	21	22	38	2	36	1	8	4	65%	88	21	0	0	0	1	23	23	61%	59

Explanation of Columns

(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Total No. of Shares	72
Trade Shares	72
Total Consumptive Use	72
Trade Shares Pro Rata CU	72

Table 53

Arkansas River Farms No. 132/133 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year (1)	River Headgate Diversions (2)	Reservoir Releases (3)	Crop Irrigation Reqt (In) (4)	Ditch Loss (5)	Farm Turnout Delivery (6)	Off-Farm Lateral Loss (7)	Farm Delivery (8)	On-Farm Lateral Loss (9)	Initial Deep Percolation (10)	Tail water (11)	Max Farm Efficiency (12)	Irrigated Acreage (13)	Applied Irrigation Water to Crop Consumptive Use (14)	Consumptive Use From Soil Moisture (15)	Applied Irrigation Water to Soil Moisture Storage (16)	Applied Irrigation Water to Additional Deep Perc (17)	SEV Losses (18)	Total Consumptive Use (19)	Prorated Total Consumptive Use (20)	Calculated Actual Farm Efficiency (21)	Crop Consumptive Use Shortage (22)
1950	561	79	22	234	407	22	384	13	84	37	65%	**184**	191	82	59	0	14	287	287	61%	66
1951	541	49	21	216	374	21	354	12	77	34	65%	**184**	182	37	48	0	14	233	233	61%	109
1952	626	9	30	233	402	22	380	13	83	37	65%	**185**	194	64	53	0	15	273	273	61%	204
1953	518	0	27	190	328	18	310	11	68	30	65%	**185**	152	50	50	0	12	213	213	61%	212
1954	281	0	30	103	178	10	168	6	37	16	65%	**185**	65	38	44	0	5	108	108	61%	362
1955	409	10	28	154	265	15	251	9	55	24	65%	**181**	141	28	21	0	10	179	179	61%	261
1956	397	0	27	146	251	14	237	8	52	23	65%	**177**	108	46	46	0	8	163	163	61%	243
1957	779	15	19	291	502	28	475	17	103	46	65%	**173**	228	54	81	0	20	301	301	61%	0
1958	389	143	24	193	339	19	321	11	70	31	65%	**169**	203	32	6	0	15	250	250	61%	100
1959	533	71	25	221	384	21	362	13	79	35	65%	**165**	151	52	85	0	13	215	215	61%	147
1960	517	6	27	192	331	18	313	11	68	30	65%	**161**	136	87	67	0	11	234	234	61%	139
1961	657	10	20	244	422	23	399	14	87	38	65%	**157**	177	77	82	0	15	269	269	61%	10
1962	667	57	25	265	459	25	433	15	95	42	65%	**153**	231	62	50	0	18	311	311	61%	23
1963	414	7	31	154	267	15	252	9	55	24	65%	**149**	85	83	78	0	7	175	175	61%	212
1964	383	0	27	140	242	13	229	8	50	22	65%	**145**	94	55	55	0	8	156	156	61%	174
1965	685	89	20	283	492	27	464	16	101	45	65%	**141**	170	67	132	0	17	255	255	61%	0
1966	448	88	24	195	341	19	322	11	70	31	65%	**136**	167	87	42	0	13	267	267	61%	16
1967	575	86	24	241	420	23	397	14	87	38	65%	**132**	192	69	66	0	15	276	276	61%	0
1968	634	22	23	240	415	23	392	14	86	38	65%	**128**	163	77	92	0	14	254	254	61%	0
1969	699	21	19	264	456	25	430	15	94	42	65%	**124**	175	26	89	15	16	218	218	58%	0
1970	674	72	24	273	473	26	447	16	98	43	65%	**120**	203	37	47	40	19	258	258	53%	0
1971	568	78	24	236	411	23	388	14	85	37	65%	**116**	183	47	12	57	15	244	244	47%	0
1972	497	59	25	203	352	19	333	12	73	32	65%	**112**	157	77	40	19	12	246	246	56%	0
1973	614	61	24	247	428	24	404	14	88	39	65%	**108**	181	36	81	0	17	235	235	61%	0
1974	366	53	29	153	266	15	251	9	55	24	65%	**104**	99	88	34	30	9	196	196	50%	61
1975	590	0	25	217	374	21	353	12	77	34	65%	**100**	146	66	84	0	13	225	225	61%	0
1976	371	33	26	148	257	14	242	8	53	23	65%	**111**	112	63	45	0	9	184	184	61%	61
1977	323	33	28	130	226	12	213	7	47	21	65%	**121**	95	57	44	0	7	158	158	61%	137
1978	447	0	24	164	283	16	267	9	58	26	65%	**132**	121	53	53	0	10	184	184	61%	91
1979	514	66	22	212	368	20	348	12	76	34	65%	**143**	172	44	54	0	15	231	231	61%	46
1980	577	169	27	271	475	26	449	16	98	43	65%	**154**	226	77	66	0	19	322	322	61%	40
1981	282	181	31	167	296	16	280	10	61	27	65%	**165**	169	13	13	0	12	194	194	61%	240
1982	738	62	23	293	507	28	479	17	105	46	65%	**175**	231	25	81	0	20	276	276	61%	79
1983	853	171	27	373	651	36	615	22	134	59	65%	**186**	336	85	64	0	27	448	448	61%	0
1984	929	122	26	384	667	37	630	22	138	61	65%	**190**	339	74	71	0	28	441	441	61%	0
1985	882	217	27	400	699	38	661	23	144	64	65%	**194**	359	68	70	0	29	457	457	61%	11
1986	553	2	25	204	352	19	332	12	72	32	65%	**194**	183	48	33	0	15	246	246	61%	177
1987	760	0	27	279	481	27	455	16	99	44	65%	**194**	253	47	43	0	19	320	320	61%	137
1988	549	208	28	275	483	27	456	16	99	44	65%	**193**	244	66	53	0	19	329	329	61%	143
1989	401	147	26	199	349	19	330	12	72	32	65%	**193**	199	21	16	0	14	234	234	61%	197
1990	480	89	27	207	362	20	342	12	75	33	65%	**193**	212	9	10	0	15	236	236	61%	209
1991	430	120	26	200	350	19	331	12	72	32	65%	**192**	180	33	35	0	13	226	226	61%	197
1992	452	103	21	202	353	19	334	12	73	32	65%	**192**	202	19	15	0	14	235	235	61%	122
1993	578	130	21	258	450	25	425	15	93	41	65%	**191**	202	41	74	0	18	261	261	61%	99
1994	524	180	26	255	448	25	424	15	92	41	65%	**191**	226	71	49	0	18	315	315	61%	124
1995	828	94	21	337	585	32	553	19	121	53	65%	**191**	237	99	122	0	23	359	359	61%	0
1996	628	200	21	301	528	29	499	17	109	48	65%	**190**	265	68	59	0	20	354	354	61%	0
1997	762	123	24	323	562	31	531	19	116	51	65%	**190**	296	47	50	0	23	366	366	61%	40
1998	651	129	26	284	496	27	469	16	102	45	65%	**190**	272	33	32	0	21	326	326	61%	104
1999	773	84	21	313	544	30	514	18	112	50	65%	**189**	273	62	61	0	23	358	358	61%	0
2000	712	154	29	315	551	30	520	18	113	50	65%	**189**	238	105	100	0	20	363	363	61%	116
2001	403	167	28	207	363	20	343	12	75	33	65%	**188**	179	65	44	0	15	259	259	61%	195
2002	155	67	35	80	141	8	134	5	29	13	65%	**188**	75	9	12	0	5	89	89	61%	470

Table 53

Arkansas River Farms No. 132/133 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	347	0	37	127	220	12	207	7	45	20	65%	**188**	129	9	6	0	9	147	147	61%	444
2004	422	0	27	155	267	15	252	9	55	24	65%	**188**	154	10	10	0	11	175	175	61%	256
2005	562	0	33	206	356	20	336	12	73	32	65%	**188**	192	16	27	0	15	223	223	61%	312
2006	387	70	28	167	290	16	274	10	60	26	65%	**188**	149	19	29	0	11	180	180	61%	279
2007	650	149	26	291	508	28	480	17	105	46	65%	**188**	263	60	49	0	21	344	344	61%	84
2008	545	131	32	246	430	24	407	14	89	39	65%	**188**	236	18	28	0	18	272	272	61%	253
2009	505	105	26	222	388	21	366	13	80	35	65%	**188**	212	24	26	0	16	251	251	61%	169
2010	564	106	31	245	426	23	403	14	88	39	65%	**188**	232	51	30	0	17	300	300	61%	207
2011	432	65	39	182	316	17	299	10	65	29	65%	**188**	194	0	0	0	14	208	208	61%	412
2012	163	68	47	84	147	8	139	5	30	13	65%	**188**	77	14	14	0	5	96	96	61%	650
2013	384	0	42	141	243	13	230	8	50	22	65%	**188**	149	0	0	0	10	159	159	61%	512
2014	542	32	40	210	364	20	344	12	75	33	65%	**188**	211	3	12	0	16	230	230	61%	421
Avg	540	75	27	224	390	22	369	13	80	36	65%	**169**	189	48	48	3	15	252	252	61%	144
Max	929	217	47	400	699	38	661	23	144	64	65%	**194**	359	105	132	57	29	457	457	61%	650
Min	155	0	19	80	141	8	134	5	29	13	65%	**100**	65	0	0	0	5	89	89	47%	0
1979 to 2014																					
Avg	553	103	28	239	417	23	394	14	86	38	65%	**187**	216	40	40	0	17	273	273	61%	187
Max	929	217	47	400	699	38	661	23	144	64	65%	**194**	359	105	122	0	29	457	457	61%	650
Min	155	0	21	80	141	8	134	5	29	13	65%	**143**	75	0	0	0	5	89	89	61%	0

Total No. of Shares	**265**
Trade Shares	**265**
Total Consumptive Use	**273**
Trade Shares Pro Rata CU	**273**

Explanation of Columns

(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Table 54

Arkansas River Farms No. 141 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
1950	474	67	22	198	344	19	325	11	71	31	65%	**224**	166	73	45	0	6	245	245	61%	173
1951	458	41	21	182	316	17	299	10	65	29	65%	**224**	164	22	30	0	5	192	192	61%	212
1952	529	7	30	197	340	19	321	11	70	31	65%	**224**	167	49	41	0	6	223	223	61%	343
1953	438	0	27	161	277	15	262	9	57	25	65%	**224**	134	36	36	0	5	175	175	61%	330
1954	237	0	30	87	150	8	142	5	31	14	65%	**224**	59	27	33	0	2	89	89	61%	473
1955	345	9	28	130	224	12	212	7	46	20	65%	**224**	124	19	14	0	4	147	147	61%	388
1956	336	0	27	123	212	12	201	7	44	19	65%	**224**	98	33	33	0	3	134	134	61%	371
1957	658	12	19	246	425	23	401	14	87	39	65%	**224**	205	47	55	0	8	260	260	61%	110
1958	329	121	24	163	287	16	271	9	59	26	65%	**224**	173	11	4	0	6	190	190	61%	259
1959	451	60	25	186	324	18	306	11	67	30	65%	**224**	134	37	65	0	5	176	176	61%	303
1960	437	5	27	162	280	15	264	9	58	26	65%	**224**	120	69	51	0	4	194	194	61%	314
1961	555	8	20	207	357	20	337	12	73	33	65%	**224**	162	63	57	0	6	230	230	61%	153
1962	563	48	25	224	388	21	366	13	80	35	65%	**224**	211	32	27	0	7	250	250	61%	220
1963	350	6	31	131	225	12	213	7	46	21	65%	**224**	79	59	59	0	3	141	141	61%	433
1964	324	0	27	119	205	11	193	7	42	19	65%	**224**	92	34	34	0	3	129	129	61%	374
1965	579	75	20	239	415	23	393	14	86	38	65%	**224**	175	54	80	0	7	235	235	61%	149
1966	379	74	24	165	288	16	272	10	59	26	65%	**224**	159	42	18	0	5	206	206	61%	242
1967	486	73	24	204	355	20	335	12	73	32	65%	**224**	189	32	29	0	6	226	226	61%	221
1968	536	18	23	203	351	19	332	12	72	32	65%	**224**	157	59	59	0	5	221	221	61%	204
1969	591	17	19	223	385	21	364	13	79	35	65%	**224**	181	53	55	0	6	240	240	61%	129
1970	570	61	24	230	400	22	378	13	82	36	65%	**224**	215	28	31	0	7	251	251	61%	203
1971	480	66	24	200	347	19	328	11	72	32	65%	**224**	173	38	40	0	6	217	217	61%	230
1972	420	49	25	171	298	16	281	10	61	27	65%	**224**	149	40	34	0	5	194	194	61%	277
1973	519	51	24	208	362	20	342	12	75	33	65%	**224**	179	40	43	0	7	225	225	61%	233
1974	309	45	29	129	225	12	213	7	46	21	65%	**224**	89	45	49	0	4	138	138	61%	401
1975	499	0	25	183	316	17	298	10	65	29	65%	**224**	148	53	46	0	5	206	206	61%	274
1976	314	28	26	125	217	12	205	7	45	20	65%	**224**	106	18	28	0	4	127	127	61%	354
1977	273	27	28	110	191	11	180	6	39	17	65%	**224**	97	30	20	0	3	130	130	61%	403
1978	378	0	24	139	239	13	226	8	49	22	65%	**224**	110	37	37	0	4	151	151	61%	301
1979	435	55	22	179	311	17	294	10	64	28	65%	**224**	154	30	37	0	6	189	189	61%	225
1980	488	143	27	229	402	22	380	13	83	37	65%	**224**	191	64	56	0	7	262	262	61%	245
1981	238	153	31	141	250	14	237	8	52	23	65%	**224**	143	11	11	0	5	158	158	61%	419
1982	624	52	23	247	429	24	405	14	88	39	65%	**224**	214	17	49	0	8	239	239	61%	196
1983	721	145	27	316	550	30	520	18	113	50	65%	**224**	309	61	29	0	10	381	381	61%	135
1984	785	103	26	324	564	31	533	19	116	51	65%	**216**	293	26	54	0	11	329	329	61%	152
1985	746	183	27	338	591	33	558	20	122	54	65%	**209**	321	45	42	0	11	377	377	61%	106
1986	468	2	25	172	297	16	281	10	61	27	65%	**210**	156	31	26	0	6	192	192	61%	254
1987	643	0	27	236	407	22	384	13	84	37	65%	**211**	231	33	19	0	8	272	272	61%	210
1988	464	176	28	232	408	22	386	13	84	37	65%	**211**	221	34	29	0	7	263	263	61%	240
1989	339	124	26	168	295	16	279	10	61	27	65%	**212**	172	9	9	0	5	187	187	61%	277
1990	406	75	27	175	306	17	289	10	63	28	65%	**213**	183	5	5	0	6	194	194	61%	287
1991	363	102	26	169	296	16	280	10	61	27	65%	**213**	155	27	27	0	5	187	187	61%	273
1992	382	87	21	171	299	16	282	10	62	27	65%	**214**	172	12	12	0	6	189	189	61%	198
1993	489	110	21	218	380	21	360	13	78	35	65%	**215**	179	26	54	0	7	213	213	61%	178
1994	443	152	26	216	379	21	358	13	78	35	65%	**215**	201	53	32	0	7	261	261	61%	221
1995	700	79	21	285	495	27	467	16	102	45	65%	**216**	216	80	88	0	9	305	305	61%	84
1996	531	169	21	254	446	25	421	15	92	41	65%	**217**	239	44	34	0	8	292	292	61%	96
1997	644	104	24	273	475	26	449	16	98	43	65%	**217**	262	15	30	0	9	286	286	61%	161
1998	550	109	26	240	419	23	396	14	86	38	65%	**218**	234	21	24	0	8	263	263	61%	215
1999	653	71	21	265	460	25	434	15	95	42	65%	**218**	235	65	47	0	9	309	309	61%	87
2000	602	130	29	267	465	26	440	15	96	42	65%	**219**	212	61	74	0	8	281	281	61%	260
2001	341	141	28	175	307	17	290	10	63	28	65%	**220**	158	48	30	0	6	212	212	61%	306
2002	131	56	35	68	120	7	113	4	25	11	65%	**220**	65	6	8	0	2	73	73	61%	575

Table 54

Arkansas River Farms No. 141 - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	293	0	37	108	186	10	175	6	38	17	65%	**220**	109	8	5	0	3	120	120	61%	562
2004	357	0	27	131	226	12	213	7	47	21	65%	**220**	136	3	3	0	4	143	143	61%	351
2005	475	0	33	174	301	17	284	10	62	27	65%	**220**	164	12	21	0	6	182	182	61%	431
2006	327	59	28	141	245	14	232	8	51	22	65%	**220**	130	13	21	0	4	147	147	61%	380
2007	550	126	26	246	430	24	406	14	89	39	65%	**220**	241	37	23	0	8	285	285	61%	198
2008	461	111	32	208	364	20	344	12	75	33	65%	**220**	206	5	17	0	7	218	218	61%	381
2009	427	89	26	188	328	18	310	11	68	30	65%	**220**	181	18	20	0	6	205	205	61%	273
2010	477	90	31	207	360	20	341	12	74	33	65%	**220**	197	42	24	0	7	246	246	61%	333
2011	365	55	39	153	267	15	252	9	55	24	65%	**220**	164	0	0	0	5	169	169	61%	543
2012	138	58	47	71	125	7	118	4	26	11	65%	**220**	65	11	11	0	2	79	79	61%	787
2013	325	0	42	119	206	11	194	7	42	19	65%	**220**	126	0	0	0	4	130	130	61%	646
2014	458	27	40	178	307	17	290	10	63	28	65%	**220**	182	1	7	0	6	189	189	61%	558
Avg	456	63	27	190	330	18	312	11	68	30	65%	**220**	170	33	33	0	6	209	209	61%	291
Max	785	183	47	338	591	33	558	20	122	54	65%	**224**	321	80	88	0	11	381	381	61%	787
Min	131	0	19	68	120	7	113	4	25	11	65%	**209**	59	0	0	0	2	73	73	61%	84
1979 to 2014																					
Avg	468	87	28	202	353	19	333	12	73	32	65%	**218**	189	27	27	0	7	223	223	61%	301
Max	785	183	47	338	591	33	558	20	122	54	65%	**224**	321	80	88	0	11	381	381	61%	787
Min	131	0	21	68	120	7	113	4	25	11	65%	**209**	65	0	0	0	2	73	73	61%	84

Total No. of Shares	**224**
Trade Shares	**224**
Total Consumptive Use	**223**
Trade Shares Pro Rata CU	**223**

Explanation of Columns
(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

Table 55

Arkansas River Farms B. Coen Farm - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
1950	305	43	22	127	221	12	209	7	46	20	65%	**125**	106	46	30	0	4	155	155	61%	79
1951	294	27	21	117	203	11	192	7	42	19	65%	**125**	103	17	22	0	3	123	123	61%	103
1952	340	5	30	127	219	12	206	7	45	20	65%	**125**	107	33	28	0	4	143	143	61%	173
1953	281	0	27	103	178	10	168	6	37	16	65%	**125**	84	25	25	0	3	112	112	61%	170
1954	153	0	30	56	97	5	91	3	20	9	65%	**125**	37	19	22	0	1	57	57	61%	256
1955	222	6	28	83	144	8	136	5	30	13	65%	**125**	78	14	10	0	2	94	94	61%	205
1956	216	0	27	79	137	8	129	5	28	12	65%	**126**	61	23	23	0	2	86	86	61%	198
1957	423	8	19	158	273	15	258	9	56	25	65%	**126**	130	32	37	0	5	167	167	61%	43
1958	212	78	24	105	184	10	174	6	38	17	65%	**127**	111	8	2	0	4	122	122	61%	132
1959	290	38	25	120	208	11	197	7	43	19	65%	**127**	85	25	43	0	3	113	113	61%	160
1960	281	3	27	104	180	10	170	6	37	16	65%	**128**	76	45	34	0	3	125	125	61%	166
1961	357	5	20	133	229	13	217	8	47	21	65%	**128**	103	41	38	0	4	147	147	61%	73
1962	362	31	25	144	249	14	236	8	51	23	65%	**129**	135	22	19	0	4	161	161	61%	110
1963	225	4	31	84	145	8	137	5	30	13	65%	**130**	50	39	39	0	2	91	91	61%	242
1964	208	0	27	76	132	7	124	4	27	12	65%	**130**	58	23	23	0	2	83	83	61%	210
1965	372	48	20	154	267	15	252	9	55	24	65%	**131**	110	35	54	0	4	150	150	61%	75
1966	244	48	24	106	185	10	175	6	38	17	65%	**131**	101	30	13	0	3	134	134	61%	130
1967	313	47	24	131	228	13	216	8	47	21	65%	**132**	120	22	20	0	4	146	146	61%	118
1968	345	12	23	131	226	12	213	7	46	21	65%	**132**	100	39	39	0	3	142	142	61%	110
1969	380	11	19	143	248	14	234	8	51	23	65%	**133**	116	35	36	0	4	154	154	61%	65
1970	366	39	24	148	257	14	243	9	53	23	65%	**133**	138	19	20	0	5	161	161	61%	110
1971	309	43	24	128	223	12	211	7	46	20	65%	**134**	110	26	27	0	4	140	140	61%	129
1972	270	32	25	110	191	11	181	6	39	17	65%	**135**	96	26	22	0	3	125	125	61%	159
1973	333	33	24	134	232	13	220	8	48	21	65%	**135**	115	25	28	0	4	144	144	61%	133
1974	199	29	29	83	145	8	137	5	30	13	65%	**136**	57	30	32	0	2	90	90	61%	237
1975	321	0	25	118	203	11	192	7	42	19	65%	**136**	94	35	30	0	3	133	133	61%	160
1976	202	18	26	80	139	8	132	5	29	13	65%	**137**	67	12	18	0	2	82	82	61%	212
1977	176	18	28	71	123	7	116	4	25	11	65%	**137**	62	20	14	0	2	83	83	61%	243
1978	243	0	24	89	154	8	145	5	32	14	65%	**137**	71	24	24	0	3	97	97	61%	180
1979	280	36	22	115	200	11	189	7	41	18	65%	**138**	98	20	25	0	4	122	122	61%	134
1980	314	92	27	147	258	14	244	9	53	24	65%	**138**	123	41	36	0	5	168	168	61%	144
1981	153	98	31	91	161	9	152	5	33	15	65%	**138**	92	7	7	0	3	102	102	61%	255
1982	401	34	23	159	276	15	261	9	57	25	65%	**139**	136	11	33	0	5	152	152	61%	117
1983	464	93	27	203	354	19	334	12	73	32	65%	**139**	197	42	20	0	7	246	246	61%	75
1984	505	66	26	209	363	20	343	12	75	33	65%	**146**	189	16	34	0	7	212	212	61%	112
1985	479	118	27	217	380	21	359	13	78	35	65%	**153**	211	30	23	0	7	248	248	61%	104
1986	301	1	25	111	191	11	180	6	39	17	65%	**152**	100	16	17	0	4	120	120	61%	202
1987	413	0	27	152	262	14	247	9	54	24	65%	**151**	152	21	9	0	5	178	178	61%	167
1988	298	113	28	149	262	14	248	9	54	24	65%	**150**	144	17	17	0	5	166	166	61%	190
1989	218	80	26	108	190	10	179	6	39	17	65%	**149**	112	5	5	0	3	120	120	61%	205
1990	261	48	27	113	197	11	186	6	40	18	65%	**148**	118	3	3	0	4	125	125	61%	209
1991	234	65	26	109	190	10	180	6	39	17	65%	**146**	100	17	17	0	3	120	120	61%	196
1992	246	56	21	110	192	11	181	6	40	18	65%	**145**	111	7	7	0	4	121	121	61%	142
1993	314	70	21	140	245	13	231	8	50	22	65%	**144**	116	16	34	0	4	137	137	61%	126
1994	285	98	26	139	244	13	230	8	50	22	65%	**143**	130	33	20	0	4	168	168	61%	153
1995	450	51	21	183	318	18	301	11	66	29	65%	**142**	139	51	56	0	6	196	196	61%	60
1996	341	109	21	164	287	16	271	9	59	26	65%	**141**	154	28	22	0	5	187	187	61%	65
1997	414	67	24	176	306	17	289	10	63	28	65%	**140**	169	9	19	0	6	184	184	61%	105
1998	354	70	26	154	269	15	255	9	56	25	65%	**139**	150	13	15	0	5	169	169	61%	136
1999	420	46	21	170	295	16	279	10	61	27	65%	**138**	151	42	30	0	6	198	198	61%	52
2000	387	83	29	171	299	16	283	10	62	27	65%	**137**	135	40	48	0	5	181	181	61%	157
2001	219	91	28	112	197	11	187	7	41	18	65%	**136**	101	32	20	0	4	136	136	61%	184
2002	84	36	35	44	77	4	73	3	16	7	65%	**136**	42	4	5	0	1	47	47	61%	354

Table 55

Arkansas River Farms B. Coen Farm - Consumptive Use Analysis - Fort Lyon Canal Water Rights

Analysis Using Hydologic-Institutional Model (HI Model) Factors and Historically Irrigated Acres

(units of ac-ft unless noted)

36.7% <---- Ditch Loss (%) **35.1%** <---- Res. Rel. Ditch Loss (%) **3.5%** <---- On-Farm Lateral Loss (%) **10.0%** <---- Tail Water (%) **16.9%** <---- Available Water Holding Capacity (%)
3.5% <---- Off-Farm Lateral Loss (%) **22.6%** <---- Initial Deep Percolation (%) **15.0%** <---- Starting Soil Moisture Storage Content (%) **4.9** <---- Average Rooting Depth (feet)

Irrigation Year	River Headgate Diversions	Reservoir Releases	Crop Irrigation Reqt (In)	Ditch Loss	Farm Turnout Delivery	Off-Farm Lateral Loss	Farm Delivery	On-Farm Lateral Loss	Initial Deep Percolation	Tail water	Max Farm Efficiency	Irrigated Acreage	Applied Irrigation Water to Crop Consumptive Use	Consumptive Use From Soil Moisture	Applied Irrigation Water to Soil Moisture Storage	Applied Irrigation Water to Additional Deep Perc	SEV Losses	Total Consumptive Use	Prorated Total Consumptive Use	Calculated Actual Farm Efficiency	Crop Consumptive Use Shortage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
2003	189	0	37	69	119	7	113	4	25	11	65%	**136**	70	5	3	0	2	77	77	61%	345
2004	229	0	27	84	145	8	137	5	30	13	65%	**136**	87	2	2	0	3	92	92	61%	214
2005	306	0	33	112	193	11	183	6	40	18	65%	**136**	105	8	14	0	4	117	117	61%	262
2006	210	38	28	91	158	9	149	5	33	14	65%	**136**	83	9	14	0	3	94	94	61%	231
2007	353	81	26	158	276	15	261	9	57	25	65%	**136**	154	24	16	0	5	183	183	61%	116
2008	296	71	32	134	234	13	221	8	48	21	65%	**136**	132	4	12	0	4	140	140	61%	230
2009	275	57	26	121	211	12	199	7	43	19	65%	**136**	116	12	13	0	4	132	132	61%	164
2010	307	58	31	133	232	13	219	8	48	21	65%	**136**	127	27	16	0	4	158	158	61%	200
2011	235	35	39	99	172	9	162	6	35	16	65%	**136**	105	0	0	0	3	109	109	61%	332
2012	89	37	47	46	80	4	76	3	17	7	65%	**136**	42	7	7	0	1	51	51	61%	485
2013	209	0	42	77	132	7	125	4	27	12	65%	**136**	81	0	0	0	2	84	84	61%	396
2014	295	17	40	114	198	11	187	7	41	18	65%	**136**	116	1	5	0	4	121	121	61%	340
Avg	293	41	27	122	212	12	200	7	44	19	65%	**136**	109	22	21	0	4	134	134	61%	174
Max	505	118	47	217	380	21	359	13	78	35	65%	**153**	211	51	56	0	7	248	248	61%	485
Min	84	0	19	44	77	4	73	3	16	7	65%	**125**	37	0	0	0	1	47	47	61%	43
1979 to 2014																					
Avg	301	56	28	130	227	12	214	7	47	21	65%	**140**	122	17	17	0	4	143	143	61%	193
Max	505	118	47	217	380	21	359	13	78	35	65%	**153**	211	51	56	0	7	248	248	61%	485
Min	84	0	21	44	77	4	73	3	16	7	65%	**136**	42	0	0	0	1	47	47	61%	52

Total No. of Shares	144
Trade Shares	144
Total Consumptive Use	143
Trade Shares Pro Rata CU	143

Explanation of Columns

(1) November - October Irrigation Year
(2) Diversions from Table 3.
(3) Diversions from Tables 4 through 7.
(4) Crop Irrigation Requirement from Column 14 of Table 12.
(5) Calculated as Column 2 x Ditch Loss Percentage + Column 3 x Reservoir Release Ditch Loss Percentage
(6) Calculated as Column 2 + Column 3 - Column 5
(7) Calculated as (Column 2 + Columne 3) x Off-Farm Later Loss Percentage
(8) Calculated as Column 6 - Column 7
(9) Calculated as Column 8 x On-Farm Lateral Loss Percentage
(10) Calculated as (Column 8 - Column 9) x Initial Deep Percolation Percentage
(11) Calculated as (Column 8 - Column 9) x Tail Water Percentage
(12) Maximum farm efficiency set to 65% for flood irrigation of fields.
(13) Irrigated acreage from Table 13.
(14) Calculated as the minimum of Column 8 x Column 12 or Column 4 / 12 x Column 13
(15) Calculated as the minimum of Column 4 /12 x Column 13 - Column 14 or beginning monthly soil moisture.
(16) Calculated as the minimum of Column 8 x Column 12 -Column 14 or Column 13 x Average Rooting Depth x Available Water Holding Capacity - Beginning Monthly Soil Moisture + Column 15
(17) Calculated as Column 8 x Column 12 - Column 14 - Column 16
(18) Calculated as SEV monthly factors x the sum of Columns 7, 9, and 11 (when appropriate).
(19) Calculated as Column 14 + Column 15 + Column 18
(20) Calculated as Column 19 x Trade Shares / Total Number of Shares on farm.
(21) Calculated as (Column 14 + Column 16) / Column 8
(22) Calculated as Column 4 / 12 x Column 13 - Column 14 - Column 15

TABLE 56

SUMMARY OF WATER BUDGET RESULTS AND DERIVATION OF DEPLETION FACTORS FOR FARMS USING THE FARM NO. 60 RECHARGE SITES

(Farm Nos. 3, 40, 57 and 60 - 365 of 366 Total FLCC Shares)

STUDY PERIOD OF 1979 TO 2014

(values in acre-feet)

Row	Component	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
	Ditch and Off-Farm Lateral Operations													
1	Pro rata share of River HG	47.5	1.2	2.2	1.3	36.7	80.6	108.5	150.4	117.9	97.2	61.8	57.9	763.4
2	Pro rata share of Res Rel	0.7	0.2	0.1	0.3	2.6	20.8	19.8	10.2	27.7	27.0	24.8	8.1	142.3
3	Canal loss	17.7	0.5	0.9	0.6	14.4	36.9	46.8	58.7	53.0	45.2	31.4	24.1	330.2
4	Farm Turnout Delivery	30.5	0.9	1.5	1.0	24.9	64.5	81.6	101.8	92.6	79.1	55.2	41.9	575.5
5	Off-farm lateral loss	1.7	0.0	0.1	0.1	1.4	3.5	4.5	5.6	5.1	4.3	3.0	2.3	31.7
	On-Farm Operation													
6	Farm delivery	28.8	0.9	1.4	0.9	23.5	61.0	77.1	96.1	87.5	74.7	52.2	39.6	543.8
7	On-Farm lateral Loss	1.0	0.0	0.0	0.0	0.8	2.1	2.7	3.4	3.1	2.6	1.8	1.4	19.0
8	Deep percolation	6.3	0.2	0.3	0.2	5.1	13.3	16.8	21.0	19.1	16.3	11.4	8.6	118.6
9	Tail water	2.8	0.1	0.1	0.1	2.3	5.9	7.4	9.3	8.4	7.2	5.0	3.8	52.5
10	Crop consumptive use	5.7	3.1	2.7	3.7	7.0	43.2	54.3	76.2	64.0	49.0	32.0	12.6	353.5
11	SEV Losses	0.4	0.0	0.0	0.0	0.7	2.5	3.7	5.6	5.5	4.0	2.1	1.1	25.7
12	Total consumptive use	6.1	3.1	2.7	3.7	7.7	45.7	58.1	81.8	69.5	53.0	34.1	13.7	379.2
13	End of month soil storage	15.1	28.2	25.6	23.9	20.8	29.1	25.5	21.3	7.6	0.4	0.0	2.0	199.6
14	Soil storage change	13.2	13.1	-2.5	-1.7	-3.1	8.3	-3.6	-4.2	-13.7	-7.1	-0.4	2.0	-----
	Lagged Return Flows													
15	Surface water return	2.8	0.1	0.1	0.1	2.3	5.9	7.4	9.3	8.4	7.2	5.0	3.8	52.5
16	Ground water return	14.0	12.9	11.7	10.7	10.2	10.6	11.7	13.0	14.1	14.7	14.8	14.6	153.0
	Stream Depletion													
17	Stream depletion	13.8	-12.1	-10.3	-9.8	12.5	48.0	62.4	79.5	70.1	57.1	35.3	23.5	370.0
18	Stream depletion as % of Farm Turnout Delivery	47.8%	Total Winter Depls=		-32.2	52.9%	78.7%	81.0%	82.7%	80.1%	76.5%	67.7%	59.3%	68.0%
19	Annual Farm Turnout		-2.2%	-1.9%	-1.8%									-5.9%
20	SEV Loss Factor (%)	9.5%	7.8%	8.4%	12.1%	20.4%	27.9%	33.4%	40.3%	43.5%	37.2%	28.2%	19.3%	-----
	LAWMA'S Portion of the Total FLCC Shares													
21	Pro-Rata River HG	47.4	1.2	2.2	1.3	36.6	80.4	108.3	149.9	117.6	97.0	61.6	57.7	761.3
22	Pro-Rata Res Rel	0.7	0.2	0.1	0.3	2.6	20.7	19.8	10.1	27.6	27.0	24.7	8.1	141.9
23	Pro-Rata Farm Delivery	28.8	0.9	1.4	0.9	23.5	60.8	76.9	95.9	87.3	74.5	52.0	39.5	542.4
24	Pro-Rata Stream Depletion	13.8	-12.1	-10.3	-9.8	12.4	47.9	62.3	79.3	69.9	57.0	35.2	23.4	369.0
25	Pro-Rata Surface water return flow	2.8	0.1	0.1	0.1	2.3	5.9	7.4	9.3	8.4	7.2	5.0	3.8	52.3

TABLE 56

SUMMARY OF WATER BUDGET RESULTS AND DERIVATION OF DEPLETION FACTORS FOR FARMS USING THE FARM NO. 60 RECHARGE SITES

(Farm Nos. 3, 40, 57 and 60 - 365 of 366 Total FLCC Shares)

STUDY PERIOD OF 1979 TO 2014

(values in acre-feet)

Row	Component	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
26	Pro-Rata Ground water return flow	13.9	12.9	11.7	10.7	10.2	10.6	11.7	12.9	14.1	14.7	14.8	14.6	152.6
27	Pro-Rata Total Consumptive use	6.1	3.1	2.7	3.7	7.7	45.6	57.9	81.6	69.3	52.9	34.0	13.6	378.1
		Total Winter Stream Depletions=			-32.2									

24.9% <---- Annual SEV as a Percentage of Off-Farm Lateral Loss, On-Farm Lateral Loss, and Tailwater
65.0% <---- Average Annual Farm Efficiency (%)

Row descriptions:

1) Pro rata share of historical River Headgate diversions.
2) Pro rata share of historical Reservoir releases.
3) Row 1 x 36.7% + Row 2 x 35.1%
4) Row 1 + Row 2 - Row 3
5) (Row 1 + Row 2) x 3.5%
6) Row 4 - Row 5
7) Row 6 x 3.5%
8) (Row 6 - Row 7) x 22.6% When the water supply exceeded the consumptive irrigation requirement and refilled the root zone the excess was assigned to deep percolation resulting in more than 22.6% in some months.
9) (Row 6 - Row 7) x 10.0%
10) crop consumptive use from applied irrigation water. and from soil moisture storage Calculated from monthly water budget.
11) Row 9 x Row 19
12) Row 10 + Row 11
13) Previous Row 13 + Row 6 - Row 7 - Row 8 - Row 9 - Row 10
14) Row 13 - previous Row 13
15) Row 9 x (1 - Row 19)
16) Lagged Off-Farm Lateral loss, On Farm Lateral Loss, and tailwater (lagging after SEV loss)
17) Row 4 - Row 15 - Row 16
18) Row 17 ÷ Row 6 x 100%.
19) Row 17 ÷ Annual Row 6 x 100%.
20) SEV loss factors from HI Model
21) Row 1 x 365 ÷ 366.
22) Row 2 x 365 ÷ 366.
23) Row 4 x 365 ÷ 366.
24) Row 17 x 365 ÷ 366.
25) Row 15 x 365 ÷ 366.
26) Row 16 x 365 ÷ 366.
27) Row 12 x 365 ÷ 366.

TABLE 57

SUMMARY OF WATER BUDGET RESULTS AND DERIVATION OF DEPLETION FACTORS FOR FARMS USING THE HORSE CREEK AUGMENTATION STATION

(Farm Nos. 13, 19, 21, 22, 23, 59, and 61 - 1,527 of 1,569 Total FLCC Shares)

STUDY PERIOD OF 1979 TO 2014

(values in acre-feet)

Row	Component	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
	Ditch and Off-Farm Lateral Operations													
1	Pro rata share of River HG	203.7	5.3	9.5	5.5	157.3	345.7	465.3	644.6	505.6	416.8	264.9	248.2	3,272.5
2	Pro rata share of Res Rel	3.0	0.8	0.6	1.1	11.2	89.0	85.0	43.5	118.8	115.9	106.3	34.8	610.2
3	Canal loss	75.8	2.2	3.7	2.4	61.7	158.2	200.6	251.9	227.3	193.7	134.6	103.3	1,415.4
4	Farm Turnout Delivery	130.9	3.9	6.5	4.2	106.9	276.6	349.7	436.3	397.1	339.0	236.7	179.7	2,467.3
5	Off-farm lateral loss	7.2	0.2	0.4	0.2	5.9	15.2	19.3	24.1	21.9	18.6	13.0	9.9	135.9
	On-Farm Operation													
6	Farm delivery	123.7	3.7	6.1	4.0	101.0	261.4	330.5	412.2	375.2	320.4	223.7	169.8	2,331.4
7	On-Farm lateral Loss	4.3	0.1	0.2	0.1	3.5	9.1	11.6	14.4	13.1	11.2	7.8	5.9	81.6
8	Deep percolation	43.1	1.1	2.2	1.1	34.2	79.8	92.1	102.2	92.4	80.8	63.3	58.3	650.7
9	Tail water	11.9	0.4	0.6	0.4	9.7	25.2	31.9	39.8	36.2	30.9	21.6	16.4	225.0
10	Crop consumptive use	15.7	9.0	7.7	10.5	20.9	152.6	194.3	295.4	282.6	215.5	128.2	39.7	1,372.1
11	SEV Losses	1.6	0.0	0.1	0.1	2.9	10.1	15.3	23.0	22.6	16.5	8.7	4.5	105.4
12	Total consumptive use	17.4	9.0	7.8	10.6	23.8	162.7	209.5	318.4	305.2	232.0	137.0	44.2	1,477.6
13	End of month soil storage	212.0	260.5	253.6	249.0	240.7	273.3	267.8	268.2	228.4	179.2	161.0	163.7	-----
14	Soil storage change	48.3	48.5	-6.9	-4.7	-8.2	32.5	-5.5	0.5	-39.8	-49.3	-18.1	2.7	-----
	Lagged Return Flows													
15	Surface water return	11.9	0.4	0.6	0.4	9.7	25.2	31.9	39.8	36.2	30.9	21.6	16.4	225.0
16	Ground water return	72.8	67.6	61.0	55.8	53.7	56.9	62.8	68.5	73.0	75.4	75.7	75.4	798.6
	Stream Depletion													
17	Stream depletion	46.2	-64.1	-55.1	-52.0	43.4	194.4	255.0	327.9	287.8	232.7	139.4	87.9	1,443.7
18	Farm Turnout Delivery	37.3%	Total Winter Depls= -171.2			43.0%	74.4%	77.2%	79.6%	76.7%	72.6%	62.3%	51.8%	61.9%
19	Winter depletions as % of Annual Farm Turnout Delivery		-2.7%	-2.4%	-2.2%									-7.3%
19	SEV Loss Factor (%)	9.5%	7.8%	8.4%	12.1%	20.4%	27.9%	33.4%	40.3%	43.5%	37.2%	28.2%	19.3%	-----
	LAWMA'S Portion of the Total FLCC Shares													
20	Pro-Rata River HG	198.3	5.1	9.3	5.3	153.1	336.5	452.9	627.3	492.0	405.7	257.8	241.6	3,184.9
21	Pro-Rata Res Rel	2.9	0.8	0.6	1.1	10.9	86.6	82.8	42.4	115.6	112.8	103.5	33.8	593.8
22	Pro-Rata Farm Delivery	120.4	3.6	5.9	3.9	98.3	254.4	321.6	401.1	365.2	311.8	217.7	165.2	2,269.0
23	Pro-Rata Stream Depletion	45.4	-62.0	-53.2	-50.2	42.6	189.6	248.6	319.6	280.6	226.9	136.1	86.0	1,409.9

TABLE 57

SUMMARY OF WATER BUDGET RESULTS AND DERIVATION OF DEPLETION FACTORS FOR FARMS USING THE HORSE CREEK AUGMENTATION STATION

(Farm Nos. 13, 19, 21, 22, 23, 59, and 61 - 1,527 of 1,569 Total FLCC Shares)

STUDY PERIOD OF 1979 TO 2014

(values in acre-feet)

Row	Component	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
24	Pro-Rata Surface water return flow	11.6	0.3	0.6	0.4	9.5	24.5	31.0	38.7	35.2	30.1	21.0	15.9	219.0
25	Pro-Rata Ground water return flow	70.4	65.4	58.9	53.9	51.9	55.0	60.7	66.3	70.6	73.0	73.2	73.0	772.4
26	Pro-Rata Total Consumptive use	17.0	8.8	7.6	10.4	23.3	159.0	204.7	311.1	297.9	226.4	133.6	43.3	1,443.0

Total Winter Stream Depletions= -165.4

23.8% <---- Annual SEV as a Percentage of Off-Farm Lateral Loss, On-Farm Lateral Loss, and Tailwater

58.9% <---- Average Annual Farm Efficiency (%)

Row descriptions:

1) Pro rata share of historical River Headgate diversions.
2) Pro rata share of historical Reservoir releases.
3) Row 1 x 36.7% + Row 2 x 35.1%
4) Row 1 + Row 2 - Row 3
5) (Row 1 + Row 2) x 3.5%
6) Row 4 - Row 5
7) Row 6 x 3.5%
8) (Row 6 - Row 7) x 22.6% When the water supply exceeded the consumptive irrigation requirement and refilled the root zone the excess was assigned to deep percolation resulting in more than 22.6% in some months.
9) (Row 6 - Row 7) x 10.0%
10) crop consumptive use from applied irrigation water. and from soil moisture storage Calculated from monthly water budget.
11) Row 9 x Row 19
12) Row 10 + Row 11
13) Previous Row 13 + Row 6 - Row 7 - Row 8 - Row 9 - Row 10
14) Row 13 - previous Row 13
15) Row 9 x (1 - Row 19)
16) Lagged Off-Farm Lateral loss, On Farm Lateral Loss, and tailwater (lagging after SEV loss)
17) Row 4 - Row 15 - Row 16
18) Row 17 ÷ Row 6 x 100%.
19) Row 17 ÷ Annual Row 6 x 100%.
20) SEV loss factors from HI Model
21) Row 1 x 1,572 ÷ 1,569.
22) Row 2 x 1,572 ÷ 1,569.
23) Row 4 x 1,572 ÷ 1,569.
24) Row 17 x 1,572 ÷ 1,569.
25) Row 15 x 1,572 ÷ 1,569.
26) Row 16 x 1,572 ÷ 1,569.
27) Row 12 x 1,572 ÷ 1,569.

TABLE 58

SUMMARY OF WATER BUDGET RESULTS AND DERIVATION OF DEPLETION FACTORS
FOR FARMS USING THE FARM NO. 27 AUGMENTATION STATION (ARF126CO)

(Farm Nos. 1, 2, 27 - 1,008 OF 1,008 Total FLCC Shares)
STUDY PERIOD OF 1979 TO 2014
(values in acre-feet)

Row	Component	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
	Ditch and Off-Farm Lateral Operations													
1	Pro rata share of River HG	130.9	3.4	6.1	3.5	101.1	222.1	299.0	414.1	324.8	267.8	170.2	159.5	2,102.4
2	Pro rata share of Res Rel	1.9	0.5	0.4	0.7	7.2	57.2	54.6	28.0	76.3	74.5	68.3	22.3	392.0
3	Canal loss	48.7	1.4	2.4	1.5	39.6	101.6	128.9	161.8	146.0	124.4	86.5	66.4	909.3
4	Farm Turnout Delivery	84.1	2.5	4.1	2.7	68.6	177.7	224.7	280.3	255.1	217.8	152.0	115.4	1,585.1
5	Off-farm lateral loss	4.6	0.1	0.2	0.1	3.8	9.8	12.4	15.5	14.0	12.0	8.3	6.4	87.3
	On-Farm Operation													
6	Farm delivery	79.4	2.3	3.9	2.5	64.9	167.9	212.3	264.8	241.1	205.8	143.7	109.1	1,497.8
7	On-Farm lateral Loss	2.8	0.1	0.1	0.1	2.3	5.9	7.4	9.3	8.4	7.2	5.0	3.8	52.4
8	Deep percolation	24.4	0.6	1.2	0.6	20.1	45.5	50.4	59.3	54.8	47.5	35.9	32.6	373.0
9	Tail water	7.7	0.2	0.4	0.2	6.3	16.2	20.5	25.6	23.3	19.9	13.9	10.5	144.5
10	Crop consumptive use	11.2	6.2	5.4	7.4	14.7	104.5	131.3	200.1	187.1	145.9	85.1	27.7	926.5
11	SEV Losses	0.6	0.0	0.0	0.0	1.1	4.0	6.0	9.1	8.9	6.5	3.4	1.8	41.5
12	Total consumptive use	11.8	6.2	5.4	7.4	15.8	108.5	137.3	209.2	196.0	152.4	88.5	29.5	968.0
13	End of month soil storage	119.1	152.5	147.8	144.6	138.8	160.3	156.1	158.7	129.1	96.5	81.7	85.4	-----
14	Soil storage change	33.7	33.4	-4.7	-3.2	-5.8	21.5	-4.2	2.6	-29.6	-32.6	-14.7	3.7	-----
	Lagged Return Flows													
15	Surface water return	7.7	0.2	0.4	0.2	6.3	16.2	20.5	25.6	23.3	19.9	13.9	10.5	144.5
16	Ground water return	43.3	40.5	37.4	35.4	34.9	37.3	40.4	43.2	45.3	45.9	45.4	44.8	493.6
	Stream Depletion													
17	Stream depletion	33.2	-38.3	-33.6	-32.9	27.4	124.2	163.8	211.6	186.6	152.0	92.8	60.2	946.9
18	Stream depletion as % of Farm Turnout Delivery	41.7%	Total Winter Depls=		-104.8	42.3%	74.0%	77.2%	79.9%	77.4%	73.9%	64.6%	55.1%	63.2%
19	Winter depletions as % of Annual Farm Turnout Delivery		-2.6%	-2.2%	-2.2%									-7.0%
20	SEV Loss Factor (%)	9.5%	7.8%	8.4%	12.1%	20.4%	27.9%	33.4%	40.3%	43.5%	37.2%	28.2%	19.3%	-----

14.6% <---- Annual SEV as a Percentage of Off-Farm Lateral Loss, On-Farm Lateral Loss, and Tailwater
61.9% <---- Average Annual Farm Efficiency (%)

Row descriptions:
1) Pro rata share of historical River Headgate diversions.
2) Pro rata share of historical Reservoir releases.
3) Row 1 x 36.7% + Row 2 x 35.1%
4) Row 1 + Row 2 - Row 3
5) (Row 1 + Row 2) x 3.5%
6) Row 4 - Row 5
7) Row 6 x 3.5%
8) (Row 6 - Row 7) x 22.6% When the water supply exceeded the consumptive irrigation requirement and refilled the root zone the excess was assigned to deep percolation resulting in more than 22.6% in some months.
9) (Row 6 - Row 7) x 10.0%
10) crop consumptive use from applied irrigation water. and from soil moisture storage Calculated from monthly water budget.
11) Row 9 x Row 19
12) Row 10 + Row 11
13) Previous Row 13 + Row 6 - Row 7 - Row 8 - Row 9 - Row 10
14) Row 13 - previous Row 13
15) Row 9 x (1 - Row 19)
16) Lagged Off-Farm Lateral loss, On Farm Lateral Loss, and tailwater (lagging after SEV loss)
17) Row 4 - Row 15 - Row 16
18) Row 17 ÷ Row 6 x 100%.
19) Row 17 ÷ Annual Row 6 x 100%.
20) SEV loss factors from HI Model

TABLE 59

SUMMARY OF WATER BUDGET RESULTS AND DERIVATION OF DEPLETION FACTORS
FOR FARMS USING THE FARM NO. 36 - LATERAL 160 AUGMENTATION STATION

(Farm Nos. 33 and 36 - 316 of 320 Total FLCC Shares)
STUDY PERIOD OF 1979 TO 2014
(values in acre-feet)

Row	Component	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
	Ditch and Off-Farm Lateral Operations													
1	Pro rata share of River HG	41.5	1.1	1.9	1.1	32.1	70.5	94.9	131.5	103.1	85.0	54.0	50.6	667.4
2	Pro rata share of Res Rel	0.6	0.2	0.1	0.2	2.3	18.2	17.3	8.9	24.2	23.6	21.7	7.1	124.4
3	Canal loss	15.5	0.5	0.8	0.5	12.6	32.3	40.9	51.4	46.4	39.5	27.4	21.1	288.7
4	Farm Turnout Delivery	26.7	0.8	1.3	0.9	21.8	56.4	71.3	89.0	81.0	69.1	48.3	36.6	503.2
5	Off-farm lateral loss	1.5	0.0	0.1	0.0	1.2	3.1	3.9	4.9	4.5	3.8	2.6	2.0	27.7
	On-Farm Operation													
6	Farm delivery	25.2	0.7	1.2	0.8	20.6	53.3	67.4	84.1	76.5	65.3	45.6	34.6	475.5
7	On-Farm lateral Loss	0.9	0.0	0.0	0.0	0.7	1.9	2.4	2.9	2.7	2.3	1.6	1.2	16.6
8	Deep percolation	5.5	0.2	0.3	0.2	4.5	11.6	14.7	18.3	16.7	14.3	9.9	7.6	103.7
9	Tail water	2.4	0.1	0.1	0.1	2.0	5.1	6.5	8.1	7.4	6.3	4.4	3.3	45.9
10	Crop consumptive use	4.7	2.5	2.2	2.8	5.7	37.8	46.5	67.4	56.2	45.3	27.5	10.4	309.1
11	SEV Losses	0.3	0.0	0.0	0.0	0.6	2.0	3.0	4.5	4.4	3.2	1.7	0.9	20.4
12	Total consumptive use	5.0	2.5	2.2	2.8	6.2	39.7	49.5	71.9	60.6	48.4	29.1	11.3	329.5
13	End of month soil storage	21.5	33.1	31.1	29.7	27.4	35.1	32.0	29.3	16.5	10.0	7.2	9.4	282.0
14	Soil storage change	12.1	11.7	-2.0	-1.4	-2.3	7.7	-3.1	-2.7	-12.8	-6.5	-2.8	2.2	-----
	Lagged Return Flows													
15	Surface water return	2.4	0.1	0.1	0.1	2.0	5.1	6.5	8.1	7.4	6.3	4.4	3.3	45.9
16	Ground water return	12.1	11.4	10.5	9.8	9.4	9.6	10.3	11.2	12.0	12.5	12.6	12.5	133.8
	Stream Depletion													
17	Stream depletion	12.2	-10.7	-9.3	-9.0	10.4	41.7	54.5	69.7	61.6	50.3	31.2	20.8	323.5
18	Stream depletion as % of Farm Turnout Delivery	48.4%	Total Winter Depls=		-29.0	50.7%	78.2%	80.9%	82.9%	80.5%	77.0%	68.5%	60.1%	68.0%
19	Winter depletions as % of Annual Farm Turnout Delivery		-2.2%	-2.0%	-1.9%									-6.1%
20	SEV Loss Factor (%)	9.5%	7.8%	8.4%	12.1%	20.4%	27.9%	33.4%	40.3%	43.5%	37.2%	28.2%	19.3%	-----
	LAWMA'S Portion of the Total FLCC Shares													
21	Pro-Rata River HG	41.0	1.1	1.9	1.1	31.7	69.6	93.7	129.8	101.8	84.0	53.4	50.0	659.1
22	Pro-Rata Res Rel	0.6	0.2	0.1	0.2	2.3	17.9	17.1	8.8	23.9	23.3	21.4	7.0	122.9
23	Pro-Rata Farm Delivery	24.9	0.7	1.2	0.8	20.3	52.6	66.6	83.0	75.6	64.5	45.0	34.2	469.6
24	Pro-Rata Stream Depletion	12.1	-10.5	-9.2	-8.9	10.3	41.2	53.8	68.8	60.8	49.7	30.8	20.5	319.5

TABLE 59

SUMMARY OF WATER BUDGET RESULTS AND DERIVATION OF DEPLETION FACTORS FOR FARMS USING THE FARM NO. 36 - LATERAL 160 AUGMENTATION STATION

(Farm Nos. 33 and 36 - 316 of 320 Total FLCC Shares)

STUDY PERIOD OF 1979 TO 2014

(values in acre-feet)

Row	Component	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
25	Pro-Rata Surface water return flow	2.4	0.1	0.1	0.1	2.0	5.1	6.4	8.0	7.3	6.2	4.3	3.3	45.3
26	Pro-Rata Ground water return flow	11.9	11.2	10.4	9.7	9.3	9.5	10.2	11.0	11.9	12.4	12.5	12.4	132.1
27	Pro-Rata Total Consumptive use	5.0	2.5	2.2	2.8	6.1	39.2	48.8	71.0	59.9	47.9	28.8	11.2	325.4
		Total Winter Stream Depletions=			-28.6									

22.6% <---- Annual SEV as a Percentage of Off-Farm Lateral Loss, On-Farm Lateral Loss, and Tailwater

65.0% <---- Average Annual Farm Efficiency (%)

Row descriptions:

1) Pro rata share of historical River Headgate diversions.
2) Pro rata share of historical Reservoir releases.
3) Row 1 x .% + Row 2 x .%
4) Row 1 + Row 2 - Row 3
5) (Row 1 + Row 2) x 3.5%
6) Row 4 - Row 5
7) Row 6 x 3.5%
8) (Row 6 - Row 7) x 22.6% When the water supply exceeded the consumptive irrigation requirement and refilled the root zone the excess was assigned to deep percolation resulting in more than 22.6% in some months.
9) (Row 6 - Row 7) x 10.0%
10) crop consumptive use from applied irrigation water. and from soil moisture storage Calculated from monthly water budget.
11) Row 9 x Row 19
12) Row 10 + Row 11
13) Previous Row 13 + Row 6 - Row 7 - Row 8 - Row 9 - Row 10
14) Row 13 - previous Row 13
15) Row 9 x (1 - Row 19)
16) Lagged Off-Farm Lateral loss, On Farm Lateral Loss, and tailwater (lagging after SEV loss)
17) Row 4 - Row 15 - Row 16
18) Row 17 ÷ Row 6 x 100%.
19) Row 17 ÷ Annual Row 6 x 100%.
20) SEV loss factors from HI Model
21) Row 1 x 191 ÷ 200.
22) Row 2 x 191 ÷ 200.
23) Row 4 x 191 ÷ 200.
24) Row 17 x 191 ÷ 200.
25) Row 15 x 191 ÷ 200.
26) Row 16 x 191 ÷ 200.
27) Row 12 x 191 ÷ 200.

TABLE 60

SUMMARY OF WATER BUDGET RESULTS AND DERIVATION OF DEPLETION FACTORS FOR FARMS USING THE FARM NO. 132/133 AUGMENTATION & RECHARGE SITES

(Farm Nos. 14, 15, 37, 41, 54B*, 58, 132/133 - 1,021 of 1,027 Total FLCC Shares)

STUDY PERIOD OF 1979 TO 2014

(values in acre-feet)

Row	Component	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
	Ditch and Off-Farm Lateral Operations													
1	Pro rata share of River HG	133.3	3.5	6.2	3.6	103.0	226.3	304.6	421.9	330.9	272.8	173.4	162.5	2,142.0
2	Pro rata share of Res Rel	2.0	0.5	0.4	0.7	7.3	58.3	55.7	28.5	77.8	75.9	69.6	22.8	399.4
3	Canal loss	49.6	1.5	2.4	1.6	40.4	103.5	131.3	164.9	148.8	126.8	88.1	67.6	926.4
4	Farm Turnout Delivery	85.7	2.5	4.2	2.7	69.9	181.0	228.9	285.6	259.9	221.9	154.9	117.6	1,615.0
5	Off-farm lateral loss	4.7	0.1	0.2	0.2	3.9	10.0	12.6	15.8	14.3	12.2	8.5	6.5	88.9
	On-Farm Operation													
6	Farm delivery	80.9	2.4	4.0	2.6	66.1	171.1	216.3	269.8	245.6	209.7	146.4	111.1	1,526.0
7	On-Farm lateral Loss	2.8	0.1	0.1	0.1	2.3	6.0	7.6	9.4	8.6	7.3	5.1	3.9	53.4
8	Deep percolation	17.7	0.5	0.9	0.6	14.4	37.3	47.2	58.8	53.6	45.7	31.9	24.2	332.8
9	Tail water	7.8	0.2	0.4	0.3	6.4	16.5	20.9	26.0	23.7	20.2	14.1	10.7	147.3
10	Crop consumptive use	20.4	10.8	8.8	11.0	22.0	126.5	153.0	200.3	168.9	138.6	93.0	38.8	992.0
11	SEV Losses	0.8	0.0	0.0	0.0	1.5	5.1	7.8	11.7	11.5	8.4	4.4	2.3	53.6
12	Total consumptive use	21.2	10.8	8.8	11.1	23.5	131.7	160.7	212.0	180.4	147.0	97.4	41.1	1,045.6
13	End of month soil storage	38.3	70.5	61.3	55.1	45.7	66.6	51.3	39.0	14.1	4.8	2.5	4.7	-----
14	Soil storage change	33.6	32.2	-9.2	-6.2	-9.4	20.9	-15.3	-12.4	-24.9	-9.2	-2.3	2.2	-----
	Lagged Return Flows													
15	Surface water return	7.8	0.2	0.4	0.3	6.4	16.5	20.9	26.0	23.7	20.2	14.1	10.7	147.3
16	Ground water return	39.3	36.0	32.2	29.5	28.6	30.7	34.4	38.4	41.6	43.0	42.7	41.5	437.9
	Stream Depletion													
17	Stream depletion	38.6	-33.7	-28.4	-27.1	35.0	133.8	173.6	221.1	194.6	158.7	98.1	65.4	1,029.8
18	Stream depletion as % of Farm Turnout Delivery	47.6%	Total Winter Depls= -89.1			52.9%	78.2%	80.3%	82.0%	79.2%	75.7%	67.0%	58.9%	67.5%
19	Annual Farm Turnout		-2.2%	-1.9%	-1.8%									-5.8%
19	SEV Loss Factor (%)	9.5%	7.8%	8.4%	12.1%	20.4%	27.9%	33.4%	40.3%	43.5%	37.2%	28.2%	19.3%	-----
	LAWMA'S Portion of the Total FLCC Shares													
20	Pro-Rata River HG	132.6	3.4	6.2	3.6	102.4	225.0	302.8	419.4	329.0	271.2	172.4	161.5	2,129.5
21	Pro-Rata Res Rel	2.0	0.5	0.4	0.7	7.3	57.9	55.3	28.3	77.3	75.4	69.2	22.6	397.1
22	Pro-Rata Farm Delivery	80.5	2.4	4.0	2.6	65.7	170.1	215.0	268.2	244.2	208.5	145.5	110.5	1,517.1
23	Pro-Rata Stream Depletion	38.3	-33.5	-28.2	-26.9	34.8	133.1	172.6	219.8	193.5	157.8	97.5	65.0	1,023.9
24	Pro-Rata Surface water return flow	7.8	0.2	0.4	0.2	6.3	16.4	20.8	25.9	23.6	20.1	14.0	10.7	146.4

25	Pro-Rata Ground water return flow	39.1	35.7	32.0	29.4	28.4	30.5	34.2	38.2	41.4	42.7	42.4	41.2	435.3
26	Pro-Rata Total Consumptive use	21.1	10.7	8.8	11.0	23.3	130.9	159.8	210.8	179.4	146.2	96.8	40.8	1,039.6
		Total Winter Stream Depletions=			-88.6									

18.5% <---- Annual SEV as a Percentage of Off-Farm Lateral Loss, On-Farm Lateral Loss, and Tailwater
65.0% <---- Average Annual Farm Efficiency (%)

Row descriptions:
1) Pro rata share of historical River Headgate diversions.
2) Pro rata share of historical Reservoir releases.
3) Row 1 x 36.7% + Row 2 x 35.1%
4) Row 1 + Row 2 - Row 3
5) (Row 1 + Row 2) x 3.5%
6) Row 4 - Row 5
7) Row 6 x 3.5%
8) (Row 6 - Row 7) x 22.6% When the water supply exceeded the consumptive irrigation requirement and refilled the root zone the excess was assigned to deep percolation resulting in more than 22.6% in some months.
9) (Row 6 - Row 7) x 10.0%
10) crop consumptive use from applied irrigation water. and from soil moisture storage Calculated from monthly water budget.
11) Row 9 x Row 19
12) Row 10 + Row 11
13) Previous Row 13 + Row 6 - Row 7 - Row 8 - Row 9 - Row 10
14) Row 13 - previous Row 13
15) Row 9 x (1 - Row 19)
16) Lagged Off-Farm Lateral loss, On Farm Lateral Loss, and tailwater (lagging after SEV loss)
17) Row 4 - Row 15 - Row 16
18) Row 17 ÷ Row 6 x 100%.
19) Row 17 ÷ Annual Row 6 x 100%.
20) SEV loss factors from HI Model
21) Row 1 x 1,021 ÷ 1,027.
22) Row 2 x 1,021 ÷ 1,027.
23) Row 4 x 1,021 ÷ 1,027.
24) Row 17 x 1,021 ÷ 1,027.
25) Row 15 x 1,021 ÷ 1,027.
26) Row 16 x 1,021 ÷ 1,027.
27) Row 12 x 1,021 ÷ 1,027.

TABLE 61

SUMMARY OF WATER BUDGET RESULTS AND DERIVATION OF DEPLETION FACTORS FOR FARMS USING THE LIMESTONE CREEK AUGMENTATION STATION

(Farm No. 39 - 191 of 200 Total FLCC Shares)

STUDY PERIOD OF 1979 TO 2014

(values in acre-feet)

Row	Component	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
	Ditch and Off-Farm Lateral Operations													
1	Pro rata share of River HG	26.0	0.7	1.2	0.7	20.1	44.1	59.3	82.2	64.4	53.1	33.8	32.2	417.7
2	Pro rata share of Res Rel	0.4	0.1	0.1	0.1	1.4	11.3	10.8	5.5	15.1	14.8	13.6	4.5	77.8
3	Canal loss	9.7	0.3	0.5	0.3	7.9	20.2	25.6	32.1	29.0	24.7	17.2	13.4	180.6
4	Farm Turnout Delivery	16.7	0.5	0.8	0.5	13.6	35.3	44.6	55.6	50.6	43.2	30.2	23.3	314.9
5	Off-farm lateral loss	0.9	0.0	0.0	0.0	0.8	1.9	2.5	3.1	2.8	2.4	1.7	1.3	17.3
	On-Farm Operation													
6	Farm delivery	15.8	0.5	0.8	0.5	12.9	33.3	42.1	52.5	47.8	40.8	28.5	22.0	297.5
7	On-Farm lateral Loss	0.6	0.0	0.0	0.0	0.5	1.2	1.5	1.8	1.7	1.4	1.0	0.8	10.4
8	Deep percolation	3.4	0.1	0.2	0.1	2.8	7.3	9.2	11.5	10.4	8.9	6.2	4.7	64.8
9	Tail water	1.5	0.0	0.1	0.0	1.2	3.2	4.1	5.1	4.6	3.9	2.8	2.1	28.7
10	Crop consumptive use	4.2	2.2	1.8	2.2	4.4	25.1	31.0	38.1	31.5	26.5	18.3	7.9	193.2
11	SEV Losses	0.1	0.0	0.0	0.0	0.2	0.6	0.8	1.3	1.3	0.9	0.5	0.3	5.8
12	Total consumptive use	4.3	2.2	1.8	2.2	4.5	25.6	31.9	39.4	32.8	27.5	18.8	8.1	199.0
13	End of month soil storage	6.4	12.5	10.6	9.4	7.4	11.4	8.0	4.4	0.4	0.0	0.0	0.2	-----
14	Soil storage change	6.2	6.1	-1.9	-1.3	-1.9	4.0	-3.4	-3.6	-4.0	-0.4	0.0	0.2	-----
	Lagged Return Flows													
15	Surface water return	1.5	0.0	0.1	0.0	1.2	3.2	4.1	5.1	4.6	3.9	2.8	2.1	28.7
16	Ground water return	7.8	6.9	6.1	5.5	5.4	6.2	7.2	8.2	8.9	9.1	8.8	8.3	88.5
	Stream Depletion													
17	Stream depletion	7.3	-6.5	-5.3	-5.0	6.9	25.9	33.3	42.3	37.1	30.2	18.6	12.8	197.7
18	Stream depletion as % of Farm Turnout Delivery	46.6%	Total Winter Depls= -16.8			53.9%	77.6%	79.1%	80.6%	77.6%	73.9%	65.2%	58.2%	62.8%
19	Winter depletions as % of Annual Farm Turnout Delivery		-2.2%	-1.8%	-1.7%									-5.7%
20	SEV Loss Factor (%)	9.5%	7.8%	8.4%	12.1%	20.4%	27.9%	33.4%	40.3%	43.5%	37.2%	28.2%	19.3%	-----
	LAWMA'S Portion of the Total FLCC Shares													
21	Pro-Rata River HG	24.8	0.6	1.2	0.7	19.2	42.1	56.6	78.5	61.5	50.7	32.2	30.7	398.9
22	Pro-Rata Res Rel	0.4	0.1	0.1	0.1	1.4	10.8	10.4	5.3	14.5	14.1	12.9	4.3	74.3
23	Pro-Rata Farm Delivery	15.1	0.4	0.7	0.5	12.3	31.8	40.2	50.2	45.7	39.0	27.2	21.0	284.1
24	Pro-Rata Stream Depletion	7.0	-6.2	-5.1	-4.8	6.6	24.7	31.8	40.4	35.4	28.8	17.8	12.2	188.8

TABLE 61

SUMMARY OF WATER BUDGET RESULTS AND DERIVATION OF DEPLETION FACTORS
FOR FARMS USING THE LIMESTONE CREEK AUGMENTATION STATION

(Farm No. 39 - 191 of 200 Total FLCC Shares)

STUDY PERIOD OF 1979 TO 2014

(values in acre-feet)

Row	Component	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
25	Pro-Rata Surface water return flow	1.5	0.0	0.1	0.0	1.2	3.1	3.9	4.8	4.4	3.8	2.6	2.0	27.4
26	Pro-Rata Ground water return flow	7.5	6.6	5.8	5.3	5.2	5.9	6.9	7.8	8.5	8.7	8.4	8.0	84.5
27	Pro-Rata Total Consumptive use	4.1	2.1	1.7	2.1	4.3	24.5	30.4	37.6	31.3	26.2	17.9	7.7	190.1
		Total Winter Stream Depletions=			-16.1									

10.4% <---- Annual SEV as a Percentage of Off-Farm Lateral Loss, On-Farm Lateral Loss, and Tailwater
64.9% <---- Average Annual Farm Efficiency (%)

Row descriptions:
1) Pro rata share of historical River Headgate diversions.
2) Pro rata share of historical Reservoir releases.
3) Row 1 x 36.7% + Row 2 x 35.1%
4) Row 1 + Row 2 - Row 3
5) (Row 1 + Row 2) x 3.5%
6) Row 4 - Row 5
7) Row 6 x 3.5%
8) (Row 6 - Row 7) x 22.6% When the water supply exceeded the consumptive irrigation requirement and refilled the root zone the excess was assigned to deep percolation resulting in more than 22.6% in some months.
9) (Row 6 - Row 7) x 10.0%
10) crop consumptive use from applied irrigation water. and from soil moisture storage Calculated from monthly water budget.
11) Row 9 x Row 19
12) Row 10 + Row 11
13) Previous Row 13 + Row 6 - Row 7 - Row 8 - Row 9 - Row 10
14) Row 13 - previous Row 13
15) Row 9 x (1 - Row 19)
16) Lagged Off-Farm Lateral loss, On Farm Lateral Loss, and tailwater (lagging after SEV loss)
17) Row 4 - Row 15 - Row 16
18) Row 17 ÷ Row 6 x 100%.
19) Row 17 ÷ Annual Row 6 x 100%.
20) SEV loss factors from HI Model
21) Row 1 x 191 ÷ 200.
22) Row 2 x 191 ÷ 200.
23) Row 4 x 191 ÷ 200.
24) Row 17 x 191 ÷ 200.
25) Row 15 x 191 ÷ 200.
26) Row 16 x 191 ÷ 200.
27) Row 12 x 191 ÷ 200.

TABLE 62

SUMMARY OF WATER BUDGET RESULTS AND DERIVATION OF DEPLETION FACTORS
FOR FARMS USING THE FARM NO. 65 RECHARGE SITES

(Farm Nos. 65 and 127 - 216 of 216 Total FLCC Shares)

STUDY PERIOD OF 1979 TO 2014

(values in acre-feet)

Row	Component	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
	Ditch and Off-Farm Lateral Operations													
1	Pro rata share of River HG	28.0	0.7	1.3	0.8	21.7	47.6	64.1	88.7	69.6	57.4	36.5	34.2	450.5
2	Pro rata share of Res Rel	0.4	0.1	0.1	0.2	1.5	12.3	11.7	6.0	16.4	16.0	14.6	4.8	84.0
3	Canal loss	10.4	0.3	0.5	0.3	8.5	21.8	27.6	34.7	31.3	26.7	18.5	14.2	194.8
4	Farm Turnout Delivery	18.0	0.5	0.9	0.6	14.7	38.1	48.1	60.1	54.7	46.7	32.6	24.7	339.7
5	Off-farm lateral loss	1.0	0.0	0.0	0.0	0.8	2.1	2.7	3.3	3.0	2.6	1.8	1.4	18.7
	On-Farm Operation													
6	Farm delivery	17.0	0.5	0.8	0.5	13.9	36.0	45.5	56.7	51.7	44.1	30.8	23.4	321.0
7	On-Farm lateral Loss	0.6	0.0	0.0	0.0	0.5	1.3	1.6	2.0	1.8	1.5	1.1	0.8	11.2
8	Deep percolation	3.7	0.1	0.2	0.1	3.0	7.8	9.9	12.4	11.3	9.6	6.7	5.1	70.0
9	Tail water	1.6	0.0	0.1	0.1	1.3	3.5	4.4	5.5	5.0	4.3	3.0	2.3	31.0
10	Crop consumptive use	4.2	2.2	1.9	2.4	4.6	26.9	33.3	41.9	34.6	28.7	19.6	8.2	208.6
11	SEV Losses	0.1	0.0	0.0	0.0	0.2	0.6	0.9	1.4	1.4	1.0	0.5	0.3	6.3
12	Total consumptive use	4.3	2.2	1.9	2.4	4.8	27.5	34.2	43.3	36.0	29.7	20.2	8.5	214.9
13	End of month soil storage	7.3	14.2	12.3	11.0	8.9	13.3	9.8	6.1	1.0	0.0	0.0	0.4	-----
14	Soil storage change	7.0	6.9	-1.9	-1.3	-2.0	4.4	-3.5	-3.7	-5.1	-1.0	0.0	0.4	-----
	Lagged Return Flows													
15	Surface water return	1.6	0.0	0.1	0.1	1.3	3.5	4.4	5.5	5.0	4.3	3.0	2.3	31.0
16	Ground water return	8.4	7.6	6.7	6.1	6.0	6.7	7.7	8.7	9.5	9.6	9.4	9.0	95.6
	Stream Depletion													
17	Stream depletion	7.9	-7.1	-5.9	-5.6	7.3	27.9	36.0	45.8	40.2	32.8	20.2	13.5	213.1
18	Stream depletion as % of Farm Turnout Delivery	46.6%	Total Winter Depls=	-18.6		52.7%	77.4%	79.2%	80.8%	77.9%	74.3%	65.6%	57.6%	66.4%
19	Annual Farm Turnout		-2.2%	-1.8%	-1.7%									-5.8%
20	SEV Loss Factor (%)	9.5%	7.8%	8.4%	12.1%	20.4%	27.9%	33.4%	40.3%	43.5%	37.2%	28.2%	19.3%	-----

10.4% <---- Annual SEV as a Percentage of Off-Farm Lateral Loss, On-Farm Lateral Loss, and Tailwater
65.0% <---- Average Annual Farm Efficiency (%)

Row descriptions:
1) Pro rata share of historical River Headgate diversions.
2) Pro rata share of historical Reservoir releases.
3) Row 1 x 36.7% + Row 2 x 35.1%
4) Row 1 + Row 2 - Row 3
5) (Row 1 + Row 2) x 3.5%
6) Row 4 - Row 5
7) Row 6 x 3.5%
8) (Row 6 - Row 7) x 22.6% When the water supply exceeded the consumptive irrigation requirement and refilled the root zone the excess was assigned to deep percolation resulting in more than 22.6% in some months.
9) (Row 6 - Row 7) x 10.0%
10) crop consumptive use from applied irrigation water. and from soil moisture storage Calculated from monthly water budget.
11) Row 9 x Row 19
12) Row 10 + Row 11
13) Previous Row 13 + Row 6 - Row 7 - Row 8 - Row 9 - Row 10
14) Row 13 - previous Row 13
15) Row 9 x (1 - Row 19)
16) Lagged Off-Farm Lateral loss, On Farm Lateral Loss, and tailwater (lagging after SEV loss)
17) Row 4 - Row 15 - Row 16
18) Row 17 ÷ Row 6 x 100%.
19) Row 17 ÷ Annual Row 6 x 100%.
20) SEV loss factors from HI Model

TABLE 63

SUMMARY OF WATER BUDGET RESULTS AND DERIVATION OF DEPLETION FACTORS FOR FARMS USING THE McCLAVE LATERAL AUGMENTATION STATION

(Farm Nos. 42 and 64 - 390 of 390 Total FLCC Shares)

STUDY PERIOD OF 1979 TO 2014

(values in acre-feet)

Row	Component	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
	Ditch and Off-Farm Lateral Operations													
1	Pro rata share of River HG	50.6	1.3	2.4	1.4	39.1	85.9	115.7	160.2	125.7	103.6	65.8	61.7	813.4
2	Pro rata share of Res Rel	0.7	0.2	0.2	0.3	2.8	22.1	21.1	10.8	29.5	28.8	26.4	8.6	151.7
3	Canal loss	18.8	0.6	0.9	0.6	15.3	39.3	49.9	62.6	56.5	48.1	33.4	25.7	351.8
4	Farm Turnout Delivery	32.5	1.0	1.6	1.0	26.6	68.8	86.9	108.4	98.7	84.3	58.8	44.7	613.3
5	Off-farm lateral loss	1.8	0.1	0.1	0.1	1.5	3.8	4.8	6.0	5.4	4.6	3.2	2.5	33.8
	On-Farm Operation													
6	Farm delivery	30.7	0.9	1.5	1.0	25.1	65.0	82.1	102.5	93.3	79.6	55.6	42.2	579.5
7	On-Farm lateral Loss	1.1	0.0	0.1	0.0	0.9	2.3	2.9	3.6	3.3	2.8	1.9	1.5	20.3
8	Deep percolation	6.8	0.2	0.3	0.2	5.5	14.2	17.9	22.3	20.3	17.4	12.6	9.5	127.3
9	Tail water	3.0	0.1	0.1	0.1	2.4	6.3	7.9	9.9	9.0	7.7	5.4	4.1	55.9
10	Crop consumptive use	6.1	3.2	2.9	3.8	7.2	45.1	57.7	82.7	68.5	52.2	33.3	13.2	375.8
11	SEV Losses	0.2	0.0	0.0	0.0	0.3	1.1	1.7	2.5	2.4	1.8	0.9	0.5	11.4
12	Total consumptive use	6.3	3.2	2.9	3.8	7.5	46.2	59.3	85.2	70.9	54.0	34.3	13.7	387.2
13	End of month soil storage	18.3	32.1	29.5	27.6	24.4	33.5	30.7	26.4	10.4	2.5	2.0	4.4	-----
14	Soil storage change	13.9	13.7	-2.6	-1.9	-3.2	9.1	-2.8	-4.3	-16.1	-7.9	-0.4	2.4	-----
	Lagged Return Flows													
15	Surface water return	3.0	0.1	0.1	0.1	2.4	6.3	7.9	9.9	9.0	7.7	5.4	4.1	55.9
16	Ground water return	15.4	13.9	12.3	11.4	11.2	12.3	14.0	15.7	16.9	17.3	16.9	16.3	173.6
	Stream Depletion													
17	Stream depletion	14.2	-13.0	-10.9	-10.4	13.0	50.2	65.0	82.9	72.8	59.3	36.5	24.3	383.8
18	Farm Turnout Delivery	46.2%	Total Winter Depls=	-34.3		51.7%	77.2%	79.1%	80.9%	78.1%	74.5%	65.7%	57.5%	66.2%
19	Winter depletions as % of Annual Farm Turnout Delivery		-2.2%	-1.9%	-1.8%									-5.9%
20	SEV Loss Factor (%)	9.5%	7.8%	8.4%	12.1%	20.4%	27.9%	33.4%	40.3%	43.5%	37.2%	28.2%	19.3%	-----

10.4% <---- Annual SEV as a Percentage of Off-Farm Lateral Loss, On-Farm Lateral Loss, and Tailwater

64.8% <---- Average Annual Farm Efficiency (%)

Row descriptions:

1) Pro rata share of historical River Headgate diversions.
2) Pro rata share of historical Reservoir releases.
3) Row 1 x 36.7% + Row 2 x 35.1%
4) Row 1 + Row 2 - Row 3
5) (Row 1 + Row 2) x 3.5%
6) Row 4 - Row 5
7) Row 6 x 3.5%
8) (Row 6 - Row 7) x 22.6% When the water supply exceeded the consumptive irrigation requirement and refilled the root zone the excess was assigned to deep percolation resulting in more than 22.6% in some months.
9) (Row 6 - Row 7) x 10.0%
10) crop consumptive use from applied irrigation water. and from soil moisture storage Calculated from monthly water budget.
11) Row 9 x Row 19
12) Row 10 + Row 11
13) Previous Row 13 + Row 6 - Row 7 - Row 8 - Row 9 - Row 10
14) Row 13 - previous Row 13
15) Row 9 x (1 - Row 19)
16) Lagged Off-Farm Lateral loss, On Farm Lateral Loss, and tailwater (lagging after SEV loss)
17) Row 4 - Row 15 - Row 16
18) Row 17 ÷ Row 6 x 100%.
19) Row 17 ÷ Annual Row 6 x 100%.
20) SEV loss factors from HI Model

TABLE 64

SUMMARY OF WATER BUDGET RESULTS AND DERIVATION OF DEPLETION FACTORS FOR FARMS USING THE GRAVEYARD CREEK AUGMENTATION STATION (ARFGYDCO)

(Farm No. 53 and Coen - 314 of 314 Total FLCC Shares)

STUDY PERIOD OF 1979 TO 2014

(values in acre-feet)

Row	Component	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
	Ditch and Off-Farm Lateral Operations													
1	Pro rata share of River HG	40.8	1.1	1.9	1.1	31.5	69.2	93.1	129.0	101.2	83.4	53.0	49.7	654.9
2	Pro rata share of Res Rel	0.6	0.2	0.1	0.2	2.2	17.8	17.0	8.7	23.8	23.2	21.3	7.0	122.1
3	Canal loss	15.2	0.4	0.7	0.5	12.3	31.7	40.2	50.4	45.5	38.8	26.9	20.7	283.3
4	Farm Turnout Delivery	26.2	0.8	1.3	0.8	21.4	55.4	70.0	87.3	79.5	67.9	47.4	36.0	493.8
5	Off-farm lateral loss	1.4	0.0	0.1	0.0	1.2	3.0	3.9	4.8	4.4	3.7	2.6	2.0	27.2
	On-Farm Operation													
6	Farm delivery	24.7	0.7	1.2	0.8	20.2	52.3	66.1	82.5	75.1	64.1	44.8	34.0	466.6
7	On-Farm lateral Loss	0.9	0.0	0.0	0.0	0.7	1.8	2.3	2.9	2.6	2.2	1.6	1.2	16.3
8	Deep percolation	5.4	0.2	0.3	0.2	4.4	11.4	14.4	18.0	16.4	14.0	9.8	7.4	101.8
9	Tail water	2.4	0.1	0.1	0.1	1.9	5.0	6.4	8.0	7.2	6.2	4.3	3.3	45.0
10	Crop consumptive use	5.1	2.8	2.3	3.3	6.2	37.6	47.2	64.0	53.9	42.1	27.8	11.0	303.3
11	SEV Losses	0.1	0.0	0.0	0.0	0.2	0.9	1.3	2.0	2.0	1.4	0.8	0.4	9.2
12	Total consumptive use	5.3	2.8	2.3	3.3	6.4	38.5	48.5	66.0	55.9	43.5	28.6	11.4	312.5
13	End of month soil storage	12.4	23.3	21.0	19.5	16.7	23.7	20.1	15.9	5.5	0.4	0.0	1.3	-----
14	Soil storage change	11.1	11.0	-2.3	-1.5	-2.8	7.0	-3.6	-4.2	-10.4	-5.1	-0.4	1.3	-----
	Lagged Return Flows													
15	Surface water return	2.4	0.1	0.1	0.1	1.9	5.0	6.4	8.0	7.2	6.2	4.3	3.3	45.0
16	Ground water return	12.4	11.4	10.3	9.5	9.2	9.8	10.9	12.1	13.1	13.6	13.5	13.1	139.0
	Stream Depletion													
17	Stream depletion	11.4	-10.7	-9.1	-8.7	10.3	40.5	52.7	67.2	59.1	48.1	29.6	19.6	309.7
18	Stream depletion as % of Farm Turnout Delivery	45.9%	Total Winter Depls=		-28.6	50.8%	77.4%	79.7%	81.5%	78.7%	75.0%	66.0%	57.6%	66.4%
19	Winter depletions as % of Annual Farm Turnout Delivery		-2.3%	-2.0%	-1.9%									-6.1%
20	SEV Loss Factor (%)	9.5%	7.8%	8.4%	12.1%	20.4%	27.9%	33.4%	40.3%	43.5%	37.2%	28.2%	19.3%	-----

10.4% <---- Annual SEV as a Percentage of Off-Farm Lateral Loss, On-Farm Lateral Loss, and Tailwater
65.0% <---- Average Annual Farm Efficiency (%)

Row descriptions:
1) Pro rata share of historical River Headgate diversions.
2) Pro rata share of historical Reservoir releases.
3) Row 1 x 36.7% + Row 2 x 35.1%
4) Row 1 + Row 2 - Row 3
5) (Row 1 + Row 2) x 3.5%
6) Row 4 - Row 5
7) Row 6 x 3.5%
8) (Row 6 - Row 7) x 22.6% When the water supply exceeded the consumptive irrigation requirement and refilled the root zone the excess was assigned to deep percolation resulting in more than 22.6% in some months.
9) (Row 6 - Row 7) x 10.0%
10) crop consumptive use from applied irrigation water. and from soil moisture storage Calculated from monthly water budget.
11) Row 9 x Row 19
12) Row 10 + Row 11
13) Previous Row 13 + Row 6 - Row 7 - Row 8 - Row 9 - Row 10
14) Row 13 - previous Row 13
15) Row 9 x (1 - Row 19)
16) Lagged Off-Farm Lateral loss, On Farm Lateral Loss, and tailwater (lagging after SEV loss)
17) Row 4 - Row 15 - Row 16
18) Row 17 ÷ Row 6 x 100%.
19) Row 17 ÷ Annual Row 6 x 100%.
20) SEV loss factors from HI Model

TABLE 65

SUMMARY OF WATER BUDGET RESULTS AND DERIVATION OF DEPLETION FACTORS
FOR FARMS USING THE RIVERVIEW DRAIN AUGMENTATION STATION (ARFRIVCO)

(Farm No. 25 - 322 of 322 Total FLCC Shares)

STUDY PERIOD OF 1979 TO 2014

(values in acre-feet)

Row	Component	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
	Ditch and Off-Farm Lateral Operations													
1	Pro rata share of River HG	41.8	1.1	2.0	1.1	32.3	71.0	95.5	132.3	103.8	85.5	54.4	51.8	672.4
2	Pro rata share of Res Rel	0.6	0.2	0.1	0.2	2.3	18.3	17.5	8.9	24.4	23.8	21.8	7.2	125.3
3	Canal loss	15.6	0.5	0.8	0.5	12.7	32.5	41.2	51.7	46.6	39.8	27.6	21.5	290.8
4	Farm Turnout Delivery	26.9	0.8	1.3	0.9	21.9	56.8	71.8	89.5	81.5	69.6	48.6	37.4	506.9
5	Off-farm lateral loss	1.5	0.0	0.1	0.0	1.2	3.1	4.0	4.9	4.5	3.8	2.7	2.1	27.9
	On-Farm Operation													
6	Farm delivery	25.4	0.8	1.3	0.8	20.7	53.6	67.8	84.6	77.0	65.8	45.9	35.4	479.0
7	On-Farm lateral Loss	0.9	0.0	0.0	0.0	0.7	1.9	2.4	3.0	2.7	2.3	1.6	1.2	16.8
8	Deep percolation	5.5	0.2	0.3	0.2	4.5	11.7	14.8	18.4	16.8	14.3	10.0	7.6	104.3
9	Tail water	2.4	0.1	0.1	0.1	2.0	5.2	6.5	8.2	7.4	6.3	4.4	3.4	46.2
10	Crop consumptive use	7.5	4.0	3.2	3.9	7.5	41.2	48.8	58.9	50.1	42.7	29.8	13.3	310.9
11	SEV Losses	0.1	0.0	0.0	0.0	0.3	0.9	1.4	2.1	2.0	1.5	0.8	0.4	9.4
12	Total consumptive use	7.7	4.0	3.2	3.9	7.8	42.1	50.2	61.0	52.1	44.2	30.5	13.7	320.4
13	End of month soil storage	9.3	18.3	14.8	12.4	9.1	15.0	8.7	4.0	0.0	0.0	0.0	0.1	-----
14	Soil storage change	9.3	9.0	-3.5	-2.4	-3.3	5.9	-6.4	-4.7	-4.0	0.0	0.0	0.1	-----
	Lagged Return Flows													
15	Surface water return	2.4	0.1	0.1	0.1	2.0	5.2	6.5	8.2	7.4	6.3	4.4	3.4	46.2
16	Ground water return	12.6	11.5	10.4	9.7	9.5	10.3	11.5	12.7	13.6	13.9	13.7	13.2	142.5
	Stream Depletion													
17	Stream depletion	11.8	-10.8	-9.2	-8.9	10.5	41.3	53.8	68.7	60.5	49.3	30.4	20.8	318.2
18	Stream depletion as % of Farm Turnout Delivery	46.7%	Total Winter Depls=	-28.9		50.5%	77.1%	79.3%	81.2%	78.5%	75.0%	66.3%	58.9%	66.4%
19	Winter depletions as % of Annual Farm Turnout Delivery		-2.3%	-1.9%	-1.9%									-6.0%
20	SEV Loss Factor (%)	9.5%	7.8%	8.4%	12.1%	20.4%	27.9%	33.4%	40.3%	43.5%	37.2%	28.2%	19.3%	-----

10.4% <---- Annual SEV as a Percentage of Off-Farm Lateral Loss, On-Farm Lateral Loss, and Tailwater
64.9% <---- Average Annual Farm Efficiency (%)

Row descriptions:
1) Pro rata share of historical River Headgate diversions.
2) Pro rata share of historical Reservoir releases.
3) Row 1 x 36.7% + Row 2 x 35.1%
4) Row 1 + Row 2 - Row 3
5) (Row 1 + Row 2) x 3.5%
6) Row 4 - Row 5
7) Row 6 x 3.5%
8) (Row 6 - Row 7) x 22.6% When the water supply exceeded the consumptive irrigation requirement and refilled the root zone the excess was assigned to deep percolation resulting in more than 22.6% in some months.
9) (Row 6 - Row 7) x 10.0%
10) crop consumptive use from applied irrigation water. and from soil moisture storage Calculated from monthly water budget.
11) Row 9 x Row 19
12) Row 10 + Row 11
13) Previous Row 13 + Row 6 - Row 7 - Row 8 - Row 9 - Row 10
14) Row 13 - previous Row 13
15) Row 9 x (1 - Row 19)
16) Lagged Off-Farm Lateral loss, On Farm Lateral Loss, and tailwater (lagging after SEV loss)
17) Row 4 - Row 15 - Row 16
18) Row 17 ÷ Row 6 x 100%.
19) Row 17 ÷ Annual Row 6 x 100%.
20) SEV loss factors from HI Model

TABLE 66
SUMMARY OF WATER BUDGET RESULTS AND DERIVATION OF DEPLETION FACTORS
FOR FARMS USING THE FARM NO 110 RECHARGE SITE
(Farm Nos. 25, portion 63, 85, 110, 114 - 738 of 741 Total FLCC Shares)

STUDY PERIOD OF 1979 TO 2014

(values in acre-feet)

Row	Component	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
	Ditch and Off-Farm Lateral Operations													
1	Pro rata share of River HG	96.2	2.5	4.5	2.6	74.3	163.3	219.8	304.4	238.8	196.9	125.1	117.2	1,545.5
2	Pro rata share of Res Rel	1.4	0.4	0.3	0.5	5.3	42.0	40.2	20.6	56.1	54.7	50.2	16.4	288.2
3	Canal loss	35.8	1.1	1.8	1.1	29.1	74.7	94.8	118.9	107.3	91.5	63.6	48.8	668.4
4	Farm Turnout Delivery	61.8	1.8	3.0	2.0	50.5	130.6	165.2	206.0	187.5	160.1	111.8	84.9	1,165.2
5	Off-farm lateral loss	3.4	0.1	0.2	0.1	2.8	7.2	9.1	11.4	10.3	8.8	6.1	4.7	64.2
	On-Farm Operation													
6	Farm delivery	58.4	1.7	2.9	1.9	47.7	123.4	156.1	194.7	177.2	151.3	105.6	80.2	1,101.1
7	On-Farm lateral Loss	2.0	0.1	0.1	0.1	1.7	4.3	5.5	6.8	6.2	5.3	3.7	2.8	38.5
8	Deep percolation	12.7	0.4	0.6	0.4	10.4	26.9	34.0	42.5	38.6	33.0	23.0	17.5	240.1
9	Tail water	5.6	0.2	0.3	0.2	4.6	11.9	15.1	18.8	17.1	14.6	10.2	7.7	106.3
10	Crop consumptive use	15.9	8.4	6.8	8.3	16.7	93.2	113.2	140.2	117.4	98.4	67.8	29.4	715.6
11	SEV Losses	0.3	0.0	0.0	0.0	0.6	2.1	3.1	4.7	4.6	3.4	1.8	0.9	21.7
12	Total consumptive use	16.2	8.4	6.8	8.4	17.2	95.2	116.4	145.0	122.0	101.7	69.6	30.3	737.3
13	End of month soil storage	23.5	45.6	38.3	33.4	26.3	40.6	27.7	15.9	2.2	0.0	0.0	0.8	-----
14	Soil storage change	22.7	22.1	-7.3	-4.9	-7.1	14.3	-12.9	-11.8	-13.7	-2.2	0.0	0.8	-----
	Lagged Return Flows													
15	Surface water return	5.6	0.2	0.3	0.2	4.6	11.9	15.1	18.8	17.1	14.6	10.2	7.7	106.3
16	Ground water return	29.1	26.4	23.5	21.7	21.2	23.2	26.3	29.4	31.8	32.6	32.0	30.8	328.1
	Stream Depletion													
17	Stream depletion	27.1	-24.7	-20.8	-19.9	24.6	95.5	123.8	157.8	138.6	112.9	69.6	46.3	730.9
18	Stream depletion as % of Farm Turnout Delivery	46.5%	Total Winter Depls=	-65.4		51.7%	77.4%	79.3%	81.1%	78.2%	74.6%	65.9%	57.7%	66.4%
19	Winter depletions as % of Annual Farm Turnout Delivery		-2.2%	-1.9%	-1.8%									-5.9%
20	SEV Loss Factor (%)	9.5%	7.8%	8.4%	12.1%	20.4%	27.9%	33.4%	40.3%	43.5%	37.2%	28.2%	19.3%	-----
	LAWMA'S Portion of the Total FLCC Shares													
21	Pro-Rata River HG	95.8	2.5	4.5	2.6	74.0	162.6	218.9	303.2	237.8	196.1	124.6	116.8	1,539.3
22	Pro-Rata Res Rel	1.4	0.4	0.3	0.5	5.3	41.9	40.0	20.5	55.9	54.5	50.0	16.4	287.0
23	Pro-Rata Farm Delivery	58.2	1.7	2.9	1.9	47.5	122.9	155.4	193.9	176.5	150.7	105.2	79.9	1,096.6
24	Pro-Rata Stream Depletion	27.0	-24.6	-20.7	-19.8	24.5	95.1	123.3	157.2	138.1	112.5	69.3	46.1	728.0
25	Pro-Rata Surface water return flow	5.6	0.2	0.3	0.2	4.6	11.9	15.0	18.7	17.0	14.5	10.2	7.7	105.8
26	Pro-Rata Ground water return flow	28.9	26.3	23.4	21.6	21.1	23.1	26.2	29.3	31.7	32.4	31.9	30.7	326.7

TABLE 66

SUMMARY OF WATER BUDGET RESULTS AND DERIVATION OF DEPLETION FACTORS
FOR FARMS USING THE FARM NO 110 RECHARGE SITE

(Farm Nos. 25, portion 63, 85, 110, 114 - 738 of 741 Total FLCC Shares)

STUDY PERIOD OF 1979 TO 2014

(values in acre-feet)

Row	Component	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
27	Pro-Rata Total Consumptive use	16.2	8.4	6.7	8.3	17.2	94.9	115.9	144.3	121.5	101.3	69.4	30.2	734.3
		Total Winter Stream Depletions=			-65.1									

10.4% <---- Annual SEV as a Percentage of Off-Farm Lateral Loss, On-Farm Lateral Loss, and Tailwater
65.0% <---- Average Annual Farm Efficiency (%)

Row descriptions:

1) Pro rata share of historical River Headgate diversions.
2) Pro rata share of historical Reservoir releases.
3) Row 1 x 36.7% + Row 2 x 35.1%
4) Row 1 + Row 2 - Row 3
5) (Row 1 + Row 2) x 3.5%
6) Row 4 - Row 5
7) Row 6 x 3.5%
8) (Row 6 - Row 7) x 22.6% When the water supply exceeded the consumptive irrigation requirement and refilled the root zone the excess was assigned to deep percolation resulting in more than 22.6% in some months.
9) (Row 6 - Row 7) x 10.0%
10) crop consumptive use from applied irrigation water. and from soil moisture storage Calculated from monthly water budget.
11) Row 9 x Row 19
12) Row 10 + Row 11
13) Previous Row 13 + Row 6 - Row 7 - Row 8 - Row 9 - Row 10
14) Row 13 - previous Row 13
15) Row 9 x (1 - Row 19)
16) Lagged Off-Farm Lateral loss, On Farm Lateral Loss, and tailwater (lagging after SEV loss)
17) Row 4 - Row 15 - Row 16
18) Row 17 ÷ Row 6 x 100%.
19) Row 17 ÷ Annual Row 6 x 100%.
20) SEV loss factors from HI Model
21) Row 1 x 738 ÷ 741.
22) Row 2 x 738 ÷ 741.
23) Row 4 x 738 ÷ 741.
24) Row 17 x 738 ÷ 741.
25) Row 15 x 738 ÷ 741.
26) Row 16 x 738 ÷ 741.
27) Row 12 x 738 ÷ 741.

TABLE 67

SUMMARY OF WATER BUDGET RESULTS AND DERIVATION OF DEPLETION FACTORS
FOR FARMS USING THE FARM NO. 63B RECHARGE SITE

(Farm No. portion 63 - 410 of 410 Total FLCC Shares)
STUDY PERIOD OF 1979 TO 2014
(values in acre-feet)

Row	Component	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
	Ditch and Off-Farm Lateral Operations													
1	Pro rata share of River HG	53.2	1.4	2.5	1.4	41.1	90.3	121.6	168.4	132.1	108.9	68.5	64.9	854.4
2	Pro rata share of Res Rel	0.8	0.2	0.2	0.3	2.9	23.3	22.2	11.4	31.0	30.3	27.5	9.1	159.2
3	Canal loss	19.8	0.6	1.0	0.6	16.1	41.3	52.4	65.8	59.4	50.6	34.8	27.0	369.5
4	Farm Turnout Delivery	34.2	1.0	1.7	1.1	27.9	72.3	91.4	114.0	103.8	88.6	61.2	47.0	644.1
5	Off-farm lateral loss	1.9	0.1	0.1	0.1	1.5	4.0	5.0	6.3	5.7	4.9	3.4	2.6	35.5
	On-Farm Operation													
6	Farm delivery	32.3	1.0	1.6	1.0	26.4	68.3	86.4	107.7	98.1	83.7	57.9	44.4	608.7
7	On-Farm lateral Loss	1.1	0.0	0.1	0.0	0.9	2.4	3.0	3.8	3.4	2.9	2.0	1.6	21.3
8	Deep percolation	7.0	0.2	0.3	0.2	5.8	14.9	18.8	23.5	21.4	18.3	12.6	9.7	132.7
9	Tail water	3.1	0.1	0.2	0.1	2.5	6.6	8.3	10.4	9.5	8.1	5.6	4.3	58.7
10	Crop consumptive use	8.8	4.6	3.7	4.7	9.1	51.7	63.2	77.5	64.4	54.4	37.2	16.3	395.6
11	SEV Losses	0.2	0.0	0.0	0.0	0.3	1.2	1.7	2.6	2.6	1.9	1.0	0.5	12.0
12	Total consumptive use	9.0	4.6	3.7	4.7	9.4	52.8	64.9	80.1	67.0	56.3	38.2	16.9	407.6
13	End of month soil storage	12.9	25.1	21.1	18.4	14.4	22.5	15.2	8.1	0.6	0.0	0.0	0.4	-----
14	Soil storage change	12.5	12.2	-4.0	-2.7	-4.0	8.0	-7.3	-7.0	-7.5	-0.6	0.0	0.4	-----
	Lagged Return Flows													
15	Surface water return	3.1	0.1	0.2	0.1	2.5	6.6	8.3	10.4	9.5	8.1	5.6	4.3	58.7
16	Ground water return	16.1	14.5	12.8	11.7	11.4	12.6	14.5	16.4	17.9	18.3	18.1	17.2	181.6
	Stream Depletion													
17	Stream depletion	14.9	-13.6	-11.2	-10.7	14.0	53.1	68.5	87.2	76.4	62.2	37.6	25.4	403.8
18	Stream depletion as % of Farm Turnout Delivery	46.2%	Total Winter Depls=		-35.5	53.0%	77.7%	79.4%	80.9%	77.9%	74.3%	64.9%	57.3%	66.3%
19	Annual Farm Turnout		-2.2%	-1.8%	-1.8%									-5.8%
19	SEV Loss Factor (%)	9.5%	7.8%	8.4%	12.1%	20.4%	27.9%	33.4%	40.3%	43.5%	37.2%	28.2%	19.3%	-----

10.4% <---- Annual SEV as a Percentage of Off-Farm Lateral Loss, On-Farm Lateral Loss, and Tailwater
65.0% <---- Average Annual Farm Efficiency (%)

Row descriptions:
1) Pro rata share of historical River Headgate diversions.
2) Pro rata share of historical Reservoir releases.
3) Row 1 x 36.7% + Row 2 x 35.1%
4) Row 1 + Row 2 - Row 3
5) (Row 1 + Row 2) x 3.5%
6) Row 4 - Row 5
7) Row 6 x 3.5%
8) (Row 6 - Row 7) x 22.6% When the water supply exceeded the consumptive irrigation requirement and refilled the root zone the excess was assigned to deep percolation resulting in more than 22.6% in some months.
9) (Row 6 - Row 7) x 10.0%
10) crop consumptive use from applied irrigation water. and from soil moisture storage Calculated from monthly water budget.
11) Row 9 x Row 19
12) Row 10 + Row 11
13) Previous Row 13 + Row 6 - Row 7 - Row 8 - Row 9 - Row 10
14) Row 13 - previous Row 13
15) Row 9 x (1 - Row 19)
16) Lagged Off-Farm Lateral loss, On Farm Lateral Loss, and tailwater (lagging after SEV loss)
17) Row 4 - Row 15 - Row 16
18) Row 17 ÷ Row 6 x 100%.
19) Row 17 ÷ Annual Row 6 x 100%.

TABLE 68

SUMMARY OF WATER BUDGET RESULTS AND DERIVATION OF DEPLETION FACTORS
FOR FARMS USING THE WHEATRIDGE AUGMENTATION STATION

(Farm Nos. 62, 118, 141 - 691 OF 691 Total FLCC Shares)

STUDY PERIOD OF 1979 TO 2014

(values in acre-feet)

Row	Component	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
	Ditch and Off-Farm Lateral Operations													
1	Pro rata share of River HG	89.7	2.3	4.2	2.4	69.3	152.3	204.9	283.9	222.7	183.6	116.7	109.3	1,441.2
2	Pro rata share of Res Rel	1.3	0.4	0.3	0.5	4.9	39.2	37.4	19.2	52.3	51.0	46.8	15.3	268.7
3	Canal loss	33.4	1.0	1.6	1.1	27.2	69.7	88.4	110.9	100.1	85.3	59.3	45.5	623.3
4	Farm Turnout Delivery	57.6	1.7	2.8	1.8	47.1	121.8	154.0	192.1	174.9	149.3	104.2	79.1	1,086.6
5	Off-farm lateral loss	3.2	0.1	0.2	0.1	2.6	6.7	8.5	10.6	9.6	8.2	5.7	4.4	59.8
	On-Farm Operation													
6	Farm delivery	54.5	1.6	2.7	1.7	44.5	115.1	145.5	181.5	165.3	141.1	98.5	74.8	1,026.8
7	On-Farm lateral Loss	1.9	0.1	0.1	0.1	1.6	4.0	5.1	6.4	5.8	4.9	3.4	2.6	35.9
8	Deep percolation	11.9	0.4	0.6	0.4	9.7	25.1	31.7	39.6	36.0	30.8	21.5	16.3	223.9
9	Tail water	5.3	0.2	0.3	0.2	4.3	11.1	14.0	17.5	15.9	13.6	9.5	7.2	99.1
10	Crop consumptive use	10.9	5.9	5.0	6.9	13.3	81.6	102.7	143.8	120.1	93.2	60.3	23.8	667.3
11	SEV Losses	0.3	0.0	0.0	0.0	0.5	1.9	2.9	4.4	4.3	3.2	1.7	0.9	20.2
12	Total consumptive use	11.2	5.9	5.0	6.9	13.9	83.5	105.6	148.2	124.4	96.4	62.0	24.7	687.6
13	End of month soil storage	28.5	53.1	48.3	45.0	39.2	54.8	48.1	40.0	14.2	1.6	0.1	3.8	-----
14	Soil storage change	24.7	24.5	-4.8	-3.3	-5.8	15.6	-6.7	-8.1	-25.8	-12.7	-1.5	3.7	-----
	Lagged Return Flows													
15	Surface water return	5.3	0.2	0.3	0.2	4.3	11.1	14.0	17.5	15.9	13.6	9.5	7.2	99.1
16	Ground water return	27.5	24.8	21.9	19.9	19.3	21.2	24.2	27.3	29.8	30.7	30.3	29.2	305.9
	Stream Depletion													
17	Stream depletion	24.9	-23.2	-19.3	-18.2	23.5	89.5	115.8	147.3	129.2	105.0	64.4	42.7	681.6
18	Stream depletion as % of Farm Turnout Delivery	45.8%	Total Winter Depls=		-60.8	52.7%	77.8%	79.6%	81.2%	78.2%	74.4%	65.4%	57.2%	66.4%
19	Winter depletions as % of Annual Farm Turnout Delivery		-2.3%	-1.9%	-1.8%									-5.9%
20	SEV Loss Factor (%)	9.5%	7.8%	8.4%	12.1%	20.4%	27.9%	33.4%	40.3%	43.5%	37.2%	28.2%	19.3%	-----

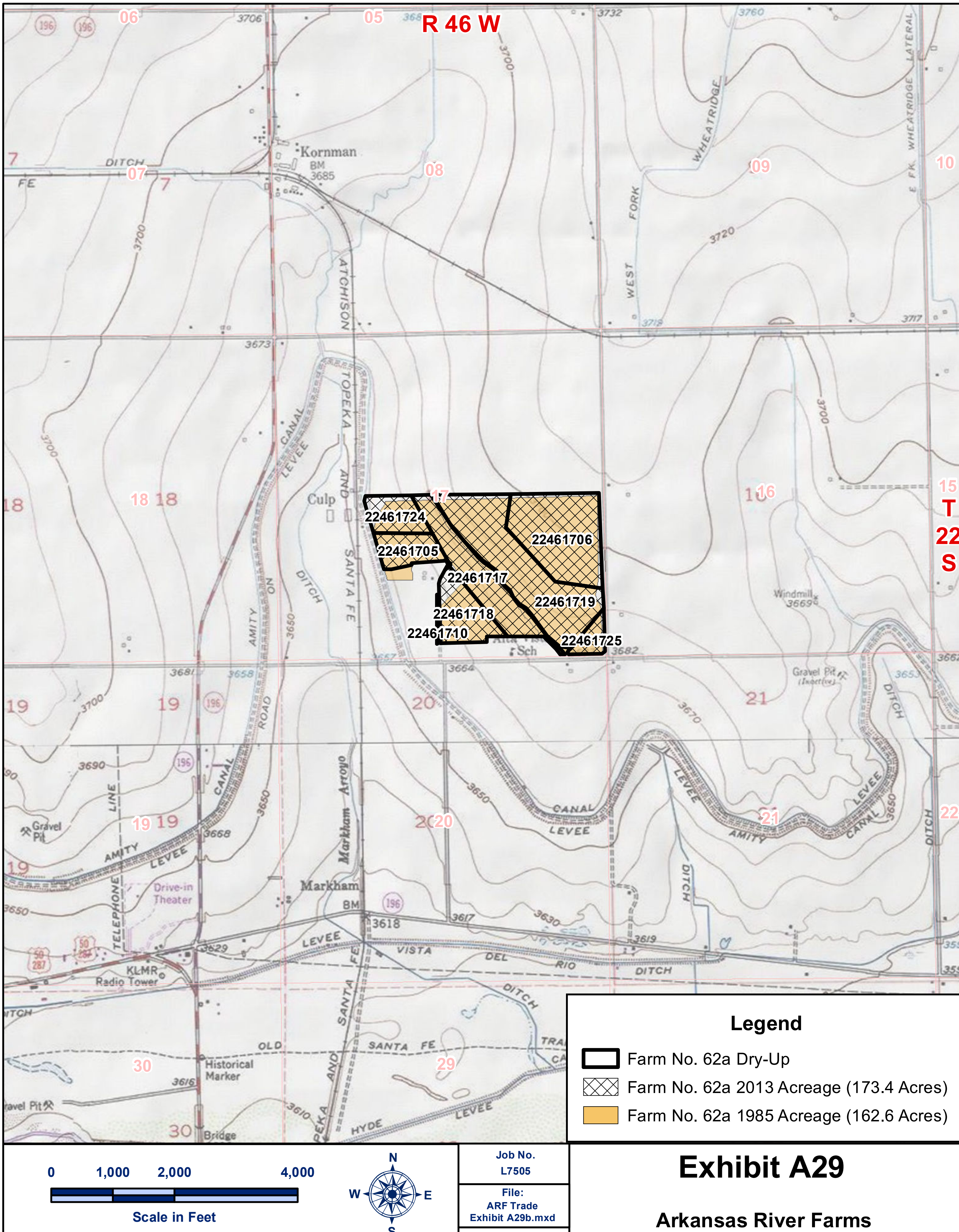
10.4% <---- Annual SEV as a Percentage of Off-Farm Lateral Loss, On-Farm Lateral Loss, and Tailwater
65.0% <---- Average Annual Farm Efficiency (%)

Row descriptions:
1) Pro rata share of historical River Headgate diversions.
2) Pro rata share of historical Reservoir releases.
3) Row 1 x 36.7% + Row 2 x 35.1%
4) Row 1 + Row 2 - Row 3
5) (Row 1 + Row 2) x 3.5%
6) Row 4 - Row 5
7) Row 6 x 3.5%
8) (Row 6 - Row 7) x 22.6% When the water supply exceeded the consumptive irrigation requirement and refilled the root zone the excess was assigned to deep percolation resulting in more than 22.6% in some months.
9) (Row 6 - Row 7) x 10.0%
10) crop consumptive use from applied irrigation water. and from soil moisture storage Calculated from monthly water budget.
11) Row 9 x Row 19
12) Row 10 + Row 11
13) Previous Row 13 + Row 6 - Row 7 - Row 8 - Row 9 - Row 10
14) Row 13 - previous Row 13
15) Row 9 x (1 - Row 19)
16) Lagged Off-Farm Lateral loss, On Farm Lateral Loss, and tailwater (lagging after SEV loss)
17) Row 4 - Row 15 - Row 16
18) Row 17 ÷ Row 6 x 100%.
19) Row 17 ÷ Annual Row 6 x 100%.
20) SEV loss factors from HI Model

Table 69
Fort Lyon Canal Consumptive Use Analysis - Arkansas River Farms
Farm Turnout Delivery
(values in acre-feet)

Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total	Mar to Nov Total	10-Year Cumulative Max
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1950	1,255	773	379	480	457	816	1,045	2,136	1,694	929	904	658	11,526	9,200	
1951	561	650	532	538	566	459	1,219	1,431	1,882	1,329	806	635	10,606	9,142	
1952	817	498	519	539	498	704	2,010	2,406	1,434	897	548	526	11,394	9,600	
1953	578	768	598	588	471	492	665	2,181	1,333	1,111	220	285	9,290	7,385	
1954	627	399	256	552	505	151	625	500	623	505	0	295	5,039	3,551	
1955	347	501	541	433	390	67	300	1,782	684	1,437	590	444	7,517	6,261	
1956	566	708	661	338	597	412	1,000	1,719	580	446	0	93	7,121	5,282	
1957	435	529	495	537	381	1,234	1,507	1,577	2,760	2,742	1,422	615	14,234	12,429	
1958	191	377	0	40	0	365	925	2,329	1,862	1,757	1,157	607	9,611	9,816	
1959	814	1,169	205	186	718	864	1,155	2,163	1,139	801	119	1,535	10,868	9,790	82,456
1960	1,295	1,317	215	115	230	485	900	2,126	1,285	430	408	576	9,383	7,308	80,564
1961	868	896	188	374	1,100	768	928	2,009	961	1,547	1,368	950	11,957	10,697	82,119
1962	1,066	298	0	444	713	1,611	1,992	1,970	2,172	1,275	743	716	13,000	12,063	84,581
1963	871	1,044	318	1,021	869	375	411	655	301	586	804	301	7,555	4,802	81,998
1964	500	584	745	727	610	447	527	1,495	487	533	107	104	6,866	4,759	83,207
1965	448	783	794	847	829	445	810	1,136	2,156	2,584	2,057	1,038	13,928	11,862	88,808
1966	807	590	19	0	245	575	1,146	1,542	1,581	1,530	928	691	9,653	8,895	92,421
1967	658	888	880	693	525	673	1,008	1,516	2,065	1,336	1,070	590	11,902	9,567	89,559
1968	784	895	844	1,171	813	555	637	2,144	1,053	1,660	670	543	11,768	9,175	88,917
1969	1,100	858	822	756	499	497	1,774	1,963	2,266	1,313	921	140	12,909	9,387	88,515
1970	14	202	112	975	980	1,486	2,039	1,805	2,102	1,811	1,613	273	13,412	12,873	94,080
1971	763	1,005	414	525	781	867	810	1,943	1,993	1,470	529	533	11,633	10,512	93,894
1972	1,585	525	62	458	620	610	1,018	2,090	1,316	623	603	474	9,985	8,036	89,868
1973	682	10	34	56	1,152	598	1,746	2,201	2,431	1,496	1,091	623	12,121	11,994	97,060
1974	655	457	12	410	1,266	580	1,050	1,166	907	479	149	408	7,540	6,626	98,927
1975	622	1,018	628	828	616	454	379	1,896	2,231	944	491	477	10,584	7,949	95,014
1976	461	21	239	729	552	503	860	1,465	551	862	493	532	7,269	6,920	93,038
1977	1,101	477	195	470	681	664	535	459	369	999	172	277	6,399	4,628	88,100
1978	472	633	818	484	422	170	442	1,998	1,374	772	215	211	8,010	6,065	84,990
1979	461	203	0	0	549	941	1,282	2,515	2,099	1,209	623	550	10,432	11,090	86,692
1980	1,322	324	0	0	465	932	844	1,680	3,147	2,784	1,245	720	13,464	11,818	85,638
1981	0	0	0	0	604	1,669	1,130	1,015	840	1,857	668	607	8,389	9,406	84,532
1982	1,017	0	0	0	592	1,033	819	2,069	1,758	2,961	2,035	2,095	14,379	14,540	91,036
1983	1,178	0	0	0	279	1,241	2,475	2,920	3,116	3,909	2,106	1,226	18,450	18,356	97,398
1984	1,083	0	0	0	128	1,364	2,415	3,561	3,219	3,629	1,992	1,518	18,908	17,904	108,676
1985	80	0	0	61	1,597	2,129	2,448	3,014	3,854	3,172	2,565	889	19,810	20,029	120,756
1986	361	0	0	0	280	665	878	1,499	2,495	1,606	1,103	1,073	9,961	9,770	123,607
1987	170	0	214	205	169	2,008	2,301	2,396	1,901	1,331	1,653	1,292	13,641	14,157	133,136
1988	1,106	0	30	0	726	2,005	2,007	2,266	1,946	1,490	1,424	675	13,674	13,162	140,234
1989	624	0	0	0	822	1,649	1,689	1,919	926	1,013	724	533	9,898	9,828	138,972
1990	554	0	0	0	266	601	1,351	2,219	1,899	1,830	805	724	10,248	10,716	137,870
1991	1,023	0	0	0	445	1,257	1,164	1,826	778	1,664	1,095	666	9,918	9,195	137,659
1992	299	0	0	0	644	1,587	1,957	2,102	1,061	1,078	757	525	10,010	10,481	133,600
1993	771	0	0	0	539	1,198	2,009	2,135	2,497	954	1,127	1,525	12,754	12,788	128,032
1994	805	0	0	0	546	1,667	1,785	2,554	1,703	1,640	1,110	891	12,700	12,703	122,830
1995	807	0	0	0	384	1,430	1,868	1,279	2,737	3,527	2,588	1,966	16,586	17,431	120,232
1996	1,652	22	0	124	510	1,962	2,235	2,241	2,635	1,214	1,109	1,244	14,949	13,868	124,330
1997	718	0	0	0	870	1,272	2,314	2,678	3,524	1,382	2,103	1,076	15,937	15,409	125,582
1998	190	50	287	1	10	662	2,868	2,831	2,969	1,125	1,822	1,234	14,049	13,780	126,199
1999	258	0	159	94	513	1,394	1,018	2,827	3,126	2,749	2,089	1,180	15,408	16,274	132,645
2000	1,377	60	412	234	1,277	2,128	2,317	2,579	1,833	1,284	1,124	977	15,602	14,097	136,026
2001	578	0	0	0	392	717	2,101	1,863	1,709	1,194	1,128	613	10,297	10,328	137,159
2002	609	0	0	0	409	1,023	991	613	196	7	20	139	4,006	3,643	130,321
2003	246	0	0	0	288	1,055	1,330	1,976	492	176	385	275	6,223	6,212	123,744
2004	235	0	0	0	336	1,132	1,220	1,317	1,352	1,017	452	509	7,569	7,760	118,802
2005	426	0	0	0	551	1,767	1,785	2,056	1,726	987	309	478	10,085	10,140	111,511
2006	481	0	0	0	386	1,067	1,488	1,283	1,015	954	627	927	8,227	8,550	106,193
2007	804	0	0	0	520	1,546	2,449	2,472	1,862	2,416	1,331	1,001	14,400	14,133	104,917
2008	537	8	10	3	826	1,611	1,837	2,331	1,862	1,622	690	855	12,190	12,130	103,267
2009	498	0	0	0	400	1,148	1,858	2,412	1,834	1,011	845	983	10,989	11,337	98,330
2010	846	0	0	0	618	2,156	1,514	2,301	1,494	1,664	916	572	12,080	11,518	95,750
2011	283	0	0	0	366	958	925	2,058	2,098	1,110	621	533	8,952	9,293	94,715
2012	624	0	0	0	354	880	1,168	783	103	91	24	150	4,178	3,776	94,848
2013	221	0	0	0	461	876	1,010	1,219	500	1,140	942	526	6,896	6,984	95,620
2014	309	0	0	0	286	928	1,403	2,354	2,107	1,617	618	679	10,303	10,662	98,522
Avg	669	301	194	247	561	1,009	1,380	1,923	1,692	1,425	938	717	11,056	10,305	105,848
Max	1,652	1,317	880	1,171	1,597	2,156	2,868	3,561	3,854	3,909	2,588	2,095	19,810	20,029	140,234
2nd Largest	1,585	1,169	844	1,021	1,277	2,129	2,475	3,014	3,524	3,629	2,565	1,966	18,908	18,356	138,972
3rd Largest	1,377	1,044	822	975	1,266	2,128	2,449	2,920	3,219	3,527	2,106	1,535	18,450	17,904	137,870
Min	0	0	0	0	0	67	300	459	103	7	0	93	4,006	3,551	80,564

Notes:
a) Monthly values are the tabulated sum of all of LAWMA's portion associated with the Arkansas River Farms.
b) All monthly, annual, and 10-year maximum volumetric limits occurred after the Winter Water Storage Program.



Job No.
L7505

File:
ARF Trade
Exhibit A29b.mxd

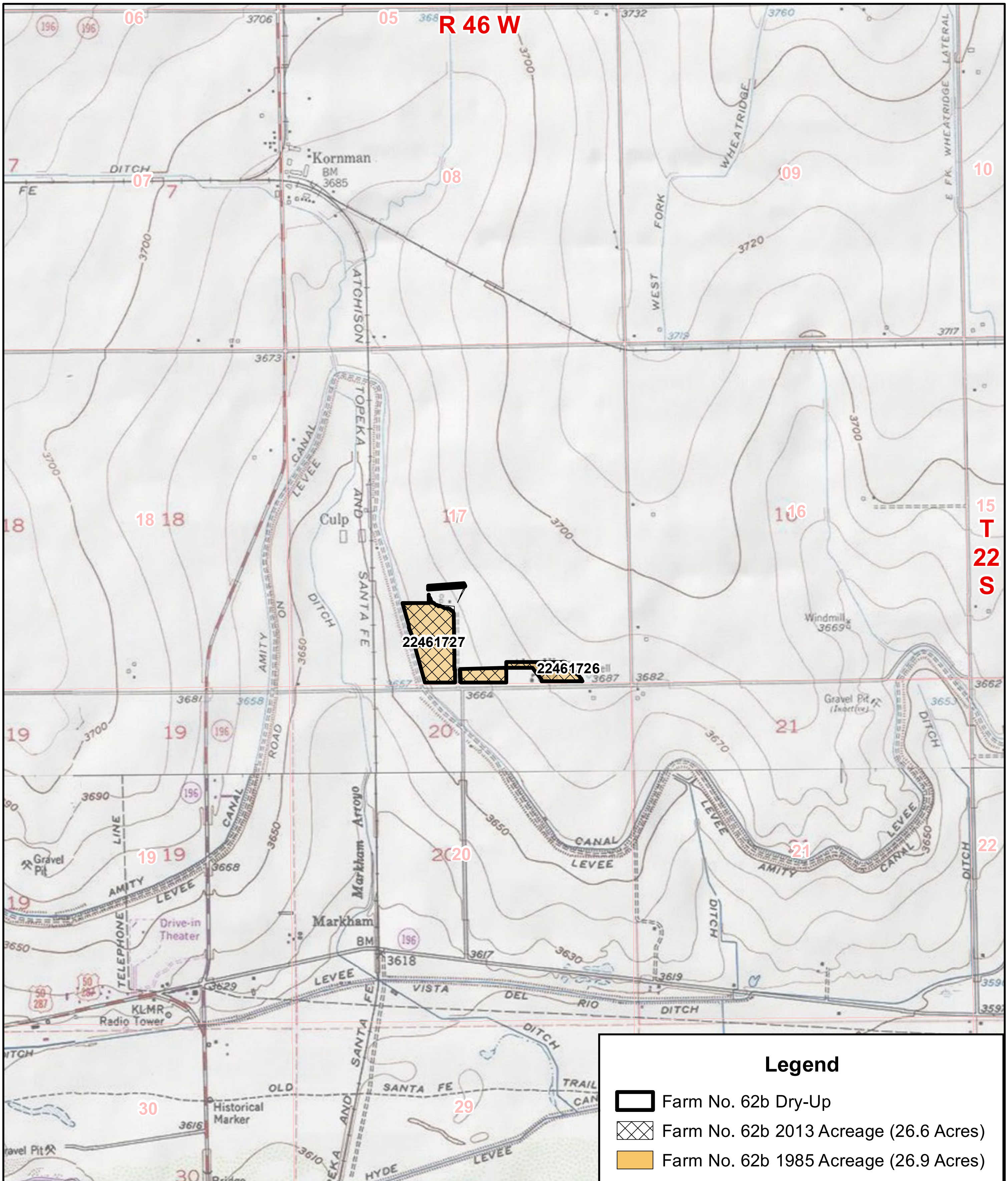
Date:
4/25/16

Prepared For:
LAWMA/ARF

Exhibit A29

Arkansas River Farms
Farm No. 62a Acreage & Dry-Up

Slattery & Hendrix
Engineering LLC



Legend

- Farm No. 62b Dry-Up
- Farm No. 62b 2013 Acreage (26.6 Acres)
- Farm No. 62b 1985 Acreage (26.9 Acres)

0 1,000 2,000 4,000

Scale in Feet

N W E S

Slattery & Hendrix Engineering LLC

Job No. L7505

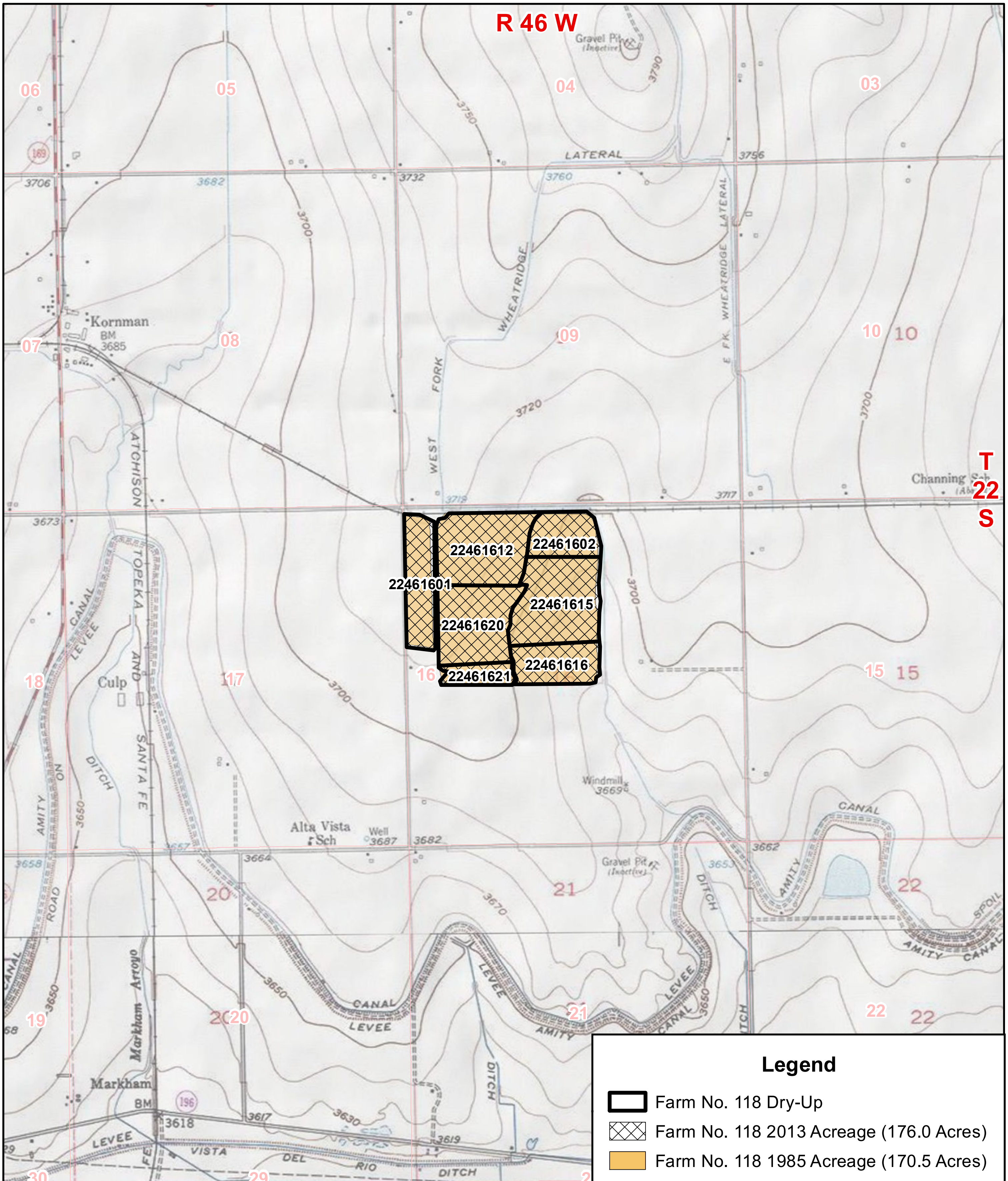
File: ARF Trade Exhibit A30b.mxd

Date: 4/25/16

Prepared For: LAWMA/ARF

Exhibit A30

Arkansas River Farms
Farm No. 62b Acreage & Dry-Up



0 1,000 2,000 4,000

Scale in Feet

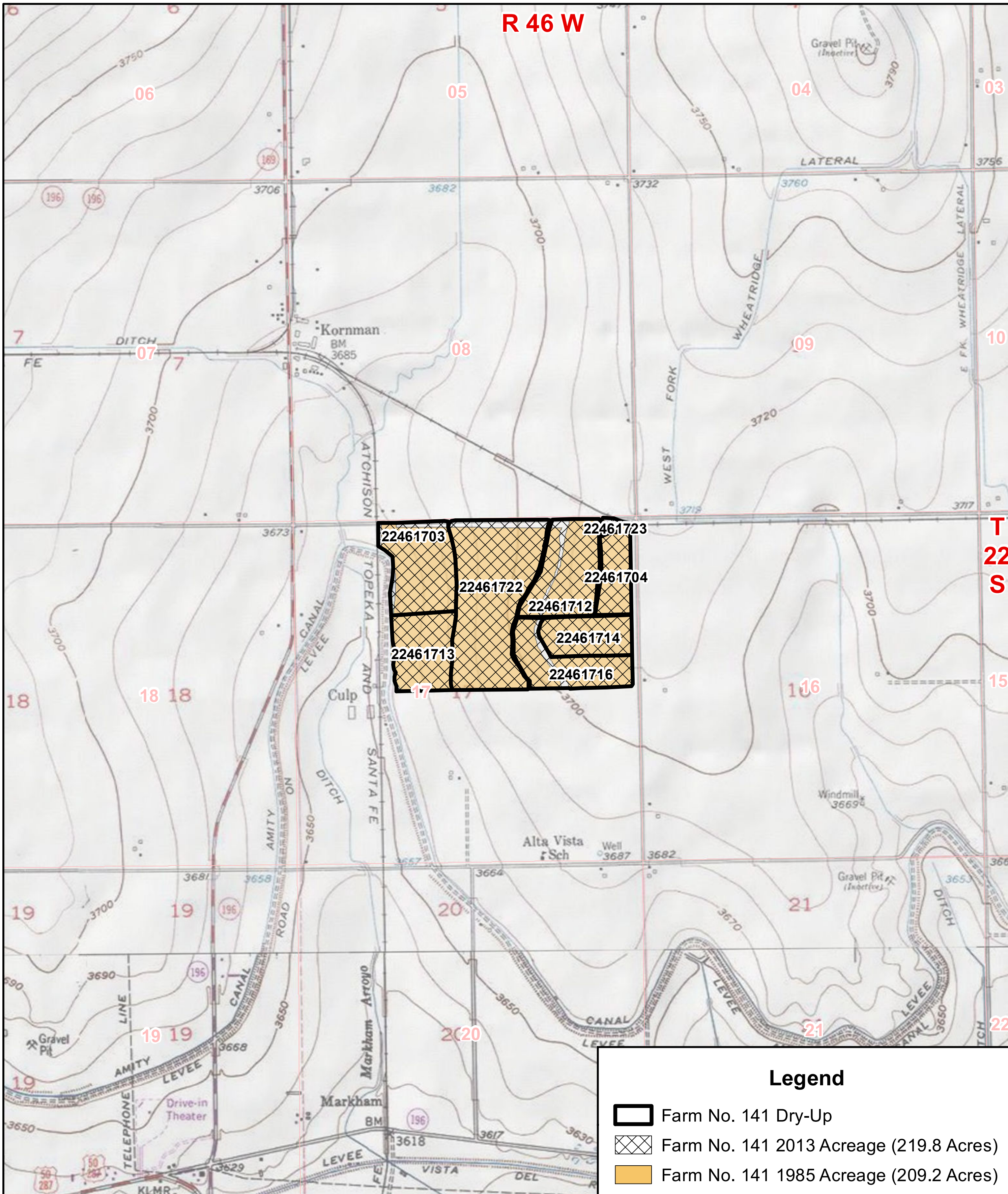
N W E S

Slattery & Hendrix Engineering LLC

Job No.	L7505
File:	ARF Trade Exhibit A38.mxd
Date:	4/27/16
Prepared For:	LAWMA/ARF

Exhibit A38

Arkansas River Farms
Farm No. 118 Acreage & Dry-Up



Legend

- Farm No. 141 Dry-Up
- Farm No. 141 2013 Acreage (219.8 Acres)
- Farm No. 141 1985 Acreage (209.2 Acres)

0 1,000 2,000 4,000

Scale in Feet

N W E S

Job No.
L7505

File:
ARF Trade
Exhibit A41.mxd

Date:
4/27/16

Prepared For:
LAWMA/ARF

Exhibit A41

Arkansas River Farms
Farm No. 141 Acreage & Dry-Up

Slattery & Hendrix Engineering LLC

Prowers County 1041 Farms

Farm #	Total Acreage	Irrigated Acres	Status Irr/dryup	Reveg/Dryland Farm	Total dry-up acres
62	182.42	176	Dryup	Dryland Farm	176
62a	Inc	Inc	Dryup	Dryland Farm	
63*	None Owned		Dryup	Dryland Farm	
118	197.8	171	Dryup	Dryland Farm	171
141	236.23	180	Dryup	Dryland Farm	180
Totals	616.45	527			527

* Water and land separated prior to Prowers 1041 by a previous owner.

Prowers County 1041 Dry-up Farms

Farm #	Acreage	Irr Acres	Status Irr/dryup	Reveg/Dryland Farm	Total dry-up acres	History since water removed
62	182.42	176	Dryup	Dryland Farm	176	Successfully Dryland farmed for the last two seasons
62a	Inc	Inc	Dryup	Dryland Farm		Successfully Dryland farmed for the last two seasons
63*	None Owned		Dryup	Dryland Farm		
118	197.8	171	Dryup	Dryland Farm	171	Successfully Dryland farmed for the last two seasons
141	236.23	180	Dryup	Dryland Farm	180	Successfully Dryland farmed for the last two seasons
Totals					527	

* Water and land seperated prior to Prowers 1041 by a previous owner. ARF only bought the water shares.

Soil Map—Prowers County, Colorado
(ARF #62A)

N

Map Scale: 1:6,980 if printed on A landscape (11" x 8.5") sheet.

0 100 200 400 600 Meters

0 300 600 1200 1800 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Prowers County, Colorado
Survey Area Data: Version 16, Sep 22, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 22, 2014—Aug 14, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Prowers County, Colorado (CO099)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
NtB	Numa clay loam, 1 to 3 percent slopes	4.5	2.4%
RoA	Rocky Ford clay loam, 0 to 1 percent slopes	19.3	10.6%
RoB	Rocky Ford clay loam, 1 to 3 percent slopes	159.3	87.0%
Totals for Area of Interest		**183.1**	**100.0%**

Soil Map—Prowers County, Colorado
(ARF#118)

Map Scale: 1:6,970 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 100, 200, 400, 600

Feet: 0, 300, 600, 1200, 1800

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
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- Wet Spot
- Other
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Water Features
- Streams and Canals

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- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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Survey Area Data: Version 16, Sep 22, 2016

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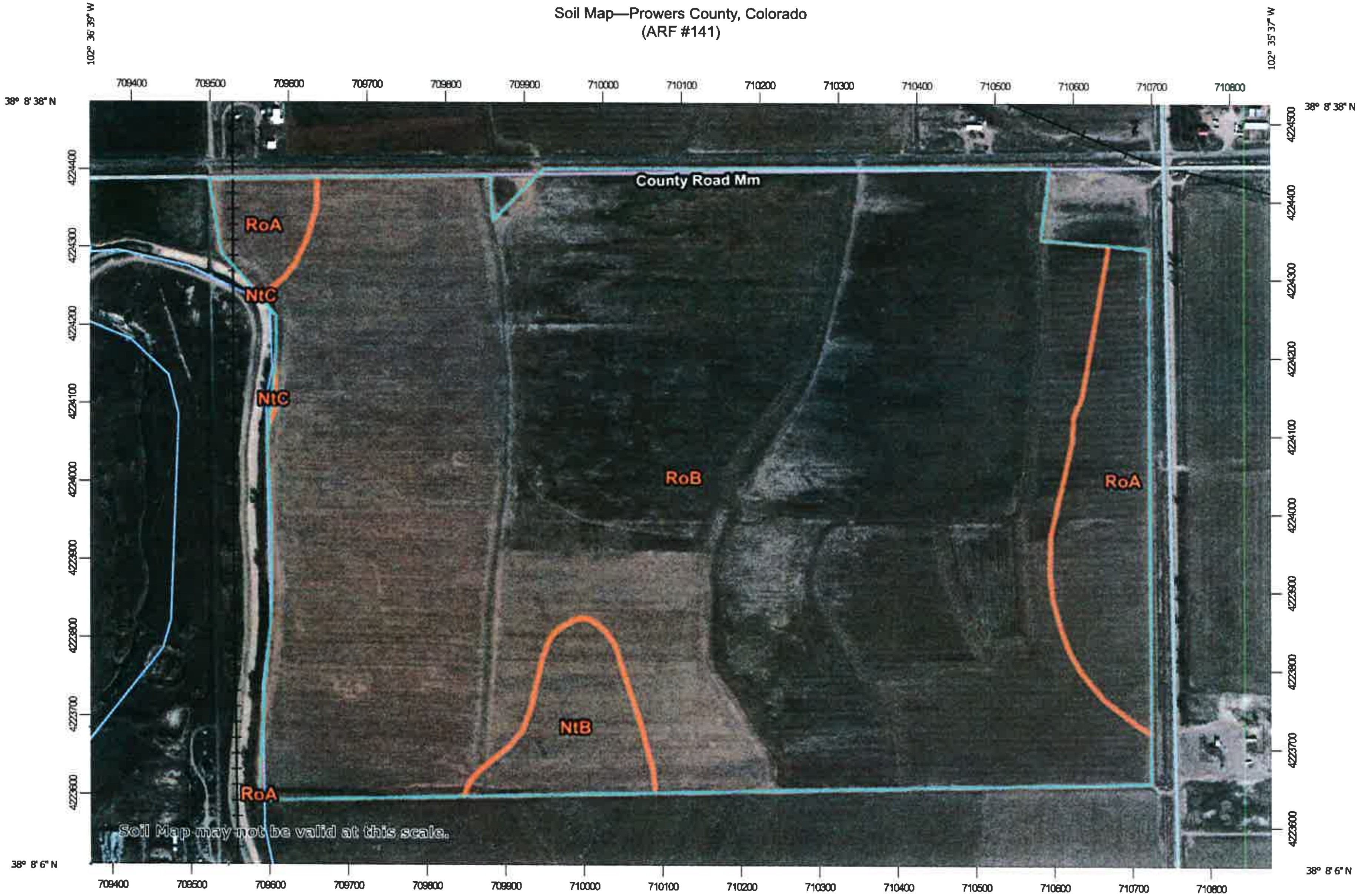
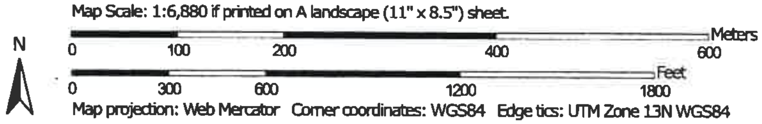
Map Unit Legend

Prowers County, Colorado (CO099)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
NmA	Nepesta clay loam, 0 to 1 percent slopes	24.3	13.7%
NtC	Numa clay loam, 3 to 5 percent slopes	0.1	0.1%
RoA	Rocky Ford clay loam, 0 to 1 percent slopes	38.0	21.5%
RoB	Rocky Ford clay loam, 1 to 3 percent slopes	114.0	64.6%
Totals for Area of Interest		**176.4**	**100.0%**

Soil Map—Prowers County, Colorado
(ARF #141)



Map Scale: 1:6,880 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

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Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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Soil Survey Area: Prowers County, Colorado
Survey Area Data: Version 16, Sep 22, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 22, 2014—Aug 14, 2016

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Map Unit Legend

Prowers County, Colorado (CO099)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
NtB	Numa clay loam, 1 to 3 percent slopes	7.8	3.6%
NtC	Numa clay loam, 3 to 5 percent slopes	0.1	0.0%
RoA	Rocky Ford clay loam, 0 to 1 percent slopes	17.8	8.1%
RoB	Rocky Ford clay loam, 1 to 3 percent slopes	194.2	88.3%
Totals for Area of Interest		**219.9**	**100.0%**

AmTrust Ag
An AmTrust Financial Company

B J FARMS LP

Prowers 1041 Exhibit N-4 Farm 62
Prowers, CO Kiowa, CO Bent, CO

Print Date: 05/09/2017

(017) 022S 046W	#62A Alta Vista

	Crop/Practice/Type	Acres
	Not Assigned	179.21

dry farm

AgriPros
Ag Risk Insurance Professionals
719-688-9300 fax 719-623-0696
Multi Peril Crop Insurance Crop Hail
Livestock Risk Protection
Pasture, Rangeland and Forage Rainfall Protection
"WE are farmers, working for YOU"

GeoCode

Prowers 1041 Exhibit N-4 Farm 62

USDA

United States Department of Agriculture
Farm Service Agency
2015 Digital Orthophotography NOT TO SCALE
Maps for FSA Purposes Only

March 03. 2016

Farm: 3307
Tract: 9881

622

PROWERS COUNTY

Disclaimer: Wetland identifiers do not represent the size, shape or specific determination of the area. Refer to your original determination (CPA-026 and attached maps) for exact wetland boundaries and determinations, or contact NRCS.

Prowers 1041 Exhibit N-4 Farm 62

Soil Map—Prowers County, Colorado
(ARF #62A)

Map Scale: 1:6,980 if printed on A landscape (11" x 8.5") sheet.

Meters: 0 100 200 400 600

Feet: 0 300 600 1200 1800

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

Soil Map—Prowers County, Colorado
(ARF #62A)

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
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- Special Line Features

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- Streams and Canals

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- US Routes
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MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Prowers County, Colorado
Survey Area Data: Version 16, Sep 22, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 22, 2014—Aug 14, 2016

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Arkansas River Farms, LLC

#62A

4796 -11404	Dryland Acres						
Alta Vista	**173.4**	Crop	Harvest	Fertilizer	Herbicide	Tillage	Notes
3/14/17							Gas Prairie Dogs (20 bags rags,55 gal gas)
3/21/17							Closed Ditches / Cement Ditch Closed
4/6/17							Gas Prairie Dogs (75 gal gas)
4/11/17	174.76					Vertical Till	
4/12/17	174.76					Mulch Finish	
5/22/17	174.76					Field Cultivate	Gas Prairie Dogs (20 gal gas)
5/23/17	174.76	Corn					Planted - Dallas May (164.62 ac)
6/21/17							Gas Prairie Dogs (20 gal gas)
6/23/17	174.76				32 oz Mad Dog 5.4, 1 lb Altrazine 4L, 1 oz Synugize		Weeds - Air Care Plane
9/18/17	Patch of alfalfa by school				15 gal RT3, 7 gal Dicamba, 4 gal 2,4-D		Johnson grass, alfalfa - B&J Pull Type Sprayer
10/17 - 10/19/17	174.76	Corn	60.74 Bu				
10/28/17	174.76	Wheat					Drilled - 25 lbs per acre Hatcher
11/28/17							Disk Rip one pass around field
4/18/18	174.76					Disk Rip	8" deep / kill alfalfa
4/28/18	57.5					Disk Rip (2)	
4/28/18	57.5					Cultivate (2)	
5/2/18	174.76	Corn					Planted - Rex Reyher (12,000 population)
7/7/18						Disk Rip	Kill Alfalfa patches
7/18/18	174.76				6 oz Roundup, 6 Lo-Vol		Alfalfa, weeds - Derek Heckman ground rig
7/19/18							Mowed ditches and around field
9/16/18	174.76					Disk	

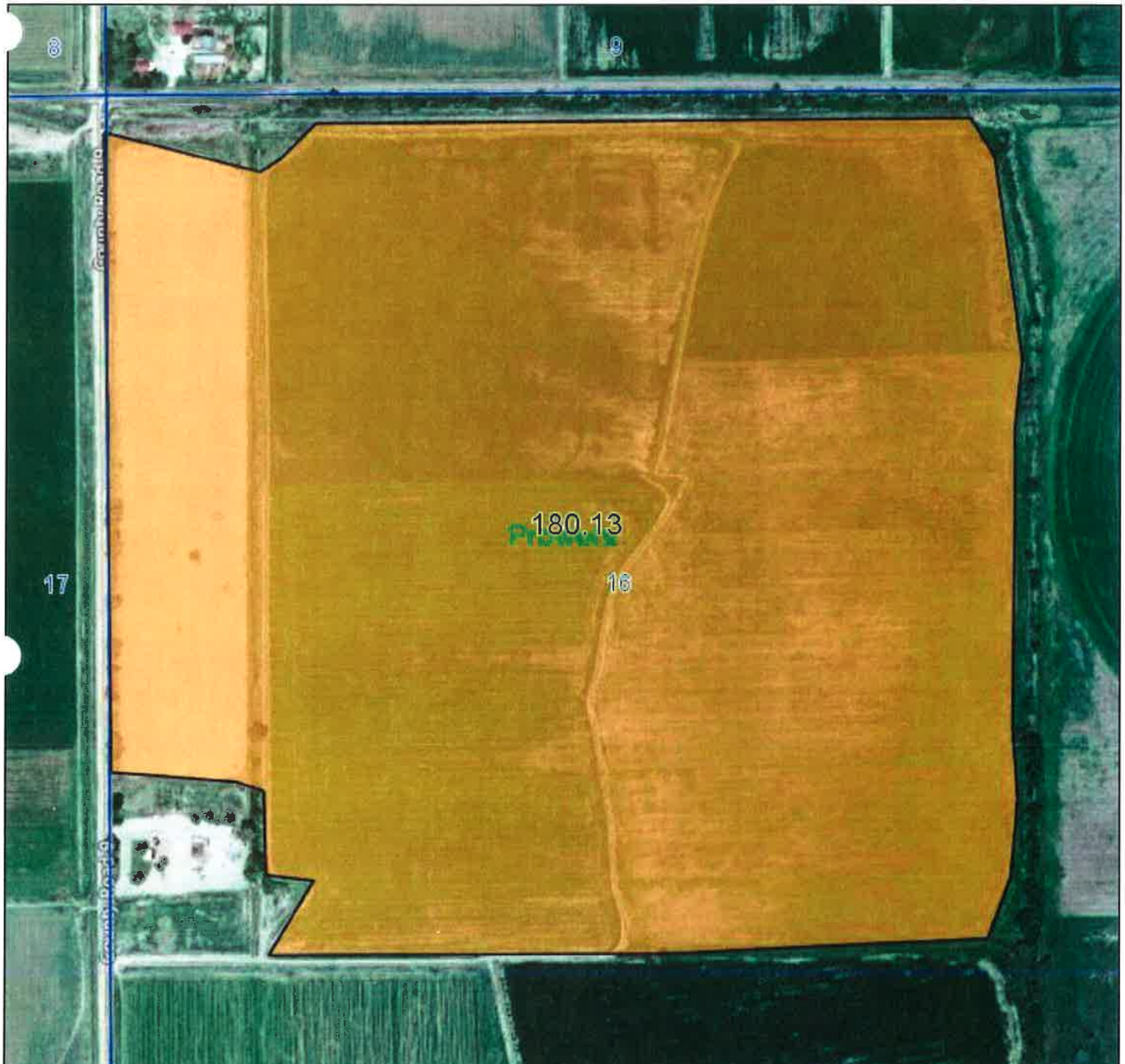
Will be farmed as dryland farm

AmTrust Ag
An AmTrust Financial Company

B J FARMS LP

Prowers, CO Kiowa, CO Bent, CO

Print Date: 05/09/2017



(016) 022S 046W	#118 Alta Vista E

	Crop/Practice/Type	Acres
	Not Assigned	180.13

dry farm

GeoCode

Prowers 1041 Exhibit N-4-118

USDA

United States Department of Agriculture
Farm Service Agency
2015 Digital Orthophotography NOT TO SCALE
Maps for FSA Purposes Only

December 28, 2015

N

Farm: 289
Tract: 681

PROWERS COUNTY

118

Disclaimer: Wetland identifiers do not represent the size, shape or specific determination of the area. Refer to your original determination (CPA-026 and attached maps) for exact wetland boundaries and determinations, or contact NRCS.

Soil Map—Prowers County, Colorado
(ARF#118)

Map Scale: 1:6,970 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 100, 200, 400, 600

Feet: 0, 300, 600, 1200, 1800

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

Prowers 1041 Exhibit N-4-118

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Prowers County, Colorado
Survey Area Data: Version 16, Sep 22, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 22, 2014—Aug 14, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Arkansas Ri · Farms, LLC

#118

4796 -681	Dryland Acres						
Alta Vista E	**176**	Crop	Harvest	Fertilizer	Herbicide	Tillage	Notes
4/10/17	75.98					Undercutt	S 1/2 E side
4/10/17	75.98					Disk Rip 4-5" deep	S 1/2 E side
4/11/17							Closed Ditches
4/11/17	172.56					Vertical Till	
4/12/17	172.56					Mulch Finish	
5/22/17	50					Mulch Finish	
5/23/17	122.56					Field Cultivate	
5/24 - 5/25	172.56	Corn					Planted - Dallas May (171 ac)
6/23/17	151.7				32 oz Mad Dog 5.4, 1 lb Altrazine 4L, 1 oz Synugize		Weeds - Air Care Plane
10/26 - 10/27/17	172.56	Corn	57.73 Bu				
10/30/17	172.56	Wheat					Drilled - 40 lbs per acre Hatcher
4/16/18	172.56					Disk Rip	8" deep / kill alfalfa
4/23/18	10					Undercutt	Kill alfalfa
4/23/18	80					Undercutt	Kill alfalfa
4/29/18	82.56					Vertical Till	
4/30/18	90					Field Cultivate	
5/1/18	172.56	Corn					Planted - Rex Reyher (12,000 population)
7/18/18	172.56				6 oz Roundup, 6 Lo-Vol		Alfalfa, weeds - Derek Heckman ground rig
8/14/18	96.58	Wheat					Drilled - 42 lbs per acre Hatcher seed wheat
8/20/18	172.56				32 oz Roundup, 8 oz 2,4-D, 6 oz Banvel		Kocia, weeds - Derek Heckman ground rig

Prowers 1041 Exhibit N-4-118

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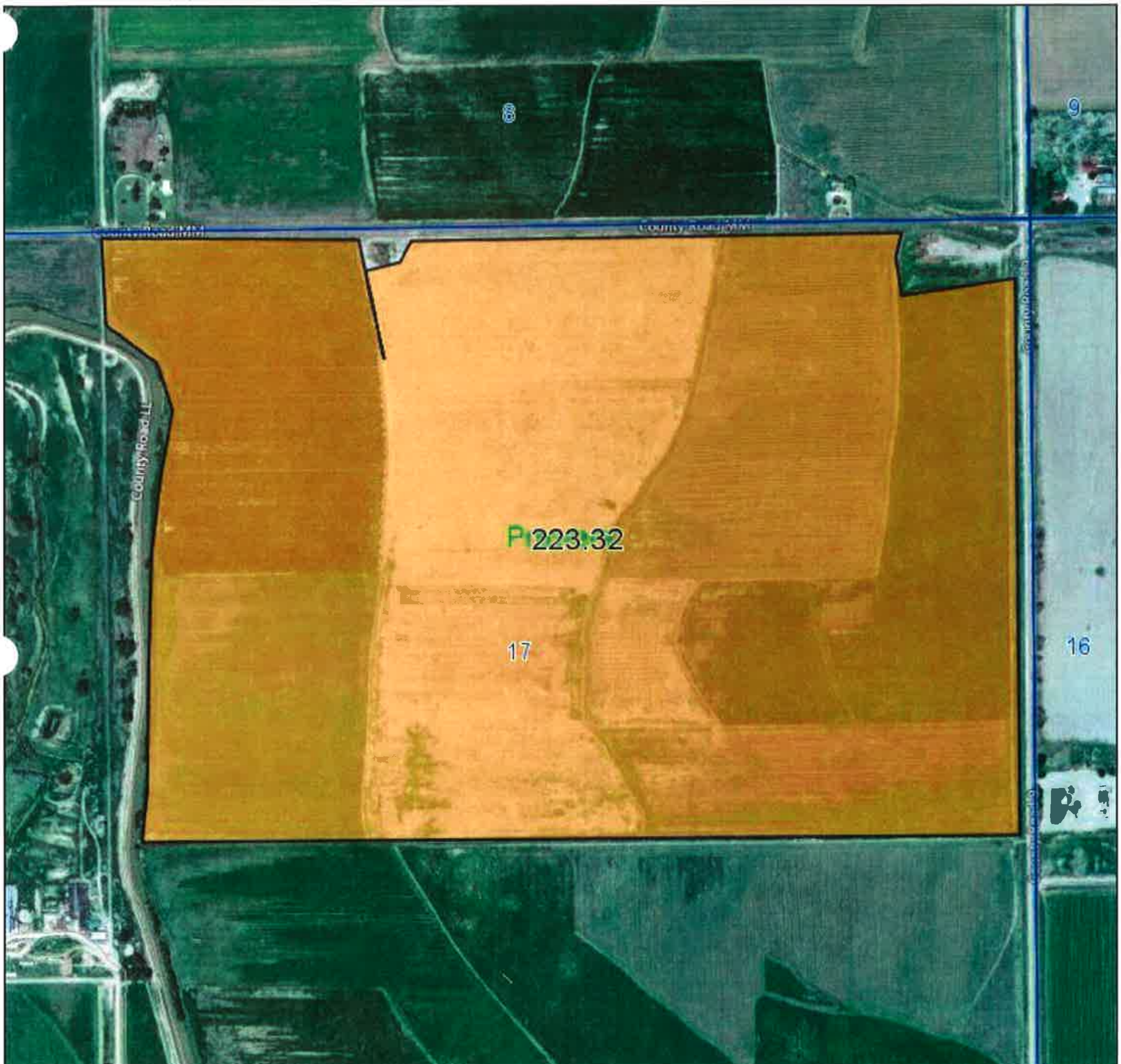
Prowers 1041 Exhibit N-4-141
Prowers, CO Kiowa, CO Bent, CO

Print Date: 05/09/2017



(017) 022S 046W	#141 Alta Vista N

	Crop/Practice/Type	Acres
	Not Assigned	223.32

dry farm

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Pasture, Rangeland and Forage Rainfall Protection
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GeoCode

Prowers 1041 Exhibit N-4-141

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Farm Service Agency
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December 28, 2015

Farm: 290
Tract: 682

\# 141

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PROWERS COUNTY

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(ARF #141)

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Map Unit Legend

Prowers County, Colorado (CO099)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
NtB	Numa clay loam, 1 to 3 percent slopes	7.8	3.6%
NtC	Numa clay loam, 3 to 5 percent slopes	0.1	0.0%
RoA	Rocky Ford clay loam, 0 to 1 percent slopes	17.8	8.1%
RoB	Rocky Ford clay loam, 1 to 3 percent slopes	194.2	88.3%
Totals for Area of Interest		**219.9**	**100.0%**

Arkansas Ri - Farms, LLC

#141

4796 -11404	Dryland Acres						
Alta Vista N	**219.8**	Crop	Harvest	Fertilizer	Herbicide	Tillage	Notes
3/13/17							Gas Prairie Dogs (20 bags rags,55 gal gas)
4/6/17							Gas Prairie Dogs (75 gal gas)
4/11/17	223.54					Vertical Till	
4/12/17	223.54					Mulch Finish	
5/22/17	223.54					Field Cultivate	Gas Prairie Dogs (18 gal gas)
5/23/17	223.54	Corn					Planted - Dallas May (223.98 ac)
6/21/17							Gas Prairie Dogs (20 gal gas)
6/23/17	223.54				32 oz Mad Dog 5.4, 1 lb Altrazine 4L, 1 oz Synugize		Weeds - Air Care Plane
10/23 - 10/26/17	223.54	Corn	60.74 Bu				
10/29/17	223.54	Wheat					Drilled - 25 lbs per acre Hatcher
11/28/17							Disk Rip one pass around field
4/17/18	223.54					Disk Rip	8" deep / kill alfalfa
4/28/18	223.54					Vertical Till	
5/3/18	223.54	Corn					Planted - Rex Reyher (12,000 population)
7/18/18	223.54				6 oz Roundup, 6 Lo-Vol		Alfalfa, weeds - Derek Heckman ground rig
8/16/18	223.54	Wheat					Drilled - 42 lbs per acre Hatcher seed wheat
8/20/18	223.54				32 oz Roundup, 8 oz 2,4-D, 6 oz Banvel		Kocia, weeds - Derek Heckman ground rig

Prowers 1041 Exhibit N-4-141

AgSkill, Inc.

Agricultural & Environmental Consulting
221 Saratoga Dr., Windsor, CO 80550
(970) 324-9756, bradleywalker221@comcast.net

9/9/2017

To Whom It May Concern:

I have reviewed the grass species in Dryland Grass Pasture Mix used by Arkansas River Farms, LLC (ARF). I have also inspected many of the sites GP Irrigated planted with this grass mixture in June 2016 and October 2016. I am also familiar with the soil types of the land irrigated with water from the Fort Lyon Canal. I can say, without a doubt, that this is an appropriate grass mix for the area. With normal or above average rainfall, these grass species will become established quickly and can be harvested for hay or grazed. With that said, I have also seen these grass stands decline with periods of extended drought. However, I have seen the same type of stand decline with other grass species during periods of drought as well.

Thank you for your time. If you have questions, please contact me.
Sincerely,

Brad Walker
Soil Scientist
Certified Crop Advisor (No. 03219)
CDA Certified Commercial Pesticide Applicator - Qualified Supervisor (No. 00726)
NAICC Certified Crop Consultant & Researcher (No. 0030)
Certified Technical Service Provider (TSP) for the USDA-NRCS (No. TSP-03-3333)
Approved Investigator by the Colorado Oil & Gas Conservation Commission

Arkansas Valley Seed

Supplying QUALITY Seed
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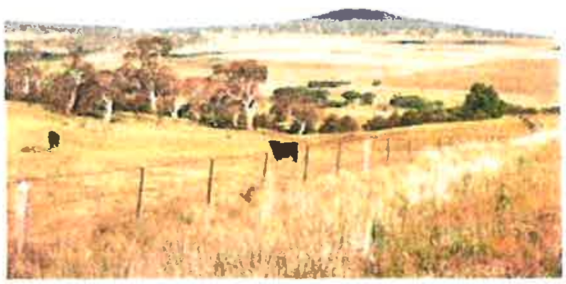
Dryland Pasture Mix

A mixture of hardy, cool season grasses, that are drought tolerant and adapt well to the Northern Great Intermountain regions. It provides a good, palatable spring forage and fair regrowth in the fall. This mix may produce a hay crop depending upon available moisture. Widely adapted to many soil types and elevations of 3,000 to 10,000 feet. Ideal for areas not receiving regular irrigation.

Characteristics Grows 30-48 inches at full potential.
Great forage and hay producer.



Seeding Rate:

New Seeding
- Broadcast: 20-25 lbs/acre
- Drilled: 15-20 lbs/acre

Overseeding
- Broadcast: 10-15 lbs/acre
- Drilled: 5-10 lbs/acre

Mix contains

20% ***Tetraploid Perennial Rye***
Bunchgrass with germination in 5-10 days.
One of the most widely used grasses and is adaptable to a wide variety of soils and climate conditions. It is leafy and fine stemmed.

20% ***Smooth Brome, Lincoln***
Sod Forming grass with germination in 10-14 days
Smooth brome is resistant to drought and extremes in temperature. Lincoln smooth brome is the most widely used of the cultivated brome grasses.

15% ***Paiute Orchardgrass***
Bunchgrass with germination in 14-21 days.
One of the earliest species to exhibit growth in the spring, making tremendous forage potential during cool conditions. Performs well on different textured soils. Is a great forage and hay producer.

15% ***Hycrest Crested Wheatgrass***
Bunchgrass with germination in 14-21 days.
A hybrid cross between Standard and Desert wheatgrass, resulting in a plant with excellent seedling vigor that establishes quickly. It is taller and has higher forage yield potential than its parents.

15% **Pubescent Wheatgrass**
Cool season, sod-forming with germination in 21-28 days.
Stays green into the summer months when soil moisture is adequate.

15% **Dahurian Wildrye**
Bunchgrass with germination in 7 – 21 days.
Deep rooted allowing good drought tolerance. Regrows aggressively after cutting and grazing, providing excellent palatable forage.

Formulations & varieties are subject to change without notice!

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Irrigation Practices, Water Consumption, & Return Flows in Colorado's Lower Arkansas River Valley

Colorado State University

Field and Model Investigations

By Timothy K. Gates, Luis A. Garcia, Ryan A. Hemphill, Eric D. Morway, and Aymn Elhaddad

CWI Completion Report No. 221 CAES Report No. TR12-10

Irrigation Practices, Water Consumption, & Return Flows in Colorado's Lower Arkansas River Valley

Additional copies of this report can be obtained from:

Colorado Water Institute
E102 Engineering Building
Colorado State University
Fort Collins, CO 80523-1033
Phone: 970-491-6308

Email: cwi@colostate.edu

This report can also be downloaded as a PDF file from www.cwi.colostate.edu.

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June 2012

Colorado Water Institute

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Edits by Lindsey Middleton

Design by Lindsey Middleton and Jena J. Thompson

Contents

Figures

Tables

Acronyms and Variables

Λ_i : Instantaneous evaporative fraction
$\boldsymbol{\Delta S_{SW}}$**:** The change in volume of water stored in soil root zone
ρ_w : Density of water
$\boldsymbol{\theta}$**:** Actual soil water content
$\boldsymbol{\theta_{fc}}$**:** Soil-water content at -⅓ bar matric potential (field capacity) expressed as a fraction of the bulk soil volume
$\boldsymbol{\theta_{wp}}$: Soil-water content at -15 bar matric potential (permanent wilting point) expressed as a fraction of the bulk soil volume
$\boldsymbol{\tau}$**:** Difference between the time of recession and the time of advance for any given point along the length of the field, or intake opportunity time
$\hat{a}$, $\hat{b}$, $\hat{c}$, and $\hat{d}$: Empirical coefficients for S-curve determined using a least-squares optimization
a**,** $\boldsymbol{a_1}$ **and** $\boldsymbol{b_1}$**,** $\boldsymbol{a_2}$ **and** $\boldsymbol{b_2}$**, *etc.*:** empirical parameters that depend on soil texture
AOI: Area of interest
ARIDAD: Arkansas River Irrigation Data and Analysis Disc
CAES: Colorado Agricultural Experiment Station
CD: Concrete Ditch Water Delivery
CDPHE: Colorado Department of Public Health and Environment
CDWR: Colorado Division of Water Resources
CN: Curve number
CoAgMet: Colorado Agricultural Meteorological Network
CP: Center Pivot
CSU: Colorado State University
CV: Coefficient of variation
CWCB: Colorado Water Conservation Board
CWI: Colorado Water Institute
DP: Deep percolation
DPF: Deep percolation fraction
DS/Downstream: Downstream of the John Martin Reservoir
$\boldsymbol{D_{wt}}$**:** Water table depth
$\boldsymbol{D_{wt_c}}$ **:** Critical water table depth
$\boldsymbol{D_{rz}}$: Depth of soil root zone below ground surface
$\boldsymbol{E_a}$: Irrigation application efficiency
EC: Specific conductance (electrical conductivity at 25oC)
$\boldsymbol{EC_e}$: Saturated paste extract soil salinity
ED: Earthen Ditch Water Delivery
$\boldsymbol{EM_H}$: Horizontal orientation measurement with EM83 tool
$\boldsymbol{EM_V}$: Vertical orientation measurement with EM83 tool
ET: Evapotranspiration
$\boldsymbol{ET_a}$: Actual evapotranspiration
$\boldsymbol{ET_i}$: Instantaneous actual evapotraspration
$\boldsymbol{ET_p}$: Potential crop ET at a particular time
$\boldsymbol{ET_r}$: Reference crop evapotranspiration
$\boldsymbol{f_0}$: Steady-state infiltration rate
$\boldsymbol{G_i}$: Heat conduction to the ground
GIS: Geographic information system
GP: Gated Pipe Water Delivery
GPS: Global Positioning System
GUI: Graphical User Interface
$\boldsymbol{H_i}$: Sensible heat flux
IDS: Integrated Decision Support
IDSCU: Integrated Decision Support Consumptive Use Model
k**:** Empirical coefficient for infiltration
$\boldsymbol{k_c}$**:** Crop coefficient
LARV: Lower Arkansas River Valley
LAVWCD: Lower Arkansas Valley Water Conservancy District
$\boldsymbol{L_v}$: Latent heat of vaporization
NASS: National Agricultural Statistics Service
NRCS: Natural Resources Conservation Service
NVDI: Normalized difference vegetation index
PVC: Polyvinyl chloride
$\boldsymbol{Q_A}$: Net volume of water applied to the field by irrigation over Δt
$\boldsymbol{Q_{DP}}$: Volume of water leaving the root zone by deep percolation over Δt
$\boldsymbol{Q_{ET}}$: Volume of water leaving the root zone by evapotranspiration over Δt
$\boldsymbol{Q_I}$: Volume of water infiltrated into the soil root zone from irrigation over Δt
$\boldsymbol{Q_P}$: Volume of water infiltrated into the soil from effective rainfall over Δt
$\boldsymbol{Q_{PT}}$: Total volume of rainfall over Δt
$\boldsymbol{Q_R}$: Volume of precipitation runoff over Δt
$\boldsymbol{Q_{TW}}$: Tailwater runoff volume over Δt
$\boldsymbol{Q_U}$: Volume of water entering the root zone by upflux from the groundwater table over Δt
$\boldsymbol{q_u}$**:** Rate of water entering root zone by upflux from the groundwater table
$\boldsymbol{q_{u_{max}}(D_{wt}, ET_P)}$**:** Maximum potential groundwater upflux rate (mm/day) as a function of D_{wt} and ET_p
$\boldsymbol{R_{n,i}}$: Net radiation
SECWCD: Southeastern Colorado Water Conservancy District
$\boldsymbol{S_R}$: Maximum soil retention volume per unit area
$\boldsymbol{S_{SW}}$: Volume of water stored in the root zone
$\boldsymbol{S_{SW_c}(D_{wt})}$**:** Critical soil water content at which upflux is initiated and, a function of D_{wt}
$\boldsymbol{S_{SW_{FC}}}$: Water content in the root zone at field capacity
$\boldsymbol{S_{SW_s}(D_{wt})}$**:** Steady soil water content (mm), a function of D_{wt}
$\boldsymbol{S_{SW_{WP}}}$: Water content in the root zone at wilting point
TAW: Total available water
TDS: Total dissolved solids
TRF: Tailwater runoff fraction
USDA: U.S. Department of Agriculture
US/Upstream: Upstream of the John Martin Reservoir
$\boldsymbol{W_{bag}}$: Weight of plastic bag (used in WC_{AD} analysis)
WBC: Water balance component
$\boldsymbol{WC_{AD}}$: Air-dried gravimetric water content
$\boldsymbol{W_{can}}$: weight of metal can (used in WC_{OD} analysis)
$\boldsymbol{WC_{OD}}$: Oven-dried gravimetric water content
$\boldsymbol{W_{ds}}$: Weight of dry soil sample (including bag) (used in WC_{AD} and WC_{OD} analysis)
$\boldsymbol{W_{ws}}$: Weight of wet soil sample (including bag) (used in WC_{AD} and WC_{OD} analysis)
z**:** Infiltration depth

Acknowledgements

This study was funded primarily by grants from the Colorado Water Conservation Board, the Colorado Division of Water Resources, the Colorado Department of Public Health and Environment, the Southeastern Colorado Water Conservancy District, the Lower Arkansas Valley Water Conservancy District, and the Colorado Agricultural Experiment Station. Financial support also was provided by the Colorado Water Institute, the United States Department of Agriculture (USDA), the United States Bureau of Reclamation, and the United States Geological Survey. Valuable in-kind support was provided by the La-Junta Area Office of the USDA Natural Resources Conservation Service, and the attentive and able assistance of Lorenz Sutherland in that office especially is appreciated. The study could not have been conducted without the interested cooperation of more than 120 landowners in the LARV, including about 40 who allowed intensive monitoring of their irrigation practices. Numerous students, technicians, and professionals lent their care and capabilities to the monitoring and analysis of irrigated fields and to project management. The authors particularly are indebted to the able assistance of Nathan Baker who helped with literature review, data analysis, modeling runs, and documentation. They also thank Roberto Arranz, J.J. Autry, Mike Bartolo, Adam Berrada, Chad Bohac, Mallory Cline, Morgan Cline, Tyler Curley, Ginger Davidson, Jeff Davidson, Ahmed Eldeiry, Patrick Greenbank, Jack Goble, Lenay Goble, Andres Jaramillo, Matthew Klein, Paula Miller, Dave Patterson, Ryan Pelton, Bret Schafer, Grant Seeley, Samantha Stuart, Matthew Vandiver, Ben Weber, Mike Weber, and Corda Williams. The authors are very grateful for all of this support and cooperation.

Photo Credits:

Cover: From top left, irrigation, Fort Lyon Canal, a field, and sprinkler in the Lower Arkansas River Valley. *Photos by Bill Cotton, CSU Photography*

Title page & 80: Catlin Canal. *Photo by Bill Cotton, CSU Photography*

Table of Contents & 116: Aerial view of the Fort Lyon Canal in the Lower Arkansas River Basin. *Photo by Bill Cotton, CSU Photography*

This page: Irrigation in the Arkansas River valley. *Photo by Bill Cotton, CSU Photography*

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Page 15: Aerial view of the Fort Lyon Canal in the Lower Arkansas River Basin. *Photo by Bill Cotton, CSU Photography*

Page 18-19: John Martin Reservoir in the Lower Arkansas River Basin. *Photo by Bill Cotton, CSU Photography*

Page 22-23 & 45: Field in Lower Arkansas River Valley. *Photo by Bill Cotton, CSU Photography*

Page 26-27 & 75: Bents Old Fort National Historic Site. *Photo by J. Stephen Conn*

Page 40: Water ripples. *Photo by Jeremy Reid*

Page 43: Aerial view of the Lower Arkansas River Basin. *Photo by Bill Cotton, CSU Photography*

Page 47: Field irrigation. *Photo by Kay Ledbetter*

Page 60: Canal in the Lower Arkansas River Valley. *Photo by Bill Cotton, CSU Photography*

Page 68, Page 76-77: Irrigation on Roger Maddox Farm near Swink, Colorado. *Photo by Bill Cotton, CSU Photography*

Page 83, Page 93, Page 98, Page 110: Fields in the Lower Arkansas River Valley. *Photo by Bill Cotton, CSU Photography*
Page 88: Farm in Lower Arkansas River Valley. Photo by Bill Cotton, CSU Photography

Page 103: Aerial view of the Arkansas River between La Junta and Las Animas, Colorado. *Photo by Bill Cotton, CSU Photography*

Back Cover: Aerial view of the Fort Lyon Canal in the lower Arkansas River basin. *Photo by Bill Cotton, CSU Photography*

Summary

The Lower Arkansas River Valley (LARV) in Colorado has a long history of rich agricultural production, but is facing the challenges of soil salinity and waterlogging from saline shallow groundwater tables, high concentrations of salts and minerals in the river and its tributaries, water lost to non-beneficial consumption, and competition from municipal water demands. Significant improvements to the irrigated stream-aquifer system are possible, but they are constrained by the need to comply with the Arkansas River Compact. Making the best decisions about system improvements and ensuring compact compliance require thorough baseline data on irrigation practices in the LARV. This report summarizes the methods, analysis, results, and implications of an extensive irrigation monitoring study conducted by Colorado State University (CSU) during the 2004-2008 irrigation seasons in representative study regions upstream and downstream of John Martin Reservoir (referenced herein as Upstream and Downstream). A total of 61 fields (33 surface-irrigated, 28 sprinkler-irrigated) were investigated. Results from 523 monitored irrigation events on these fields are presented. Data and modeling results from more extensive studies conducted by CSU between 1999 and 2008 also are provided.

Data on applied irrigation, field surface water runoff, precipitation, crop evapotranspiration (ET), irrigation water salinity, soil water salinity, depth and salinity of groundwater tables, upflux from shallow groundwater, crop yield, return flows to streams, and salt loads to streams are presented. Deep percolation and application efficiency for irrigation events on each field are estimated using a water balance method implemented within the CSU Integrated Decision Support Consumptive Use (IDSCU) Model. Tailwater runoff (surface water runoff at the end of a field) fraction ranges from zero to 69 percent on surface irrigated fields, averaging about eight percent, while deep percolation fraction ranges from zero to 90 percent, averaging about 24 percent. Application efficiency ranges from two to 100 percent on surface irrigated fields, with an average of about 68 percent. No significant runoff is observed on sprinkler-irrigated fields, and estimated deep percolation typically is negligible. On sprinkler-irrigated fields average application efficiency is about 82 percent, but in many cases these fields are under-irrigated. Upflux from shallow groundwater tables below irrigated fields is estimated to average about six percent of crop ET, ranging between zero percent and 40 percent. Average measured total dissolved solids concentration of applied surface irrigation water is 532 mg/L Upstream and 1,154 mg/L Downstream. Average estimated salt load applied per surface irrigation event is 997 lb/acre Upstream and 2,480 lb/acre Downstream. Average estimated salt load applied per sprinkler irrigation event is 1,217 lb/acre Upstream and 446 lb/acre Downstream. Soil saturated paste electrical conductivity averaged over all Upstream fields ranges from 3.7-4.7 deciSeimens per meter (dS/m) over the monitored seasons and from 4.5-6.4 dS/m over Downstream fields. Water table depth averaged over Upstream fields varies from 7.8-12.1 feet over the monitored seasons and average specific conductance (EC) of groundwater varies from 1.8-2.3 dS/m. Water table depth averaged over Downstream fields varies from 12.6-15.0 feet with average EC from 2.3-3.0 dS/m. Analysis reveals trends of decreasing crop ET with increasing soil salinity on several investigated fields. Trends of decreasing relative crop yield with increasing soil salinity on corn and alfalfa fields also are detected.

Calibrated regional groundwater models indicate an average recharge rate to shallow groundwater of 0.10 in/day and 0.06 in/day over modeled irrigation seasons 1999-2007 Upstream and 2002-2007 Downstream, respectively. Upflux to non-beneficial ET in the regions is estimated to be about 26,000 ac-ft/year Upstream and 35,000 ac-ft/year Downstream, with an approximation for the entire LARV being 82,000 ac-ft/year. Average groundwater return flow rate to the Arkansas River within the Upstream and Downstream regions is estimated as 30.9 ac-ft/day per mile and 12 ac-ft/day per mile along the river, respectively. Salt load in return flow to the river over the modeled years is estimated at about 93 tons/week per mile Upstream and about 62 tons/week per mile Downstream.

The significance and implications of these findings are discussed. Also, a number of specific questions of concern to water managers and regulatory agencies are addressed.

Introduction

Irrigation in the Arkansas River Valley

The LARV in Colorado has long been known for its valuable agricultural production. The introduction of extensive irrigation to the fertile alluvial soils in the valley in the late 19th century has created a widespread agriculturally based economy with important benefits not only on a regional scale, but also to the state of Colorado (Sherow 1990). Over the years, however, groundwater tables in the basin have risen in elevation and in salt concentration due to excessive irrigation, seepage from earthen canals, and inefficient drainage systems, creating a number of challenging problems. These high-saline water tables have in turn salinized and waterlogged much of the rich soil of the river valley, causing reductions in crop yield. High water tables also produce high hydraulic gradients that drive subsurface flows back to tributaries, open drains, and to the river.

In some locations along the LARV, these return flows can dissolve salts and minerals (like selenium and uranium) that naturally occur in the Arkansas Valley's marine shale outcrops and bedrock and from shale-derived soils as the water moves through the underlying aquifer, further increasing constituent loads as they make their way back to streams (Gates et al. 2009). In other locations along the LARV, particularly east of La Junta, precipitation of calcium sulfate (gypsum), calcium carbonate (lime), and other salts may serve to mitigate these salt loading problems. Lastly, high groundwater tables extend out under uncultivated and fallow land where substantial amounts of water are non-beneficially consumed and groundwater solute concentrations rise due to evaporative upflux from the shallow water table (Niemann et al. 2011).

There are a total of about 270,000 irrigated acres in the LARV, with irrigation practiced on about 14,000 fields. Water supply is provided by 25 canals that divert water from the river in accordance with Colorado water law and from about 2,400 wells that pump from the alluvial groundwater. The vast majority of fields are irrigated using surface-irrigation methods with less than about five percent irrigated with sprinklers (typically, center-pivot sprinklers) or drip lines.

The LARV irrigation system's operation is severely constrained by the Arkansas River Compact (with Kansas), which prohibits changes to the system that would increase the irrigated acreage of the return flow patterns (amount, spatial pattern, and timing) so as to cause the flow in the Arkansas River to be "materially depleted in usable quantity or availability for use to the water users in Colorado and Kansas." Hence, reductions in excess surface or subsurface flows that result from increases in irrigation efficiency, with the aim of mitigating the problems described above, are prohibited unless otherwise augmented. Improvements in irrigation application efficiency (by reducing surface runoff and/or deep percolation, DP) and/or in conveyance efficiency (by reducing canal seepage) that diminish return flows to the river must be offset by appropriate changes in river operation, such as with amended releases from reservoir storage. If improved irrigation efficiency can indeed be achieved in conjunction with such offsetting measures, then crop yields can be increased, river water quality can be improved, and water can be conserved (Triana et al. 2010a, 2010b).

An evaluation of on-going water use practices and the potential impacts of improvements to any water resources system requires the establishment of an accurate description of the current state, or the baseline, of the system. In the irrigated alluvial lands of the LARV, such a baseline needs to be determined for irrigation practices and efficiency, with consideration to interventions that could address current irrigation problems while complying with the Arkansas River Compact. A baseline evaluation involves estimating the various features and water balance components of field irrigation systems, including the following:

- Irrigation timing, total water applied, water consumed for crop evapotranspiration (ET), tailwater runoff, DP below the root zone, and upflux returned from the shallow water table
- Salinity of irrigation and drainage water
- The movement and accumulation of dissolved salts on irrigated fields
- General soil characteristics
- Groundwater table characteristics
- Crop yields that result from irrigation practices

Such data may provide insight into the effect of soil water salinity, as affected in part by irrigation water salinity, and irrigation practices on crop yield and ET. Analysis of such data would show the fraction of irrigation diversions from the river that are consumed beneficially by crops, as compared to the fractions that return to the river system via surface and groundwater flows as well as those that are non-beneficially consumed.

Background and Scope of This Study

During the irrigation seasons over the period 2004-2008, CSU conducted an extensive field investigation of current irrigation practices in the LARV, primarily under funding from the Colorado Water Conservation Board (CWCB), the Colorado Division of Water Resources (CDWR), the Colorado Department of Public Health and Environment (CDPHE), the Southeastern Colorado Water Conservancy District (SECWCD), the Lower Arkansas Valley Water Conservancy District (LAVWCD), and the Colorado Agricultural Experiment Station (CAES). Additional support was provided from other agencies listed in the "Acknowledgments" section at the end of this report.

Data were gathered from numerous fields, spread across two study regions under both conventional surface irrigation methods and sprinkler irrigation technologies (such as sprinkler and drip irrigation). The first study region was located upstream of John Martin Reservoir (Upstream), extending between Fowler and Las Animas, and the second region was downstream of the reservoir (Downstream), extending between McClave and the Colorado-Kansas state line (Figure 1). These two areas generally coincide with the study regions where CSU has been conducting intensive field-scale and regional-scale studies of the irrigated stream-aquifer system of the LARV since 1999 (Burkhalter and Gates 2005, Gates et al. 2006).

During the 2004, 2005, and 2006 irrigation seasons, CSU collected data from a total of 33 fields, 14 in the Upstream Study Region and 19 in the Downstream Study Region. Three of the Upstream fields were served by a sprinkler, three were supplied with surface water, and one was supplied with groundwater. Sprinklers supplied with surface water served five of the fields in the downstream area—four from the Fort Lyon Canal, and one from the Amity Canal.

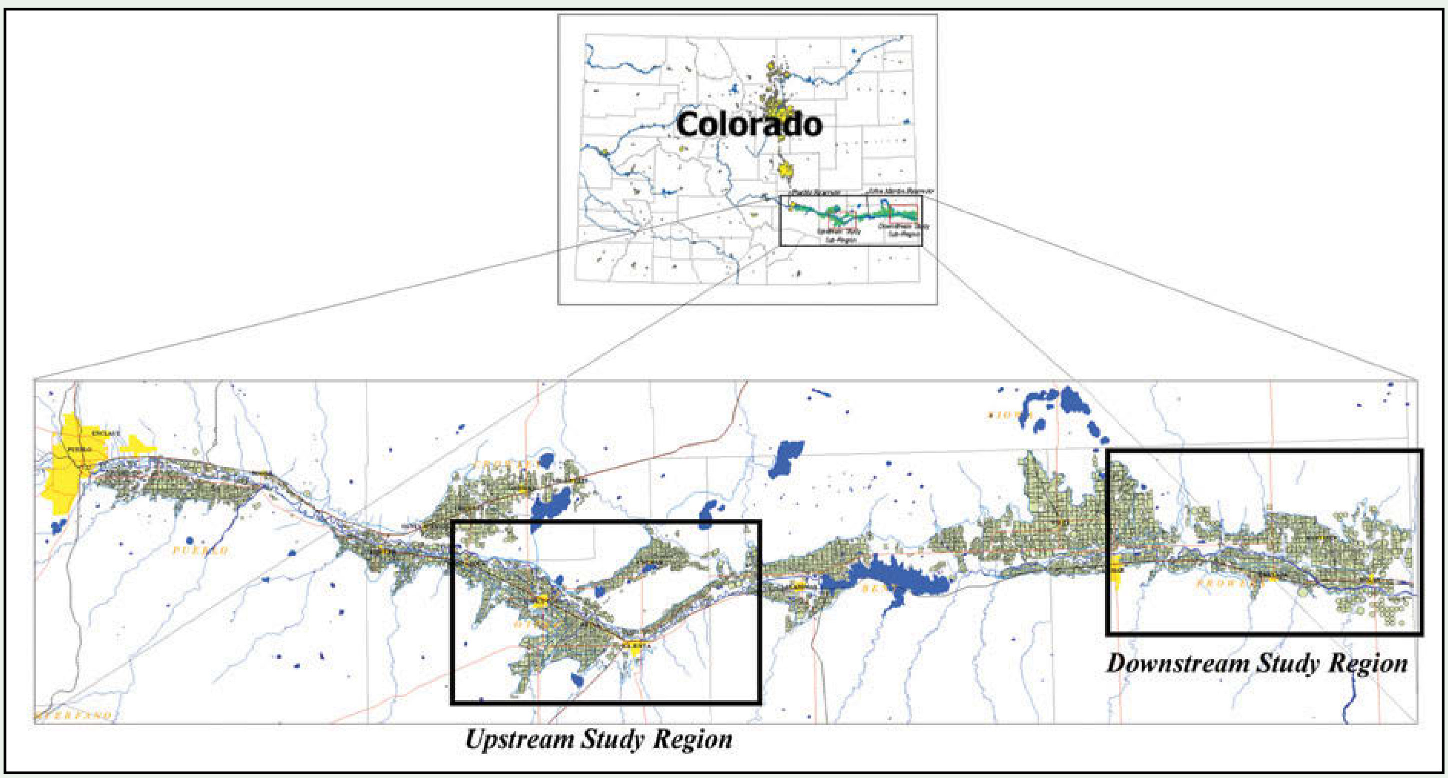


Figure 1. *LARV in Colorado highlighting the upstream and downstream study regions*

This work was performed primarily under a contract with the CWCB entered in May 2004, to address questions raised in the Kansas v. Colorado litigation before the U.S. Supreme Court regarding whether and how salinity and/or irrigation timing and amount affect crop yield and ET in the LARV. Major support also was provided for these efforts from the CDPHE, the SECWCD, the LAVWCD, and the CAES. As part of this effort, CSU conducted measurements on participating farmers' fields regarding their irrigation practices and salinity conditions.

In 2007, with funding primarily from the CDPHE, the SECWCD, the LAVWCD, and the CAES, measurements were made only in the Downstream region, where eight surface-irrigated fields and five sprinkler-irrigated fields were monitored. In 2008, data from a larger sample size were desired to improve confidence in the conclusions that could be drawn from the 2004-2007 data, and to examine more carefully the differences between sprinkler irrigation and surface irrigation. CSU conducted this research largely under a contract funded by CDWR for "Early-Season Monitoring of Irrigation Practices under Conventional and Improved Technologies in Colorado's Lower Arkansas River Valley" and a purchase order funded by CWCB for "Late Season Monitoring" of the same type, with assistance from the LAVWCD and the CAES. Under these two agreements, irrigation events were measured on a total of 10 surface-irrigated fields (including a number of corners on sprinkler-irrigated fields) and 19 sprinkler-irrigated fields. All of the sprinkler-irrigated fields drew water from canals, and one was supplemented with well water.

Over the entire study period from 2004-2008, 229 surface irrigation events on 33 separate fields and 291 sprinkler irrigation events on 28 separate fields were measured and evaluated. Three subsurface drip systems in the Upstream Study Region also were monitored in 2005, but the results are not reported herein. The data gathered in this study, in conjunction with other available data gathered by CSU under related projects, allow a description of existing conventional and sprinkler technologies and the possible effects of soil salinity and irrigation management practices on ET, crop yield, and return flows to the stream system. This description was extended from the field scale to the regional scale using calibrated and tested groundwater models.

This document describes the study objectives, setting, methodology, and results. Broad conclusions and implications are drawn regarding baseline irrigation practices in the LARV. Questions that still remain, and recommendations for addressing them, are presented.

Study Objectives

The objectives of the study described in this report are summarized as follows:

1. Measure, estimate, or calculate each major irrigation water balance component (WBC) and associated properties for a few irrigation events on each of several representative irrigated fields over the study period. Fields irrigated by both conventional and improved technology (sprinkler) systems are considered. Considered WBCs include:
    - Irrigation flow onto the field
    - Irrigation surface flow off the field (tailwater runoff)
    - Precipitation
    - Infiltration
    - Evapotranspiration
    - Soil water storage
    - Upflux from shallow groundwater
    - Deep percolation
    - Sprinkler evaporation and drift
2. Calculate irrigation application efficiency, E_a, for measured irrigation events under conventional and improved technology systems
3. Conduct measurements to describe irrigation water quality:
    - Specific conductance of irrigation water applied and in tailwater runoff water
    - Salt ions in irrigation water applied and tailwater runoff water
4. Measure and/or estimate characteristics of shallow groundwater under irrigated fields:
    - Water table depth
    - Specific conductance of groundwater
    - Salt ions in groundwater

5. Conduct measurements to estimate soil water salinity distributed over irrigated fields

6. Conduct measurements to estimate crop yields over irrigated fields

7. Address issues associated with uncertainty in the data

8. Use calibrated regional-scale models to perform a preliminary extension of the results of field-scale studies to regional-scale conditions for the LARV in regard to crop ET, upflux from water tables to ET, return flows and salt loads to streams, and other processes that vary over LARV regions that are representative of conditions Upstream and Downstream

9. Use data derived from measurements, estimation, and calculation to address some questions of concern to water managers and regulatory agencies, including the following:
   - How do the characteristic irrigation WBC and E_a values for sampled conventional surface irrigation systems compared to those for improved technology (especially sprinkler) systems?
   - Do the characteristic WBC and E_a values for irrigation events seem to vary significantly from canal to canal; which is to say, do the values appear to be affected by total water supply available from one canal to another, within a single year?
   - Do the characteristic WBC and E_a values vary significantly from year to year within the same canal system; i.e., are they affected by total water supply available within a canal?
   - Do the characteristic WBC and E_a values differ between surface-water supplied sprinklers and groundwater-supplied systems?
   - Is there any indication of intentional bias introduced into the study by irrigators hoping to demonstrate that the achievable WBC and E_a values using surface-supplied sprinklers is no different than that associated with flood and furrow methods?
   - Do the data indicate any effect of soil salinity on crop yield? If so, what conclusions can be reached with these data, and what additional information is necessary to adequately quantify the impact of soil salinity on crop yield in the LARV?
   - Do the data indicate any effect of irrigation timing or amount on crop yield? If so, what conclusions can be reached with these data, and what additional information is necessary to adequately quantify the impact of irrigation management practices on crop yield in the LARV?
   - What are the known or assumed possibilities and limitations for correlating crop yield and soil salinity to ET for the fields included in this study?
   - Does crop type appear to affect WBC and E_a under sprinkler systems?
   - Do sprinkler irrigators typically apply sufficient volumes of water necessary to meet the ET requirement of crops?
   - Do sprinkler irrigators apply sufficient water to meet the salt leaching requirement for the soil root zone?
   - What is the difference in the WBC and E_a values for sprinkler systems that practice leaching and those that do not?
   - Are there significant differences in deep percolation and leaching fraction for various types of sprinkler systems?
   - How do alfalfa crop yields from sprinkler irrigated fields compare with those irrigated by flood and furrow irrigation methods?
   - How do water table depth and salinity, soil salinity, and crop yields relate to WBC and E_a?

Study Sites and Conditions

Field Locations and Layouts

A total of 22 separate field units in the Upstream Study Region and 39 in the Downstream Study Region were included in the 2004-2008 study. Monitored fields were selected based upon the following criteria: (1) a distribution over the spatial extent of the monitored regions, including a variety of types of irrigation systems and water sources; (2) cooperation of land owners/operators with study objectives and methods; and (3) accessibility and layout that facilitated feasible and accurate measurement of desired components. Figures 2 and 3 show the locations of the monitored fields within the Upstream and Downstream regions, respectively.

Monitored fields are identified based upon which study region they are part of (US for Upstream and DS for Downstream) and by a number, usually assigned in the order in which the field was included in the study (Figures 2 and 3). For fields that are part of the same farm unit and share the same water right, a letter is added following the identification number (e.g., DS6A, DS6B). Separate fields were defined on the same farm unit when they contained different crops, were irrigated by different methods, and/or were separated by physical boundaries. Field US13 (Figure 4) is an example of a singular field parcel selected for monitoring within a farm. An example of a case where several fields make up portions of the same farm unit is shown in Figure 5. Fields DS18A, DS18B, DS18C, and DS18D were defined as separate fields within the same center pivot sprinkler circle because they contained different crops. Fields DS18E, DS18F, DS18G, and DS18H form the corners of the quarter section block containing the center pivot sprinkler. These corner fields were each independently surface irrigated. Maps showing layouts of all of the study fields are available on an accompanying Arkansas River Irrigation Data and Analysis Disc (ARIDAD) upon request from the Colorado Water Institute at CSU (CWI@ColoState.edu).

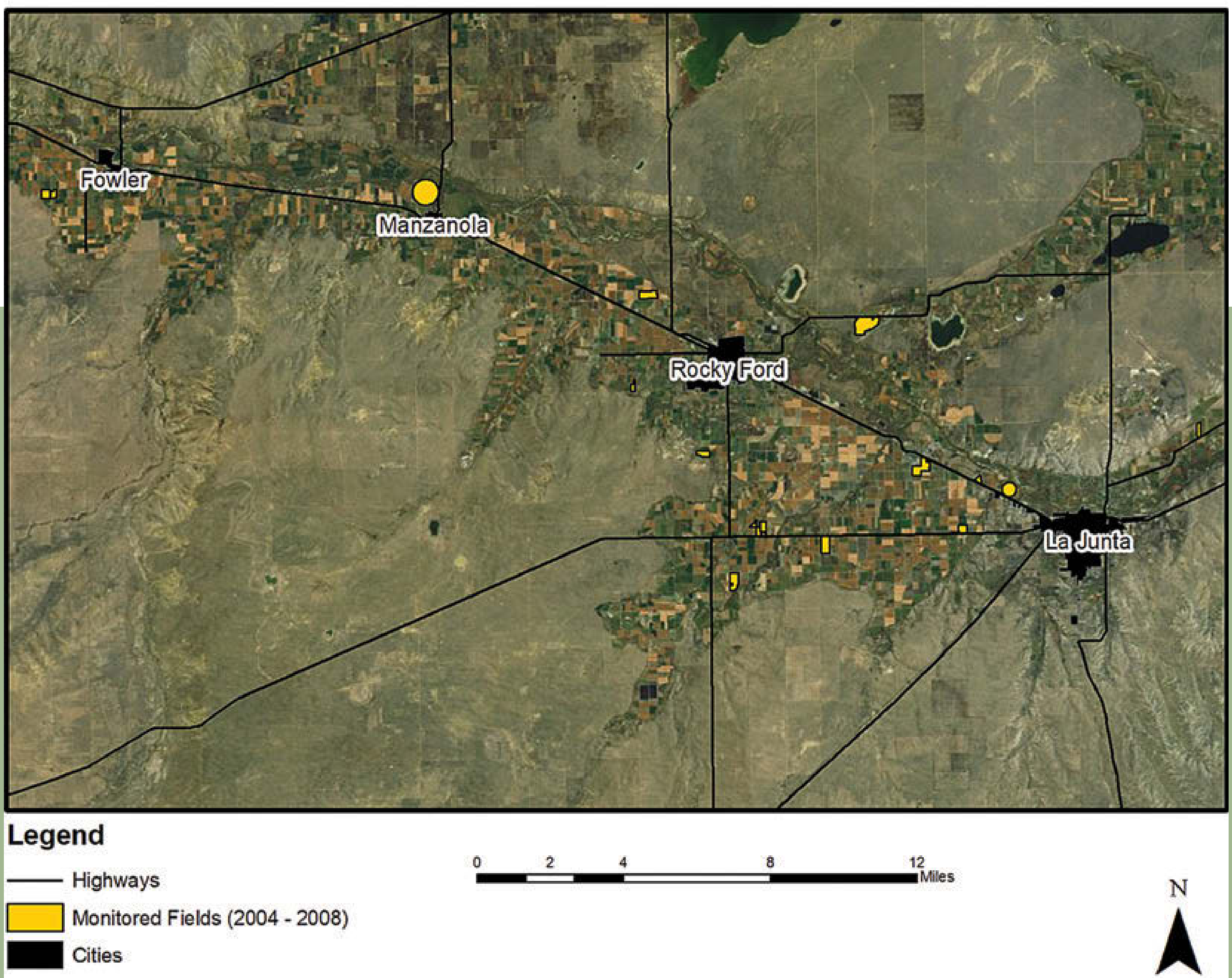


Figure 2. *Monitored fields in Upstream Study Region*

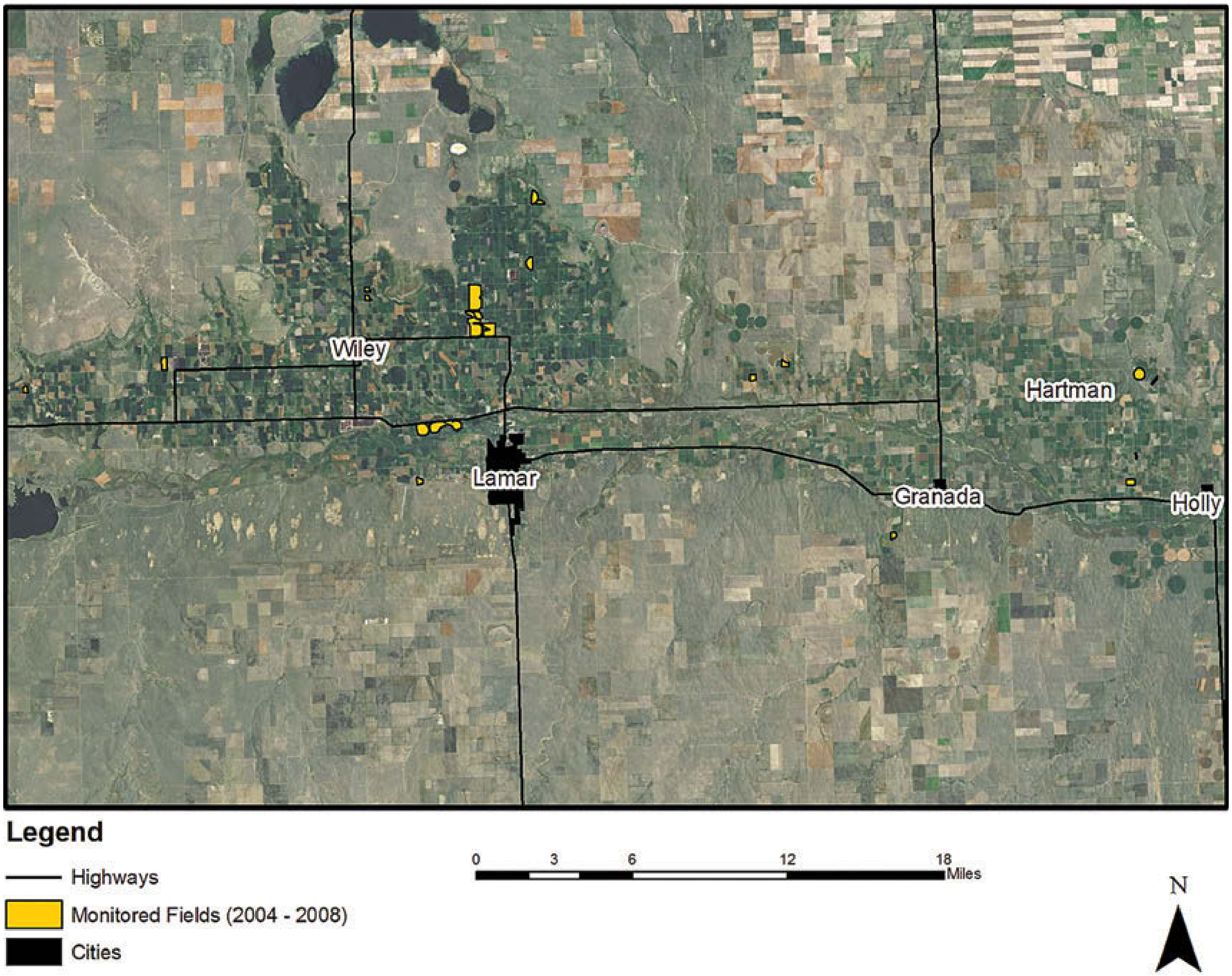
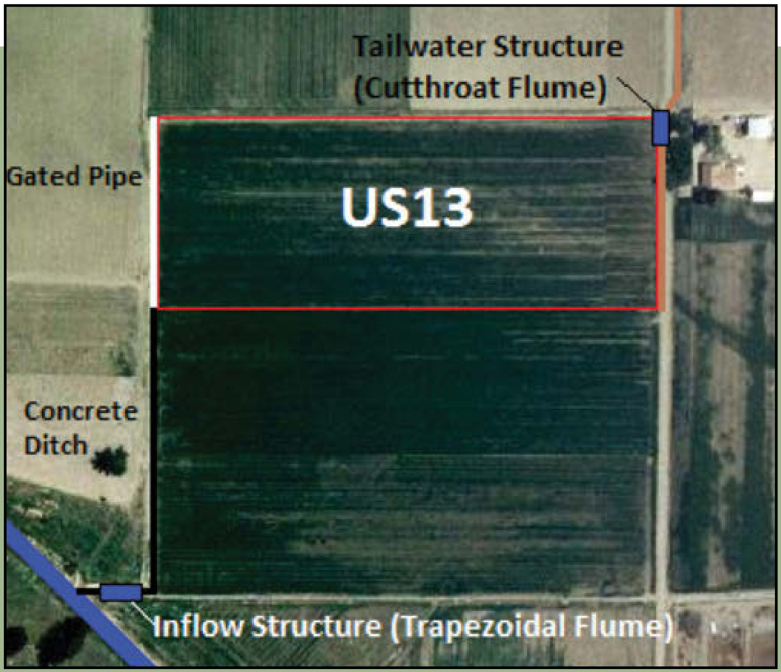


Figure 3. *Monitored fields in Downstream Study Region*



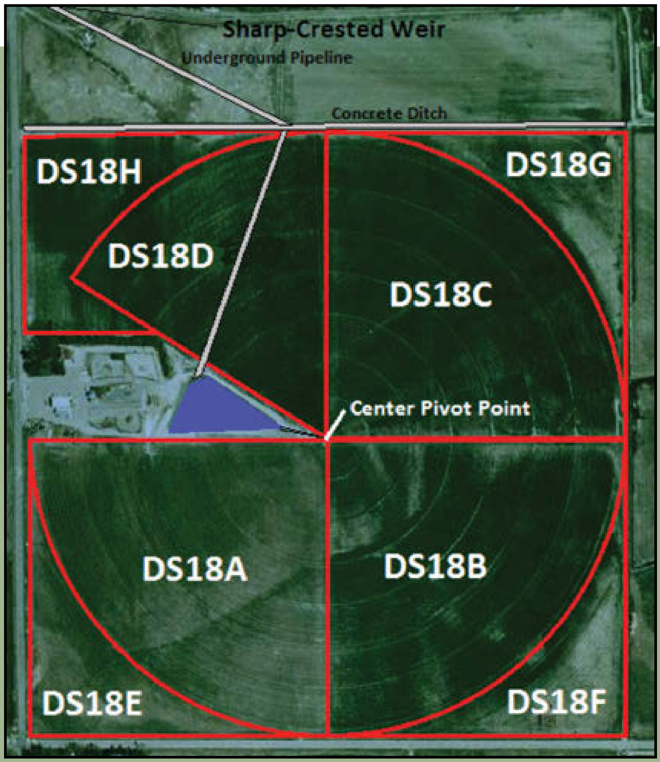


Figure 4 (left). *Layout of field US13*

Figure 5. *Layout of fields DS18A, DS18B, DS18C, DS18D, DS18E, DS18F, DS18G, and DS18H within the same farm unit*

In many fields, particularly those utilizing surface water from canal systems with rotational water allotment operations, the duration of an irrigation event was too short to irrigate the entire field area. During dry periods, these fields often went several weeks between irrigation events, so that irrigation of the entire field spanned a period of several weeks or longer. Similarly, for fields under canal systems with more junior water rights, or during drought conditions, irrigation water often was directed away from the monitored field to another field containing a higher-valued crop in need of water application. The most typical case was to direct water from alfalfa crops to corn or sorghum crops. These practices created differences in infiltrated water, soil-water content, and actual ET rates across the field area over time. Hence, fields monitored in this study often were subdivided into cells, or subfields, for the purpose of measuring and modeling irrigation events. In many irrigation events, available irrigation water was applied to only one cell. In other events, multiple cells within a field were irrigated simultaneously. For example, field US9 was divided into two cells, as seen in Figure 6.

For center-pivot sprinkler irrigated fields utilizing surface water, especially for rotational allotment canal systems, the difference in starting and ending locations of the rotating sprinkler line during an irrigation event often created “wedges” within a field that received different applied irrigation amounts than did other parts of the field over time. In many cases, the frequency of irrigation events dampened the effect of differences in

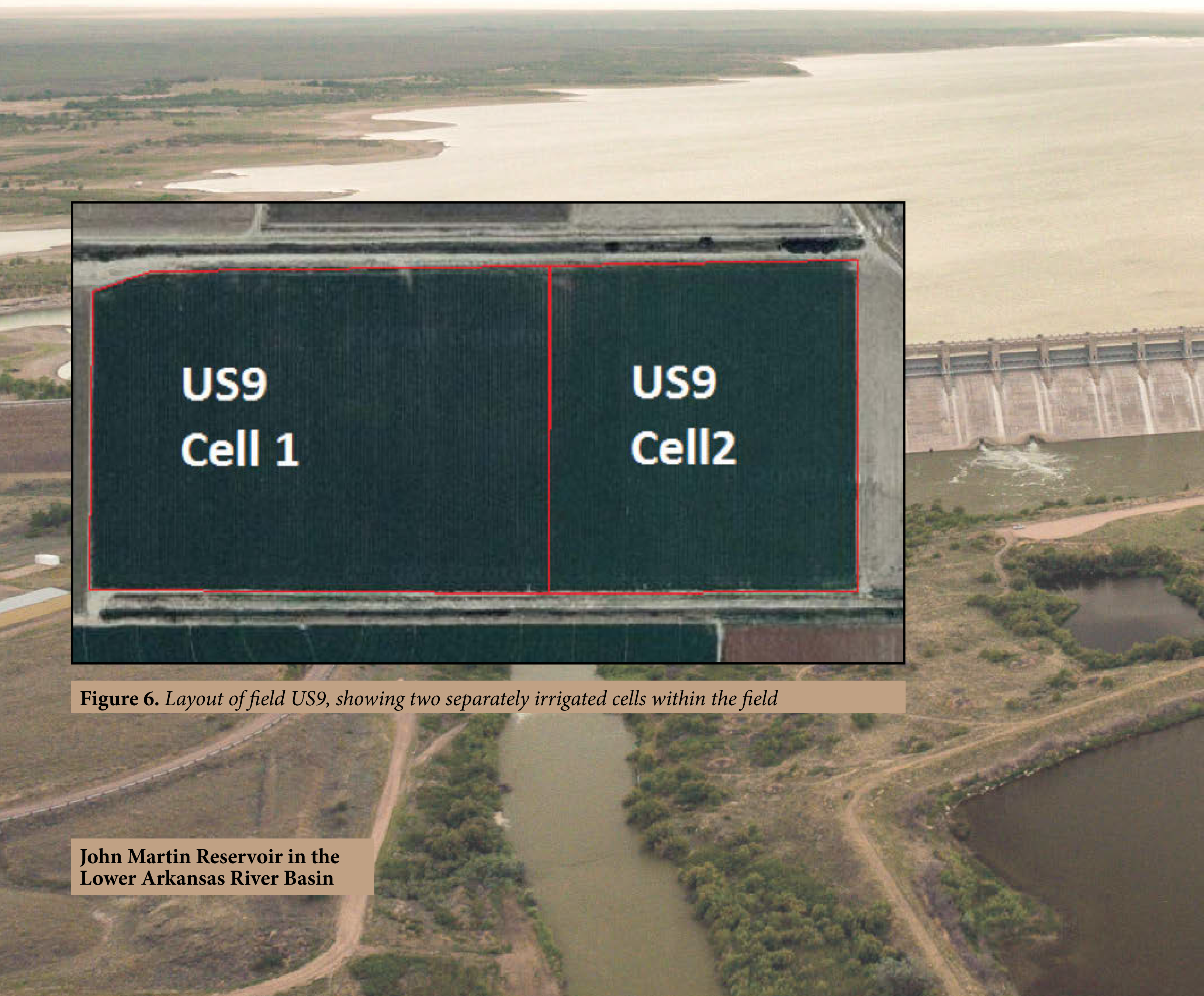


Figure 6. *Layout of field US9, showing two separately irrigated cells within the field*

John Martin Reservoir in the Lower Arkansas River Basin

irrigation timing on actual ET across the field area, but in some cases it did not.

Several fields were dropped from the study along the way for various reasons (such as physical changes to an irrigation system making it infeasible to monitor). A number of fields received no application of irrigation water during some seasons, due to water availability situations or the timing of the study, and data collection on these fields was limited to soil textural analysis, precipitation, ET, and soil salinity surveys.

Hydrological Setting

The hydrological conditions in the LARV during the period of this study (2004-2008) in relation to long-term hydrological conditions can be inferred from the plots in Figures 7 through 9. Figure 7 shows plots of the daily average flow rate in the Arkansas River at the Catlin Dam Near Fowler, Colorado (Station ID 07119700) gauging station, located near the upstream end of the Upstream Study Region, and at the gauging station Below John Martin Reservoir (Station ID 07130500), located near the upstream end of the Downstream region. A plot is shown for average conditions over the period 1975 (first year of Pueblo Reservoir)-2010 along with corresponding plots for each year within the period of this study. Cumulative daily precipitation recorded at the Colorado Agricultural Meteorological Network (CoAgMet) Stations at Rocky Ford (RFD01) in the Upstream Study Region averaged over 1992-2010

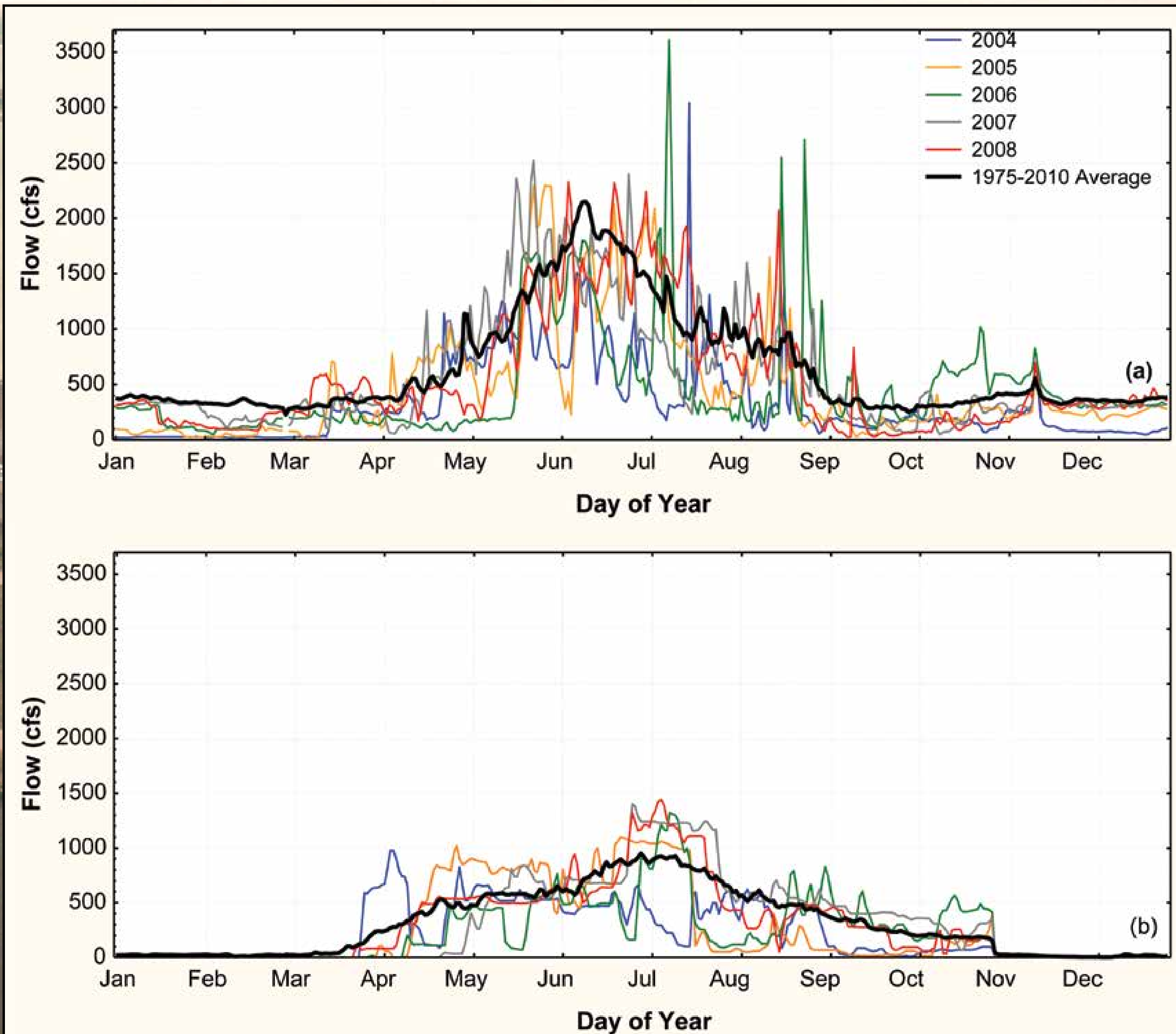


Figure 7. *Daily average flow rate in Arkansas River at (a) Catlin Dam Near Fowler, CO gauge and at (b) Below John Martin Reservoir gauge for study years compared to mean daily average flow rate for period 1975-2010*

and at Lamar (LAM02/LAM04) in the Downstream Study Region, averaged over 1998-2010, are plotted in Figure 8 with comparison precipitation plots for each of the years of this study. Cumulative daily reference crop evapotranspiration (ET_r) calculated using the Penman-Monteith method (Allen 2005) for each of the study years, compared with the 1992-2010 average, are plotted for the Rocky Ford (RFD01) CoAgMet station in Figure 9a. Similar plots for the Lamar (LAM02/LAM04) station for the years 2006 and 2007 (data were incomplete for the other study years) are compared with the 1999-2010 average in Figure 9b.

Comparison of the regulated river flow at the Catlin Dam Near Fowler, Colorado and Below John Martin Reservoir gauges during the study period to mean regulated flow rates over 1975-2010 reveal that the study period generally represents a relatively dry period of record in terms of streamflow, although there are times within each year when conditions were wetter than average. The 2004-2006 seasons were particularly dry, with 2007 and 2008 being closer to normal. Total annual flow volumes at the Catlin Dam Near Fowler, Colorado gauge on the Arkansas River for 2004, 2005, 2006, 2007, and 2008 were 50 percent, 73 percent, 71 percent, 90 percent, and 86 percent, respectively, of the mean annual flow volume over 1975-2010. Total annual flow volumes at the Below John Martin Reservoir gauge for 2004, 2005, 2006, 2007, and 2008 were 69 percent, 81 percent, 75 percent, 103 percent, and 96 percent, respectively, of the mean annual flow volume over 1975-2010.

Though the study period was relatively dry in relation to river flows available for diversion, the data in Figures 8 indicate that rainfall in the study regions over this period was close to normal or above normal with the

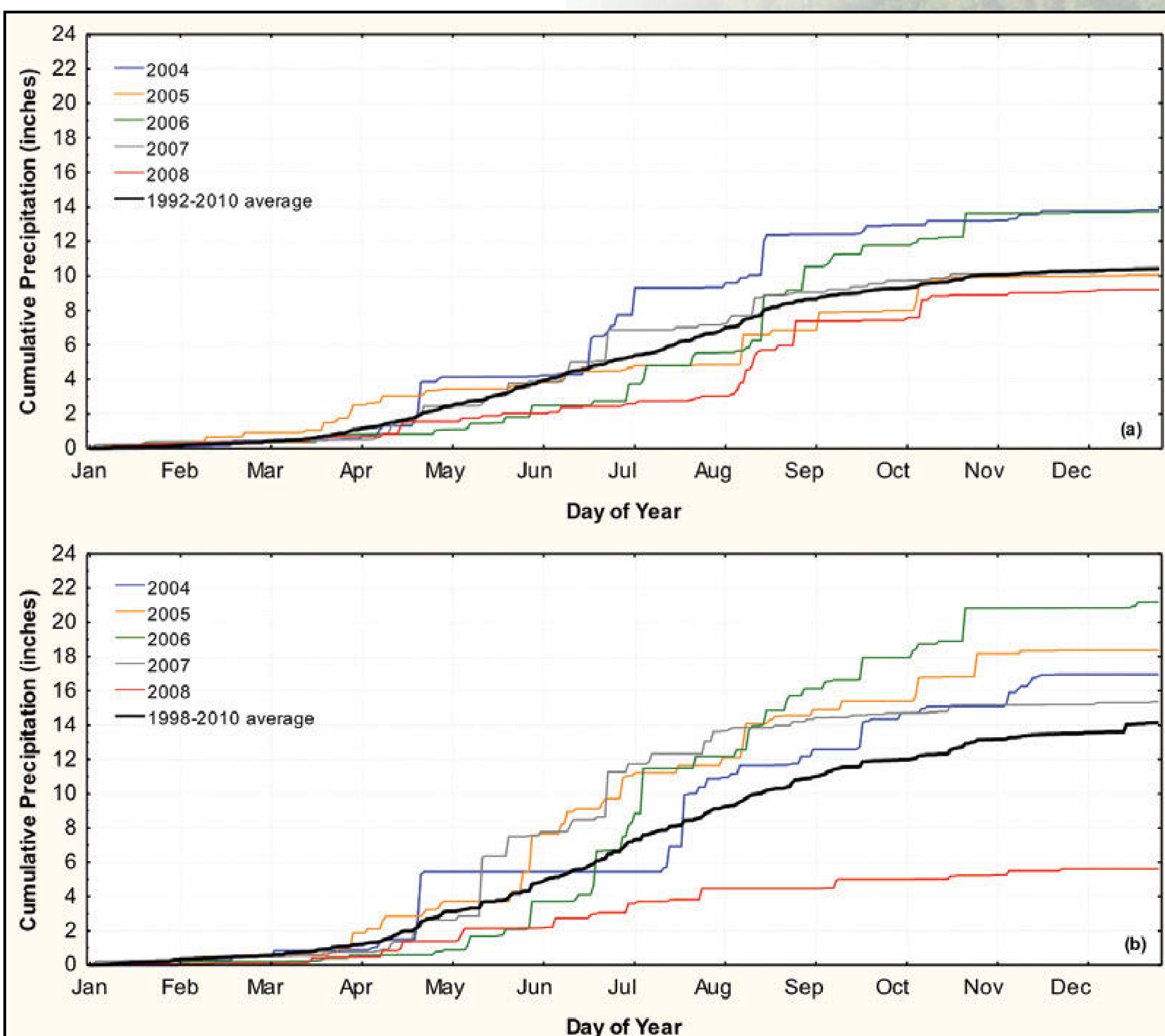


Figure 8. *Cumulative precipitation recorded for each of the study years 2004-2008 and (a) averaged over the years 1992-2010 at the CoAgMet Rocky Ford (RFD01) weather station, and (b) averaged over the years 1998-2010 at the CoAgMet Lamar (LAM02/LAM04) weather station*

exception of 2008. Precipitation at the Rocky Ford (RFD01) weather station in years 2004, 2005, 2006, and 2007 was 133 percent, 96 percent, 132 percent, and 100 percent, respectively, of the 1992-2010 average, while 2008 precipitation was 89 percent of the 1992-2010 average. At the Lamar (LAM02/LAM04) weather station, precipitation in years 2004, 2005, 2006, and 2007 was 120 percent, 130 percent, 150 percent, and 109 percent, respectively, of the 1998-2010 average, while 2008 precipitation was only 40 percent of the 1998-2010 average.

Also, from Figure 9, ET_r over the study period appears to be generally below the average over recent years. ET_r estimated from data at the Rocky Ford (RFD01) weather station in years 2004, 2005, 2006, 2007, and 2008 was 91 percent, 97 percent, 100 percent, 87 percent, and 98 percent, respectively, of the 1992-2010 average. At the Lamar (LAM02/LAM04) weather station, estimated ET_r for 2006 and 2007 was 96 percent and 89 percent, respectively, of the 1999-2010 average.

Irrigation Characteristics

For each field (or farm collection of fields), the irrigation water source, the type of irrigation system, and the number of irrigations measured during each season are summarized in Tables 1 and 2 for the Upstream and Downstream Study Regions, respectively. Most of the fields were supplied water from one of seven different canals. Groundwater wells provided water to 10 of the fields studied. A total of 33 conventional surface irrigated fields were studied. The 28 sprinkler-irrigated fields (eight Upstream, 20 Downstream) analyzed for this report were irrigated by 14 different center-pivot sprinkler systems (four Upstream, 10 Downstream).

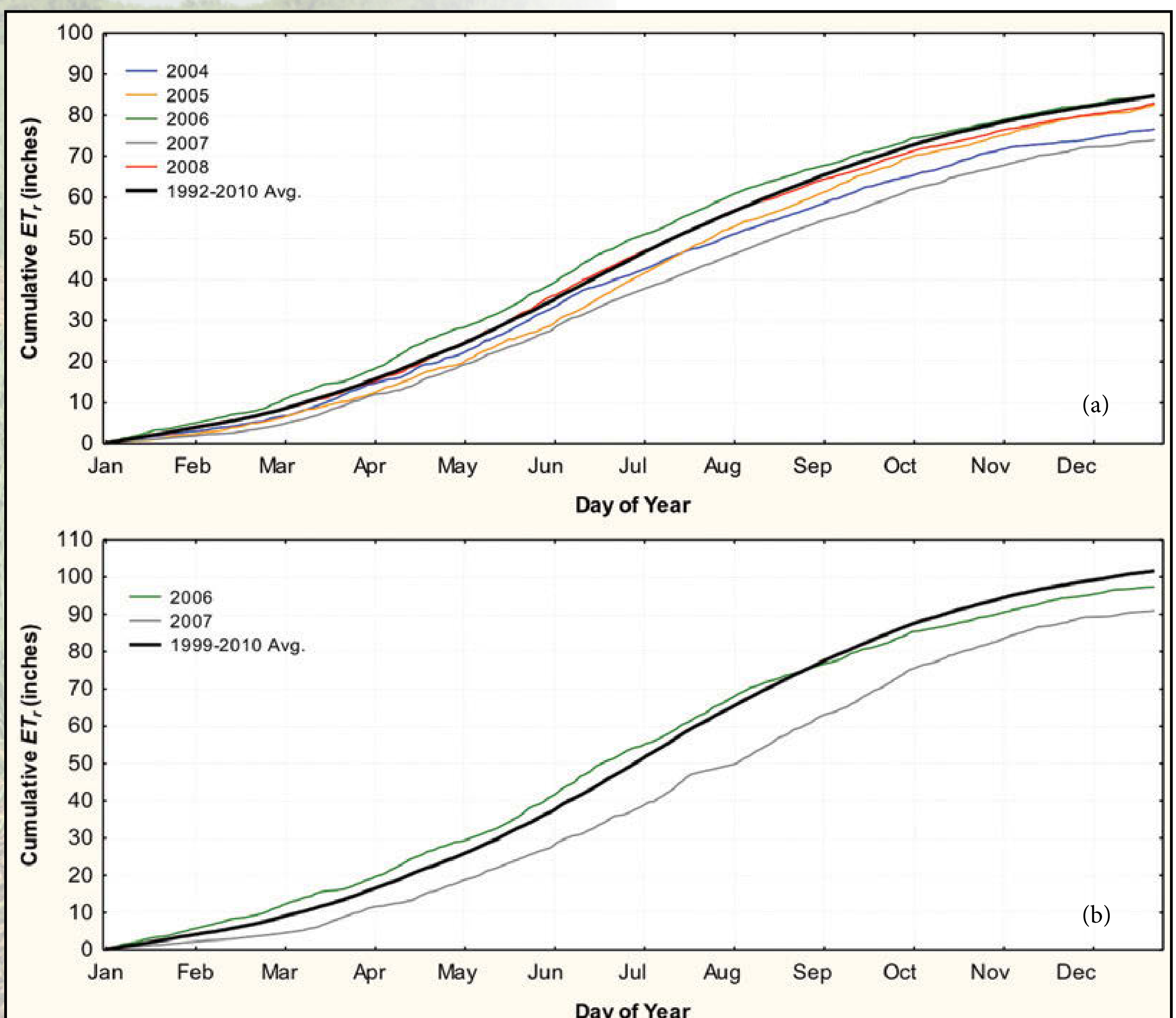


Figure 9. *Cumulative ET_r calculated for (a) each of the study years 2004-2008 and averaged over the years 1992-2010 at the CoAgMet Rocky Ford (RFD01) weather station, and (b) for study years 2006 and 2007 and averaged over the years 1999-2010 at the CoAgMet Lamar (LAM02/LAM04) weather station*

The larger number of sprinkler-irrigated fields in the Downstream region was the result of a larger population of center-pivot irrigation systems available to study in that area. Canals may divert water rights for irrigation from the Arkansas River over the period March 15 to November 15. The average earliest date of monitored irrigation events across all fields in this study was May 17, and the average latest date was September 6.

Crops

Major crops in the LARV in order of cropped area are alfalfa, corn, grass hay, wheat, sorghum, dry beans, cantaloupe, watermelon, and onions (USDA NASS Colorado Field Office 2009). The crop type on each monitored field in this study for each irrigation season is summarized in Tables 3 and 4 for the Upstream and Downstream Study Regions, respectively.

Soil Conditions

Soils within the LARV generally consist of a variety of clay loam, loam, silty clay loam, silty loam, and sandy loam textural classes. Tables 5 and 6 present soil texture data and estimated total available water (TAW) for the surveyed fields derived from soil samples collected in the field and from the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) soil surveys (USDA 2010) in the Upstream and Downstream Study Regions, respectively. Figure 10 illustrates overlays of the irrigated fields in the vicinity of the Upstream and Downstream Study Regions onto the variety of general textural classes from USDA NRCS soil surveys.

Table 1. *Irrigation water source, type of irrigation system, and annual number of irrigation events monitored on fields in the Upstream Study Region*

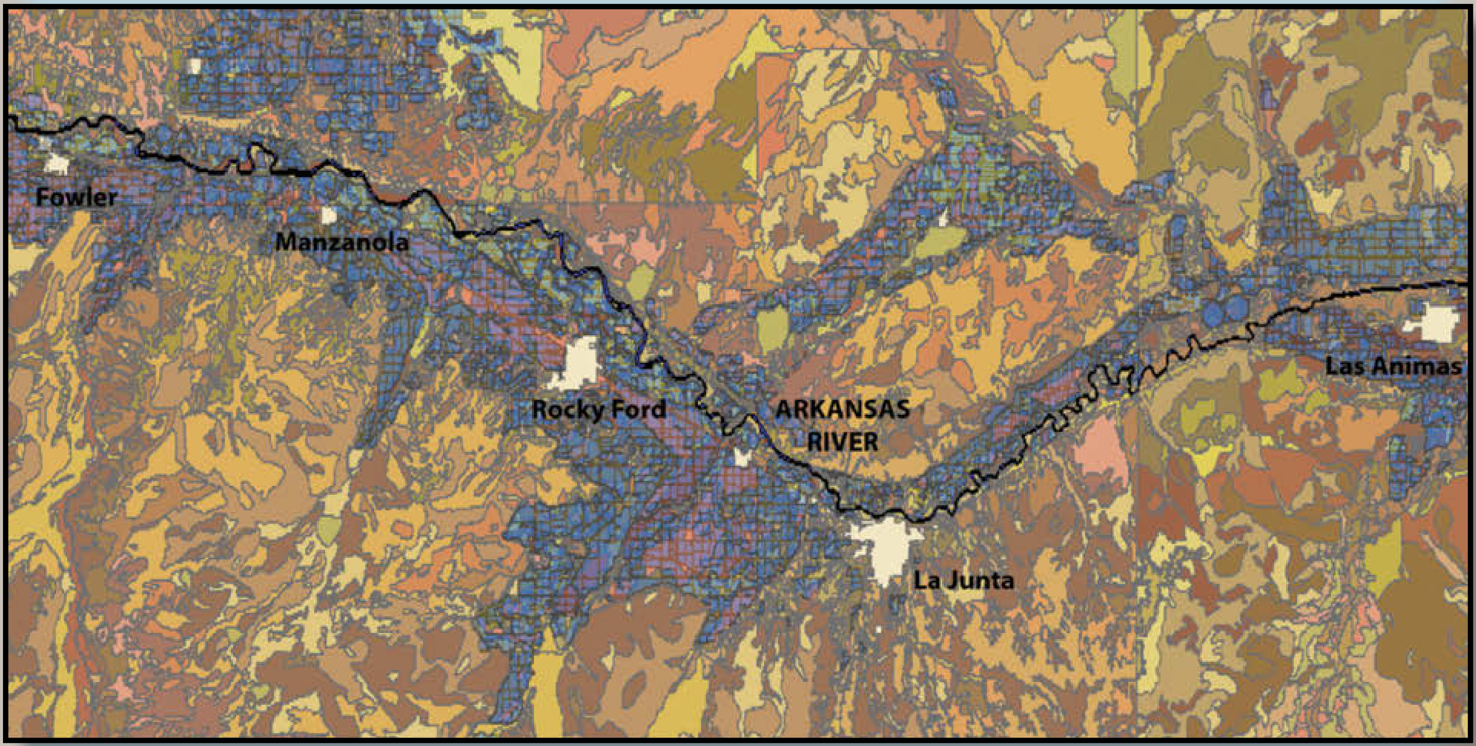
Field	Water Source	Type of Irrigation System (*)	Annual Number Monitored Irrigation Events				
			2004	2005	2006	2007	2008
US4	Well	Sprinkler (CP)	0	2	6	0	0
US4A	Well	Sprinkler (CP)	0	0	0	0	7
US4B	Well	Sprinkler (CP)	0	0	0	0	0
US5A	Catlin Canal	Sprinkler (CP)	0	9	9	0	12
US6	Catlin Canal	Surface (CD)	0	3	5	0	0
US7	Catlin Canal	Surface (CD)	0	3	7	0	0
US8	Fort Lyon Canal	Surface (CD)	1	2	2	0	2
US9	Catlin Canal	Surface (GP)	0	5	5	0	0
US10	Rocky Ford Highline Canal	Surface (GP)	0	5	4	0	0
US12	Rocky Ford Highline Canal	Surface (CD)	3	8	3	0	3
US13	Rocky Ford Highline Canal	Surface (GP)	0	7	4	0	5
US14A	Rocky Ford Highline Canal	Surface (GP)	0	3	1	0	2
US14B	Rocky Ford Highline Canal	Surface (GP)	0	3	1	0	4
US14C	Rocky Ford Highline Canal	Surface (GP)	0	3	1	0	3
US15	Catlin Canal	Surface (ED)	0	0	0	0	2
US17A	Catlin Canal	Surface (CD)	0	0	0	0	3
US17E	Well	Sprinkler (CP)	0	0	0	0	5
US17F	Well	Sprinkler (CP)	0	0	0	0	2
US18A	Well	Sprinkler (CP)	0	0	0	0	7
US18B	Well	Sprinkler (CP)	2	11	0	0	3
US20	Rocky Ford Highline Canal	Surface (GP)	2	0	0	0	0
US22	Catlin Canal	Surface (CD)	0	0	0	0	0
Total			8	64	48	0	60

*CD-Concrete Ditch Water Delivery, CP-Center Pivot, ED-Earthen Ditch Water Delivery, GP-Gated Pipe Water Delivery

Table 2. *Irrigation water source, type of irrigation system, and annual number of irrigation events monitored on fields in the Downstream Study Region*

Field	Water Source	Type of Irrigation System	Annual Number Monitored Irrigation Events 2004	2005	2006	2007	2008
DS1	Fort Lyon Canal	Surface (ED, GP)	2	5	6	8	6
DS2	Fort Lyon Canal	Surface (ED,CD)	0	3	6	9	6
DS3	Fort Lyon Canal	Surface (ED)	0	4	3	3	0
DS4A	Fort Lyon Canal	Surface (CD)	1	0	0	0	0
DS4A1	Fort Lyon Canal	Sprinkler (CP)	0	0	9	9	8
DS4A2	Fort Lyon Canal	Sprinkler (CP)	0	8	0	0	0
DS4B	Fort Lyon Canal	Surface (CD)	2	0	0	0	6
DS4C	Fort Lyon Canal	Surface (CD)	0	0	0	0	1
DS5A	Fort Lyon Canal	Sprinkler (CP)	0	9	7	12	5
DS5B	Fort Lyon Canal	Surface (ED)	0	0	0	0	3
DS6A	Fort Lyon Canal	Surface (ED)	0	0	0	0	4
DS6B	Fort Lyon Canal	Surface (GP)	0	1	2	4	0
DS6Ba	Fort Lyon Canal	Surface (GP)	0	0	0	0	3
DS7	Amity Canal/Well	Surface (ED)	0	3	0	1	0
DS7s	Amity Canal	Sprinkler (CP)	0	0	0	0	4
DS8	Well	Surface (ED)	0	2	0	0	0
DS9	Amity Canal	Sprinkler (CP)	0	2	0	3	3
DS10	Amity Canal	Surface (ED)	0	1	0	1	0
DS11	Buffalo Canal	Surface (ED)	0	1	0	0	2
DS12	Fort Bent Canal	Surface (CD)	0	1	3	0	0
DS13	Lamar Canal	Surface (ED)	0	4	0	0	0
DS14	Fort Lyon Canal	Surface (GP)	0	2	0	4	0
DS15	Well	Surface (ED,CD)	0	0	5	2	3
DS16	Fort Lyon Canal	Sprinkler (CP)	0	0	9	8	7
DS17A	Fort Lyon Canal	Sprinkler (CP)	0	0	0	12	8
DS18A	Fort Lyon Canal	Sprinkler (CP)	0	0	0	0	7
DS18B	Fort Lyon Canal	Sprinkler (CP)	0	0	0	0	9
DS18C	Fort Lyon Canal	Sprinkler (CP)	0	0	0	0	5
DS18D	Fort Lyon Canal	Sprinkler (CP)	0	0	0	0	7
DS19A	Fort Lyon Canal	Sprinkler (CP)	0	0	0	0	12
DS19B	Fort Lyon Canal	Sprinkler (CP)	0	0	0	0	8
DS19C	Fort Lyon Canal	Sprinkler (CP)	0	0	0	0	2
DS19D	Fort Lyon Canal	Sprinkler (CP)	0	0	0	0	13
DS19M	Fort Lyon Canal	Sprinkler (CP)	0	0	0	0	11
DS20A	Fort Lyon Canal	Sprinkler (CP)	0	0	0	0	5
DS20B	Fort Lyon Canal	Sprinkler (CP)	0	0	0	0	7
DS20G	Fort Lyon Canal	Sprinkler (CP)	0	0	0	0	2
DS21	Amity Canal	Surface (CD)	0	0	0	0	1
DS22	Amity Canal	Sprinkler (CP)	0	0	0	0	5
Total			5	46	50	76	163

*CD-Concrete Ditch Water Delivery, CP-Center Pivot, ED-Earthen Ditch Water Delivery, GP-Gated Pipe Water Delivery a.



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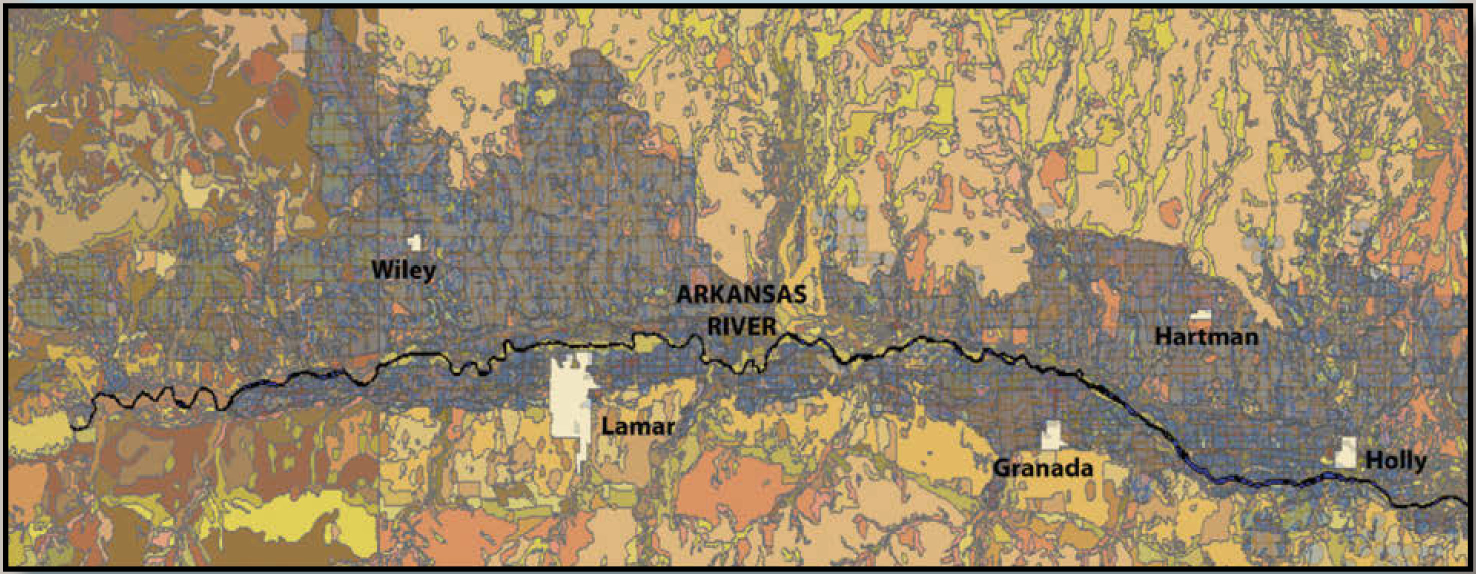


Figure 10. *Overlay of irrigated fields in the vicinity of the (a) Upstream and (b) Downstream Study Regions on the USDA NRCS soil textural classes, illustrating the variety of soil textures in the areas. For detailed information regarding soil textural class names and characteristics see http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm*

Table 3. *Crops on fields in the Upstream Study Region*

	Crop by Year				
Field	2004	2005	2006	2007	2008
US4		A	A		
US4A					WS,CG
US4B					A
US5A		ON	ON		ON
US6		A	A		
US7		A	A		
US8	SS	G	G		G
US9		A	A		
US10		A	A		
US12	A	A	A		A
US13		CG	CG		CG
US14A		G	G		G
US14B		G/A	G/A		G/A
US14C		G	G		G
US15					G
US17A					A
US17E					CG
US17F					FS
US18A					S, W
US18B					W,C
US20	A	A			
US22	A				

Abbreviations: A – alfalfa, C – canola, CT – cantaloupe, CG – corn grain, CS – corn sillage, FS – forage sorghum, G – grass, G/A – grass/alfalfa mix, O – oats, ON – onions, S – sunflowers, SG – sorghum grain, SS – sorghum silage, W – wheat, WG – wheat grain, WS – wheat silage.

Table 4. *Crops on fields in the Downstream Study Region*

	Crop by Year				
Field	2004	2005	2006	2007	2008
DS1	CG	A	A	A	A
DS2		A	A	A	A
DS3		CS	SS	SS	
DS4A	A				
DS4A1			A	A	A
DS4A2		A			
DS4B	SG				A
DS4C					A
DS5A		CG	FS	CG	A
DS5B					A
DS6A					CG
DS6B		A	A	A	
DS6Ba					A
DS7		CS		WS	
DS7s					CS
DS8		CG			
DS9		CG		CG	CG
DS10		CG		CG	
DS11		A			A
DS12		A	A		
DS13		CS		O	
DS14		FS		CG	
DS15			CS	CG	CG
DS16			FS	A	A
DS17A				A	A
DS18A					WG,CS
DS18B					A
DS18C					WG
DS18D					A
DS19A					A
DS19B					WG
DS19C					WG
DS19D					A
DS19M					A, CS
DS20A					A
DS20B					CG
DS20G					WG
DS21					A
DS22					CS,WG

Abbreviations: A – alfalfa, C – canola, CT – cantaloupe, CG – corn grain, CS – corn sillage, FS – forage sorghum, G – grass, G/A – grass/alfalfa mix, O – oats, ON – onions, S – sunflowers, SG – sorghum grain, SS – sorghum silage, W – wheat, WG – wheat grain, WS – wheat silage.

Table 5. *Soil textural class and total available water (TAW) for monitored irrigated fields in the Upstream Study Region*

	Field Survey					NRCS				
Field	Soil Type	Avg % Clay	Avg % Sand	Avg % Silt	Avg TAW (in/ft)	Soil Type	Avg % Clay	Avg % Sand	Avg % Silt	Avg TAW (in/ft)
US1	No Field Samples Collected					SCL	26.54%	11.16%	62.30%	2.01
US2	No Field Samples Collected					SaL, L	18.77%	43.87%	37.33%	1.73
US3	No Field Samples Collected					SCL	47.17%	6.60%	46.23%	2.04
US4	L	11.51%	54.43%	34.06%	1.45	L	18.06%	43.56%	36.33%	1.52
US4A	SaL	10.57%	58.10%	31.34%	1.36	L	17.04%	47.04%	28.38%	1.47
US4B	L	12.45%	50.77%	36.78%	1.53	L	19.28%	39.31%	36.57%	1.58
US5A	L	22.85%	31.34%	45.81%	1.87	SCL	27.20%	8.40%	64.40%	2.04
US6	No Field Samples Collected					L	22.07%	29.75%	48.18%	1.84
US7	No Field Samples Collected					L	25.83%	14.08%	60.08%	1.99
US8	L	17.83%	34.29%	47.88%	1.89	SCL	27.20%	8.40%	64.40%	2.04
US9	No Field Samples Collected					L	15.71%	59.02%	25.27%	1.59
US10	No Field Samples Collected					L	26.73%	16.20%	57.08%	1.99
US12	SL, L	18.26%	38.16%	43.58%	1.79	SCL	25.60%	8.80%	65.70%	2.04
US13	SaL	14.37%	50.29%	35.34%	1.53	SCL	25.60%	8.80%	65.70%	2.04
US14A	L	15.28%	40.14%	44.58%	1.78	SCL	27.20%	8.40%	64.40%	2.04
US14B	L	17.58%	46.15%	36.27%	1.63	SCL	27.39%	21.97%	50.67%	2.04
US14C	SaL, L	17.41%	44.99%	37.60%	1.63	CL	27.63%	38.39%	34.06%	2.04
US15	L	20.25%	41.68%	38.07%	1.66	SCL	27.20%	8.40%	64.40%	2.04
US17A	No Field Samples Collected					SCL	49.19%	20.32%	30.47%	1.94
US17E	SL, L	19.27%	29.81%	50.92%	1.98	SCL	36.55%	8.54%	54.91%	2.04
US17F	SL, L	19.27%	29.81%	50.92%	1.98	C, SCL	37.59%	8.39%	54.02%	2.04
US18A	No Field Samples Collected					L, SCL	25.59%	15.11%	59.30%	1.98
US18B	No Field Samples Collected					L, SCL	21.15%	33.59%	45.26%	1.80
US20	No Field Samples Collected					SCL	26.86%	9.83%	63.31%	2.03
US22	No Field Samples Collected					SCL	25.80%	13.30%	60.90%	1.96

Key: CL = clay loam, L = loam, SCL = silty clay loam, SaL = sandy loam, SL = silty loam

Table 6. *Soil textural class and total available water (TAW) for monitored irrigated fields in the Downstream Study Region*

	Field Survey					NRCS				
Field	Soil Type	Avg % Clay	Avg % Sand	Avg % Silt	Avg TAW (in/ft)	Soil Type	Avg % Clay	Avg % Sand	Avg % Silt	Avg TAW (in/ft)
DS1	SL, L	16.62%	34.14%	49.23%	1.92	CL	25.60%	11.10%	63.30%	2.16
DS2	SL, L	17.22%	34.65%	48.13%	1.89	CL	26%	11%	63%	2.16
DS3	No Field Samples Collected					CL	25.68%	16.00%	58.32%	2.06
DS4A	SL, L	16.70%	33.97%	49.32%	1.92	CL	25.30%	14.80%	59.90%	2.04
DS4A1	SL, L	16.70%	33.97%	49.32%	1.92	CL	25.30%	14.80%	59.90%	2.04
DS4A2	SL, L	16.70%	33.97%	49.32%	1.92	CL	25.30%	14.80%	59.90%	2.04
DS4B	SL	13.96%	35.63%	50.40%	1.93	CL	25.30%	14.80%	59.90%	2.04
DS4C	L	21.26%	33.32%	45.42%	1.83	CL	25.30%	14.80%	59.90%	2.04
DS5A	SL, L	19.76%	29.08%	51.16%	1.98	CL	25.82%	14.28%	59.90%	2.04
DS5B	No Field Samples Collected					CL	29.00%	8.10%	63.20%	2.28
DS6A	SL	10.10%	37.59%	52.30%	1.95	CL	25.30%	14.80%	59.90%	2.04
DS6B	SL	13.36%	36.11%	50.52%	1.98	CL	23.86%	22.86%	53.30%	2.06
DS6Ba	SL	13.36%	36.11%	50.52%	1.98	CL	21.74%	34.74%	43.56%	2.09
DS7	L	21.28%	31.68%	47.04%	1.89	CL	29.21%	45.43%	27.79%	1.75
DS7s	L	21.28%	31.68%	47.04%	1.89	CL	29.96%	39.57%	30.48%	1.61
DS8	No Field Samples Collected					CL	25.30%	14.80%	59.90%	2.04
DS9	L	13.27%	42.79%	43.94%	1.75	CL	24.67%	14.67%	61.85%	2.06
DS10	L	11.77%	39.62%	48.61%	1.87	CL	25.61%	36.37%	38.01%	1.94
DS11	No Field Samples Collected					CL	22.52%	44.45%	33.07%	1.98
DS12	No Field Samples Collected					CL	23.48%	20.96%	56.10%	1.97
DS13	L	14.08%	42.29%	43.63%	1.728	CL	23.95%	12.24%	66.30%	2.04
DS14	No Field Samples Collected					CL	26.07%	17.20%	56.73%	2.08
DS15	SL	16.30%	26.80%	56.90%	2.12	CL	25.30%	14.80%	59.90%	2.04
DS16	SL	13.56%	36.13%	13.56%	1.92	CL	25.30%	14.80%	59.90%	2.04
DS17A	SL	19.35%	29.17%	51.49%	2.00	CL	26.11%	13.99%	59.90%	2.04
DS18A	L, SL, CL	20.44%	31.03%	48.54%	1.92	CL	25.23%	14.17%	60.59%	1.99
DS18B	SL	14.45%	30.93%	54.61%	2.06	CL	25.26%	14.43%	60.31%	2.01
DS18C	SL, L	14.58%	36.46%	48.95%	1.90	CL	25.29%	16.04%	58.69%	2.04
DS18D	SL, L	16.39%	34.97%	48.64%	1.90	CL	25.30%	15.56%	59.16%	2.04
DS19A	L	17.22%	36.64%	46.14%	1.84	CL	26.12%	16.05%	57.83%	2.09
DS19B	SL, L	16.61%	30.63%	52.76%	2.01	CL	25.31%	14.82%	59.87%	2.04
DS19C	SL, L	15.89%	33.47%	50.64%	1.96	CL	25.30%	14.80%	59.90%	2.04
DS19D	SL	12.73%	30.43%	56.84%	2.10	CL	25.39%	14.93%	59.68%	2.05
DS19M	L, CL	26.72%	30.71%	42.57%	1.80	CL	26.06%	15.95%	57.99%	2.09
DS20A	L	18.35%	33.63%	48.02%	1.90	CL	25.40%	15.89%	58.72%	2.05
DS20B	SL	15.80%	32.47%	51.73%	1.99	CL	25.57%	15.06%	59.37%	2.03
DS20G	L	18.12%	32.14%	49.74%	1.94	CL	25.30%	14.80%	59.90%	2.04
DS21	SL	16.90%	32.49%	50.61%	1.96	CL	25.30%	14.80%	59.90%	2.04
DS22	L	17.21%	45.00%	37.79%	1.62	CL	17.63%	61.88%	20.56%	1.92

Key: CL = clay loam, L = loam, SCL = silty clay loam, SaL = sandy loam, SL = silty loam

Methodology

Field Water Balance

Assuming constant fluid density, the water balance within the soil root zone of an irrigated field over a time period Δt can be represented by the following equation (Figure 11):

$$Q_I + Q_P + Q_U - Q_{ET} - Q_{DP} = \Delta S_{SW} \tag{1}$$

wherein Q_I = the volume of water infiltrated into the soil root zone from irrigation over Δt, Q_P = the volume of water infiltrated into the soil from effective precipitation over Δt, Q_U = the volume of water entering the root zone by upflux from the groundwater table over Δt, Q_{ET} = the volume of water leaving the root zone by evapotranspiration over Δt, Q_{DP} = the volume of water leaving the root zone by deep percolation over Δt, and ΔS_{SW} = the change in volume of water stored in the root zone over Δt. The value of Q_I is calculated as:

$$Q_I = Q_A - Q_{TW} \tag{2}$$

wherein Q_A = the net volume of water applied to the field by irrigation over Δt, and Q_{TW} = the tailwater runoff volume over Δt. The terms in Equations (1) and (2) can be expressed in units of volume or depth (volume per unit field area).

Flow Onto and Off of Fields

The irrigation water volume diverted to each surface-irrigated field were measured using Parshall, trapezoidal, EZ Flow Ramp™, and cutthroat flumes, as well as weir structures, all equipped with stilling wells and automatic water-level loggers. Flumes in these types of applications are estimated to have measurement accuracy of about ±15 percent. This diverted volume, less any transit losses in small delivery ditches, provided an estimate of the applied volume, Q_A, flowing onto a field. Such structures also were used to measure tailwater volume, Q_{TW}, flowing off of surface-irrigated fields. In most cases, portable flume structures were installed and used (e.g., Figure 12). Whenever possible, however, permanent flow measurement structures owned by a cooperator or the canal company were used (e.g., Figure 13). In-line McPropeller® flow meters (by McCrometer®) equipped with an instantaneous flow rate indicator and totalized flow volume odometer were used to measure water

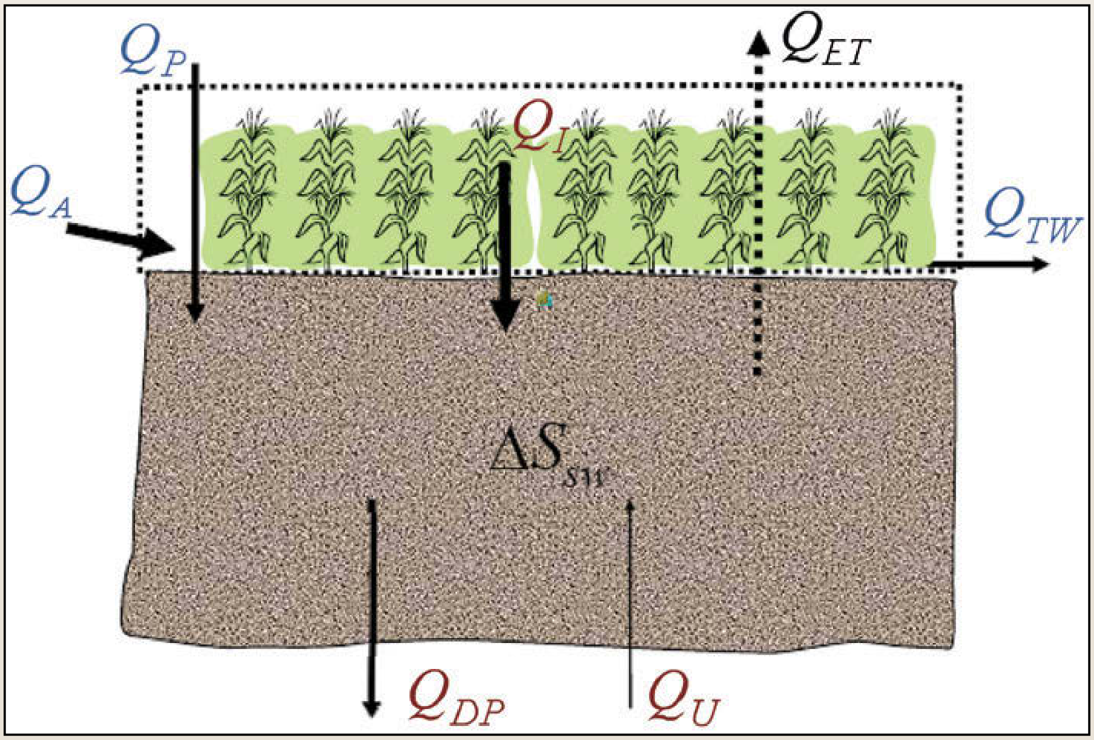


Figure 11. *The field water balance showing the surface components and the root zone components*

applied to sprinkler-irrigated fields. These meters have a rated accuracy of ±2 percent of reading and a repeatability of ±0.25 percent, and were installed by certified professionals. Significant tailwater runoff was never observed on monitored sprinkler-irrigated fields during this study. The different flow measurement structures used on the monitored fields are described in files available on the ARIDAD.

The following guidelines were used in the selection and installation of portable flumes:

1. Location was chosen so that (a) free (modular) flow conditions (Bos 1989) were present through the structure at all times (for this reason, installation in headland ditches was not attempted, since water level regulation during the irrigation process usually creates submerged (drowned) flow conditions for a period of time), and (b) the length of earthen transit channel between the structure and the irrigated field was minimized
2. Structure was sized suitable to the expected range of flow rates
3. Structure floor was raised six to 12 inches (depending on upstream channel bank elevation) from channel floor using packed soil to discourage submerged flow conditions

Figure 12. *EZ Flow Ramp™ flume used to measure tailwater from field DS14 during 2005 and 2007*

Figure 13. *Permanent measurement structure for inflow to Field DS6, provided by Fort Lyon Canal Company during seasons 2005-2008*

4. Structure was installed such that the horizontal portion of the floor was level in directions parallel and perpendicular to flow
5. Area between the channel and the structure sidewalls was packed with soil to discourage movement or shifting of the structure
6. Canvas material was placed under downstream end of structure extending into downstream channel to prevent erosion of soil and shifting of structure
7. Area between sidewalls of upstream face of the structure and the channel was packed with soil (to the same height as the top of the structure) and overlain with canvas material to prevent leakage and erosion of soil (except in the case of trapezoidal flumes)
8. Structure was equipped with a staff gage, polyvinyl chloride (PVC) stilling well (no less than four inch diameter, except for trapezoidal flumes which were 2.5 inch diameter), vented cap, and vinyl delivery tube (three-fourths inch diameter). Stilling wells were used to house automatic water level recorders while delivery tubes were used to connect the stilling well to the inside of the flume structure (at the staff gage) in order to maintain an equivalent net water depth between the two. Stilling well floor typically was lowered at least 4 inches below the flume floor to maintain water level recording accuracy in the event of low flow conditions. Stilling wells were not lowered beneath the flume floor in the case of trapezoidal flumes.

Permanent flow measurement structures were used if the following conditions were met:

1. Structure was sound (no leaks, level in directions parallel and perpendicular to flow, no deformities)
2. Structure was appropriate for measuring expected flow rates (proper size, dimensions, and type)
3. Structure was suitable for the construction of a stilling well (and in some cases a delivery tube) for water level measurement
4. Free flow conditions were present through structure
5. Flow approach to the structure was appropriate (to discourage improper flow velocities or turbulence through the structure)

6. Structure was located a short distance (less than one-fourth mile) from field boundaries in situations where an earthen transit channel was used (in order to minimize error in transit water losses)
7. Water was not divided between multiple fields downstream of the flow measurement structure

For this study, HOBO® U20-001-01 water-level recorders (pressure transducers) manufactured by Onset™ were used to continuously record pertinent water levels in each flow measurement structure during irrigation events on surface-irrigated fields. HOBO™ U20-001-01 water-level recorders have an operating range of zero to 30 ft of water (at sea level) and a typical error of ±0.015 ft of water. They were programmed to record absolute pressure readings every five minutes over the duration of an irrigation event. Flow rate values and total applied/tailwater volumes later were derived from these pressure readings using appropriate rating equations for each flow measurement device. Early in the study in 2004, Level TROLL® 300 water level recorders by In-Situ, Inc. were used to measure water levels associated with water measurement structures on several fields. Another type of pressure transducer also was used in 2004, but problems were discovered with these devices and data were deemed to be unreliable. Localized barometric pressure was recorded at a five minute interval throughout the duration of the irrigation season using a HOBO® U20-001-01 water level recorder installed in a free-draining, ventilated PVC tube buried at the ground surface in a regionally centralized location (in both the Upstream and the Downstream regions).

Transit loss is defined as the amount of irrigation water that seeps or evaporates from an earthen transit channel between the flow measurement structure (inflow or tailwater) and the point of inflow to or outflow from a monitored irrigated field. Transit losses were considered negligible in concrete ditch and pipeline systems. Transit loss amounts were not considered in earthen headland or tailwater ditches directly adjacent to a field area; instead, this flow was assumed to be part of the irrigation amount applied to the field. Transit loss amounts were estimated based upon prior CSU studies on canal seepage rates in the LARV (Susfalk et al. 2008), using estimated wetted perimeter values for the transit channel, length of the transit channel between flow-measurement structure and the irrigated field, and the duration of flow in the transit channel. Since the location of each flow measurement structure location was carefully considered when selecting fields, transit loss calculations were required for a total of only five fields during the study.

To account for changes in the water destination or switching of water to neighboring fields, CSU personnel associated with this project maintained communication with cooperating farmers in addition to visually inspecting fields on a daily basis during irrigation events. Care was taken to insure that flow-measurment structures remained unsubmerged during operation. Figures 14-16 show some of the different flow-measurement devices employed over the period of the study. The center pivot irrigation system shown in Figure 17 was metered and used to irrigate fields DS5, DS6, and DS17.

Figure 14. *Weir structure for flow measurement onto fields DS4 and DS16 in 2008*

Figure 15. *Cutthroat flume for measurement of tailwater runoff from field US14C in 2008*

Figure 16. *Parshall flume for measurement of flow to field DS1 in 2008*

Figure 17. *Center pivot sprinkler system used to irrigated fields DS5, DS6, and DS17 in 2008*

The procedure followed in the measurement and calculation of applied irrigation and tailwater depths on surface irrigated fields is summarized as follows:

1. Manual readings of water depth at the gauging location for each flow measurement structure were taken throughout the duration of each irrigation event (daily if possible). These were used as a means of calibration and comparison of the water level recorder data. In addition, flow measurement structures were checked daily to insure that equipment was functioning properly and that all inflows and outflows were being accounted for.

2. Flow measurement structures were inspected daily during irrigation events to insure that:

   - Structure was sealed (no leakage around sides or underneath)
   - Structure was level in directions parallel and perpendicular to the flow
   - Structure, approach channel, and immediate downstream channel were free of debris
   - Stilling well and delivery tube were free of sediment (stilling wells were pumped during and after each irrigation)
   - Stilling well, delivery tubes, and fittings were secured in proper location and not leaking
   - Stilling well cap was secure and properly ventilated
   - Staff gage was secured in proper location
   - Canvas material was in proper location and not hindering flow through structure
   - Bottom of water-level sensor was resting on floor of stilling well
   - String was connected to water-level sensor cap and tied to stilling well

- Flow meters were recording instantaneous flow rate and totalized volume where applicable

3. The net water pressure (at the gauging location) was calculated by subtracting the recorded regional barometric pressure value and an elevation pressure correction from the absolute pressure value was obtained from the water level recorder in the structure for each five minute interval during the irrigation event. The net water level (at the staff gauge) was determined by converting the pressure values into water depth values and then subtracting an average of the calculated offsets (which were determined from the manual readings).

4. The net water level values were converted into flow rate values using the appropriate rating equations for each measurement structure for each five-minute interval. The volume of water passing through the measurement structure during each five-minute interval was determined by averaging the flow rate values at the start and end of the interval and multiplying them by the interval length. The total volume passing through

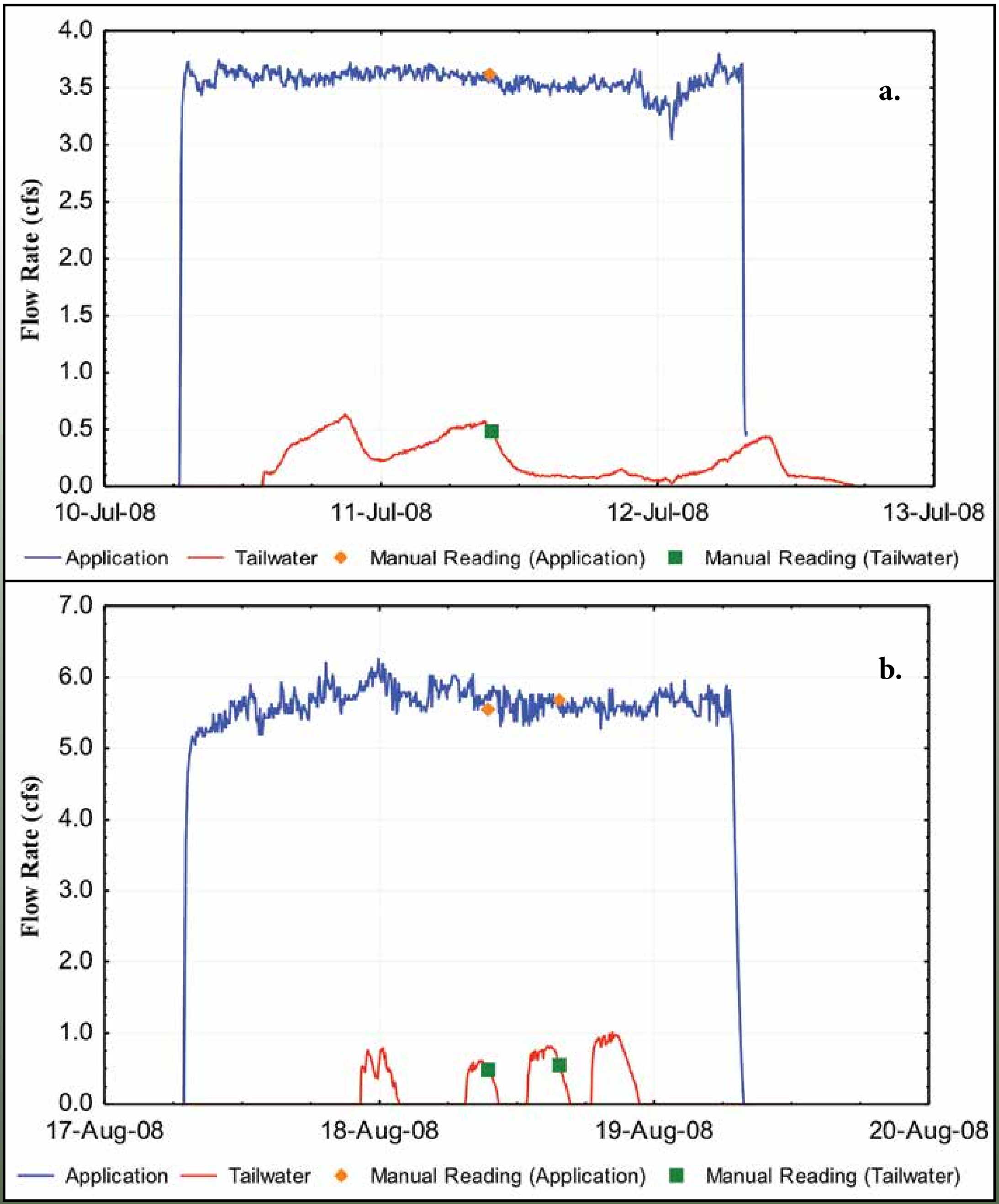


Figure 18. *Applied and tailwater hydrographs for (a) field US8, 10-12 July 2008 irrigation event, and (b) field DS2, 17-19 August 2008 irrigation event*

the structure during the irrigation event was determined by summing all of the five-minute volumes.

5. After the conclusion of an irrigation event, Garmin eTrex™ GPS units in conjunction with software from GPS Trackmaker® and ArcView® (from ESRI) were used to manually record irrigation boundaries and subsequently to calculate irrigated area values for each irrigation event. Garmin eTrex™ global positioning system (GPS) units have horizontal accuracy specifications of ± 9.8 ft (3m).
6. A hydrograph depicting applied irrigation flow rates and tailwater flow rates was generated for each irrigation event on each field. Figure 18 shows examples for fields US8 and DS2 for the 2008 season, including plots of manual readings.
7. Infiltrated irrigation depth was calculated as $Q_I = (Q_A - Q_{TW})$/Irrigated Area.
8. Tailwater fraction (TRF) = Q_{TW}/Q_A, was computed for each irrigation event and reported in units of percent.

The dates of the irrigation events measured on each of the fields reported herein are summarized in files on the ARIDAD.

Totalizing flow meters on center pivot sprinkler irrigation systems were read regularly during each irrigation event (daily if possible). Since significant tailwater runoff was not observed from any of the sprinkler-irrigated fields, no tailwater measurement structures were required. As with surface irrigation events, irrigated areas were calculated using GPS points taken around the irrigated boundaries following each irrigation event.

An additional component unique to the analysis of sprinkler–irrigated fields using water from canals was the need to estimate stabilization pond seepage losses using measured flow rate on inflow ditches, flow meter readings from pivots, local precipitation data, pond area measurements, and regional free water surface evaporation data. Two of these ponds are shown in Figure 19.

Figure 19. *Stabilization pond for center pivot sprinkler on field DS19 in 2008*

Precipitation

Rain gauges were installed at or near all monitored fields during the irrigation season. The rain gauges were equipped with a tipping bucket (HOBO™ RG2) and data logger (HOBO™ Event Data Logger) (Figure 20). Because of localized variability in precipitation during the summer months, one rain gauge was installed on or directly adjacent to each monitored field except in cases where several monitored fields were conglomerated in close proximity (less than one mile) to one another. In these cases, the rain gauge was installed at a central location between the fields. The rain gauges were calibrated prior to installation in the fields and were mounted on four inch diameter PVC pipe posts per manufacturer's recommendations. Special care was taken to ensure that rain gauges were not installed near vertical obstructions (e.g., trees, power poles, buildings) or near areas irrigated by sprinkler systems. They were maintained on a weekly basis by CSU personnel. Maintenance included inspection of electrical wiring from the rain gauge to the data logger, verification of battery life, and removal of dirt/debris from collection cone and tipping bucket. Batteries were replaced in data loggers once during the summer (typically in late July). In cases where rain gauge/data logger malfunction occurred, precipitation data were taken from another CSU rain gauge or CoAgMet station depending on which was in closer proximity. Rain gauges were removed from the field at the end of each monitored irrigation season.

Figure 20. *HOBO® rain gauge in Field US17E in 2008*

Data loggers on the rain gauges generally were downloaded mid-season (late July) and at the end of the season (mid-November) using HOBO® BoxCar 3.7 software on a laptop computer. Downloaded files were converted to Microsoft® Excel files with output containing precipitation depth over time (month, day, year, hour and minute). Analyses for daily and cumulative precipitation were carried out. Figure 21 displays a typical graph showing cumulative rainfall for a selected field US20 in 2005. For water balance analysis, total rainfall depth was computed over the selected period Δt and reduced using the SCS model described below to account for surface runoff to estimate Q_P.

To reduce total rainfall to effective infiltrated rainfall, Q_P, the SCS runoff model empirical method was used (USDA 1986). In this method, total rainfall is adjusted to account for three factors: soil water content, rainfall intensity, and rainfall amount. Soil water content is used to find a curve number (CN) that is in turn used to calculate the effective rainfall. The "average" CN used for the fields in this study area is 82; as found in tables of soil data provided in USDA (1986). The CN is adjusted based on the volume of water per unit area (depth), W_5, that has entered the system in the five days before a rainfall event by the following:

$$\mathrm{CN} = \begin{cases} 66 \ \mathit{for}\ W_5 < 1.42\ \mathit{in} \\ 82\ \mathit{for}\ 1.42\ \mathit{in} < W_5 < 2.09\ \mathit{in} \\ 95\ \mathit{for}\ W_5 > 2.09\ \mathit{in} \end{cases}$$

Once a CN as been determined, the maximum soil retention volume per unit area (depth), S_R, can be calculated as follows:

$$S_R = 1000/\mathrm{CN} - 10 \qquad (3)$$

S_R represents the volume that the soil profile can receive before surface runoff occurs.

To calculate the volume of precipitation runoff per unit area (depth), Q_R, caused by a rainfall event the following equation is used:

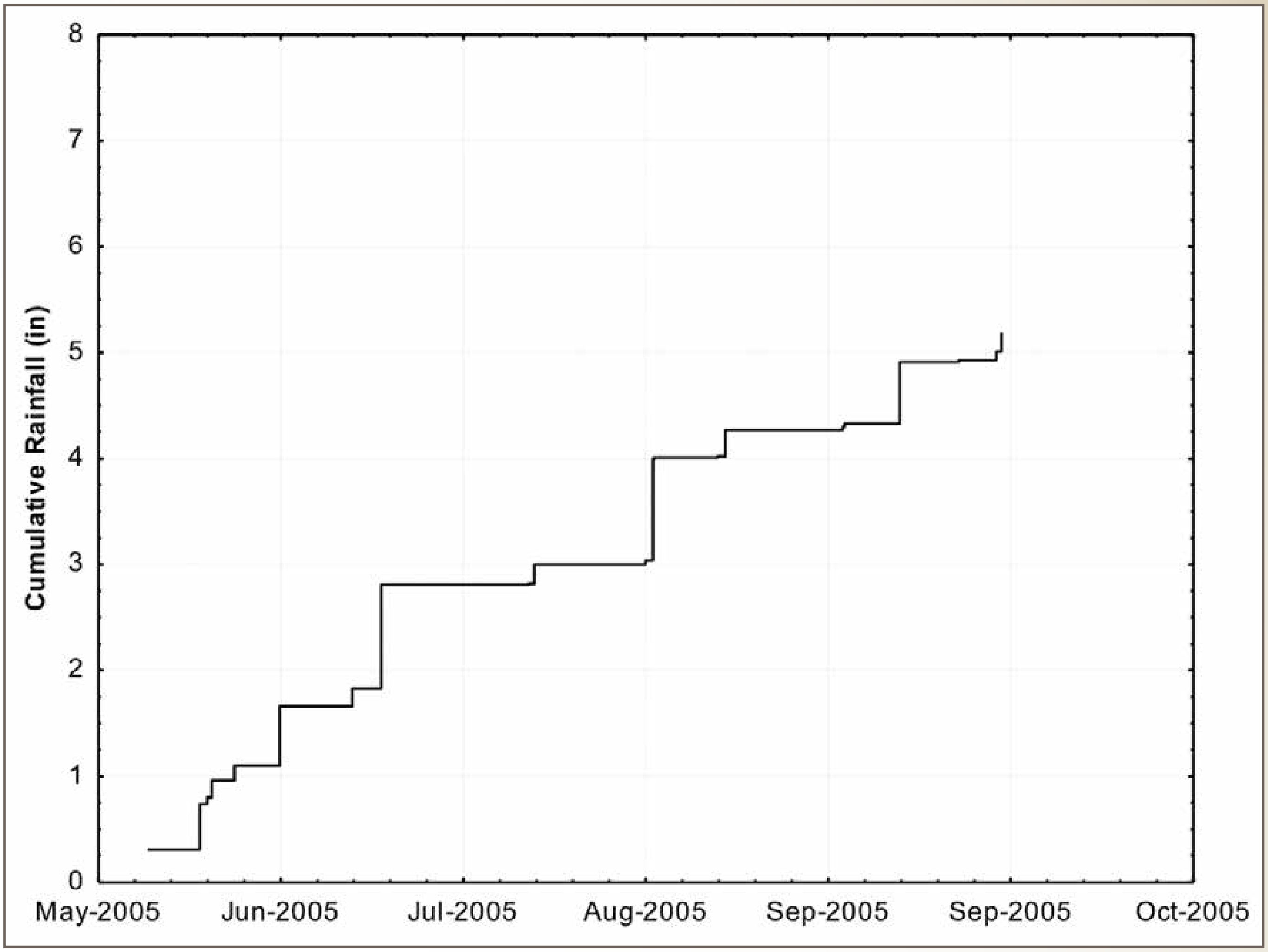


Figure 21. *Cumulative precipitation for field US20 during the 2005 irrigation season*

$$Q_R = \begin{cases} \dfrac{(Q_{PT} - 0.2S_R)^2}{(Q_{PT} + 0.8S_R)} \; for \; Q_{PT} > 0.2S_R \\ 0 \; for \; Q_{PT} \leq 0.2S_R \end{cases} \tag{4}$$

wherein Q_{PT} is the total depth (in inches) of the rainfall event. Once Q_R has been calculated the effective rainfall (Q_P) can be calculated as follows:

$$Q_P = Q_{PT} - Q_R \tag{5}$$

Evapotranspiration

Reference Evapotranspiration Calculated from ASCE Standardized Equation

The ASCE Standardized Reference Evapotranspiration Equation is based on a combination equation which combines an energy component and an advection component. The methodology depends upon net solar radiation, soil heat flux density, mean daily air temperature, mean daily wind speed, saturation vapor pressure, mean actual vapor pressure as well as other physical parameters, and is described in detail in Allen et al (2005). The ET calculated by the ASCE equation for each crop is based on the ET of a long reference crop, referred to as ET_r. In this study alfalfa was used as the long reference crop. The ET of a particular crop at a particular time is then calculated as a fraction of the ET_r at that time. If the crop is healthy, well-watered, and not adversely affected by salinity or other hazards, this fraction of the ET_r may be assumed to be a function of the growth stage of the crop and is called the crop coefficient, k_c. Since the growth stage of a crop changes throughout the growing season the k_c value changes as well. This variation of k_c with time usually can be represented by a linear equation or a third-order polynomial depending on the growth stage. The potential crop ET at a particular time is calculated as $ET_p = k_c ET_r$.

Reference Evapotranspiration Estimated from Evaporimeters

Manual atmometers (ETgage® Model A), manufactured by the *ETgage Company*™ of Loveland, Colorado, were used as another means of estimating ET_r in the monitored fields. Alfalfa reference ET diffusion covers (#54) were used on each of the atmometers. Rigid vertical wires were also utilized on the top of each ET simulator to discourage bird fouling. An example of an atmometer setup is shown in Figure 22 for field DS2 for the 2006 season.

Figure 22. *ETgage® Model A atmometer in field DS2 during the 2006 season*

Each field was monitored individually unless other monitored fields were within a distance of one mile, in which case the neighboring fields were served by only one atmometer. Each atmometer was mounted on a two by four inch wooden post via steel bracket and installed with the evaporative surface at a height of 39 inches above the ground surface. Per manufacturer's recommendations, atmometers that were not installed within a particular field's boundaries were installed immediately outside the field in an area with suitable vegetative covering. This generally was the case with tall crops such as corn and forage sorghum.

Atmometers were installed in early May and were removed from the field in early October each season in order to prevent freeze damage to equipment. They were thoroughly cleaned and inspected for damage prior to each season. New "wafers" and alfalfa reference ET diffusion covers (#54) were added to each atmometer prior to each season as well.

Atmometers were maintained by CSU personnel on a weekly basis from May through August and a bi-weekly basis for the remainder of the season. Weekly maintenance included inspection of equipment for damaged parts, inspection of diffusion covers for fouling (with dirty covers being replaced by new ones), recording of water level in apparatus sight glass, and addition of distilled water to the atmometer reservoir when more than 2/3 empty. Damage to atmometers was rare but occasionally sight tubes were damaged by large hail or ceramic cups were cracked from freezing temperatures. In cases where atmometer equipment damage occurred, ET_r data were taken from the closest CSU atmometer.

Recorded atmometer data included water level in the sight glass as well as time (month, day, year, hour and minute). Values of total ET_r between readings were estimated as the difference between the recorded water levels.

Actual Evapotranspiration Estimated from Remote Sensing

Daily average values of actual ET (ET_a) over the study regions were estimated using the ReSET land surface energy balance model (Elhaddad and Garcia 2008) to process available satellite images of the study regions.

Summing up values of ET_a over a study period Δt, and multiplying by the area of an irrigated field provided an estimate of Q_{ET} for use in the field water balance. The ReSET model is built on the same theoretical basis of its two predecessors, METRIC (Allen et al. 2007 a.b) and SEBAL (Bastiaanssen et al 1998 a,b) with the additional ability to handle data from multiple weather stations. This enhances regional ET_a estimates by taking into consideration the spatial variability of weather conditions through data acquired from different weather stations (across the area covered by the remote sensing system/imagery). ReSET can be used in both the calibrated and the un-calibrated modes. The calibrated mode is similar to METRIC in which ET_r calculated from weather station data is used to set the maximum ET_a value in the processed area, while in the un-calibrated mode the model follows a procedure similar to SEBAL where no maximum ET_a value is imposed.

Satellite images from the Landsat 5 or Landsat 7 satellites were used in this study. Multispectral images including the visible (bands 1-3), infrared (bands 4, 5, and 7), and thermal (band 6) ranges of spectrum are captured by these satellites. All bands have a linear spatial resolution of 30 m except for the thermal band. The thermal band has a 120 m resolution for Landsat 5 and a 60 m for Landsat 7. Images of the two study regions are captured every 16 days by these satellites. The cycles of the two satellites are offset by eight days for an image over a given region, and are offset by nine days between the two regions. When clouds occur over the monitored field sites or extensively throughout the regions, satellite images cannot be used to estimate ET_a. Images processed by the ReSET method yielded estimated patterns of ET_a at a 30 m × 30 m resolution. It has been estimated that ReSET and similar methods produce daily average values on the satellite date with errors on the order of 5-15 percent (Bastiaanssen et al. 1998a, Elhaddad and Garcia 2008).

For a given instant of time, the land surface energy balance equation can be written as:

$$R_{n,i} = L_v \rho_w ET_i + H_i + G_i \qquad (6)$$

wherein $R_{n,i}$ is the net radiation, L_v is the latent heat of vaporization, ρ_w is the density of water, ET_i is the instantaneous actual ET, H_i is the sensible heat flux, and G_i is the heat conduction to the ground (the subscript i denotes instantaneous values). The value of $R_{n,i}$ is computed from the surface albedo, surface temperature, digital elevation models, normalized difference vegetation index (NDVI), and surface roughness using the method developed by Bastiaanssen (2000). The visible bands (1, 2, and 3) and infrared bands (4, 5, and 7) are used to compute the surface albedo, and surface temperature is calculated from band 6. NDVI is calculated from bands 3 and 4, and G_i is computed using NDVI, albedo, surface temperature, and the sensible heat flux. H_i is calculated by selecting and processing "wet" and "dry" pixels within the satellite image. A "wet" pixel is one where ET_i occurs at the atmospheric requirement, implying that $H_i = 0$. A "dry" pixel occurs where ET_i is assumed to be zero, so that $H_i = R_{n,i} - G_i$. Once the wet and dry H_i values are known, the values for H_i at other pixels within the satellite image can be calculated.

After values of $R_{n,i}$, G_i, and H_i have been estimated, Eq. (6) is used to calculate the latent heat flux ($L_v \rho_w ET_i$) (Bastiaanssen et al. 1998). The following equation is then used to compute the instantaneous evaporative fraction (Λ_i):

$$\Lambda_i = \frac{L_v \rho_w ET_i}{L_v \rho_w ET_i + H_i} = \frac{L_v \rho_w ET_i}{R_{n,i} - G_i} \qquad (7)$$

The daily average value of is computed through the following equation, assuming that ET_a remains constant throughout the entire day:

$$ET_a = \frac{86,400 \Lambda_i R_n}{L_v \rho_w} \qquad (8)$$

The value of R_n in this equation is the 24-hour net radiation, which can be estimated using the approach of Duffie and Beckman (1991), and 86,400 is the time conversion from one second to 24 hours. It is assumed in Eq. (8) that the net soil heat flux over the 24-hr period is zero.

An additional adjustment to the seasonal ET_a calculated with ReSET for alfalfa fields was implemented for this study to account for alfalfa cutting. The ReSET model generates a seasonal ET_a value by interpolating between Landsat image dates using a ratio based on ET_r and the ReSET ET_a at the date of the two Landsat images that bound a period and the ET_r values for each day between the Landsat image dates. As part of the current project, alfalfa cutting dates were collected. In order to improve the seasonal ReSET ET_a estimates an additional adjustment was implemented to account for the alfalfa cuttings. To model the effect of cutting on ET_a the following equation was used:

$$ET_a = k_c ET_r$$

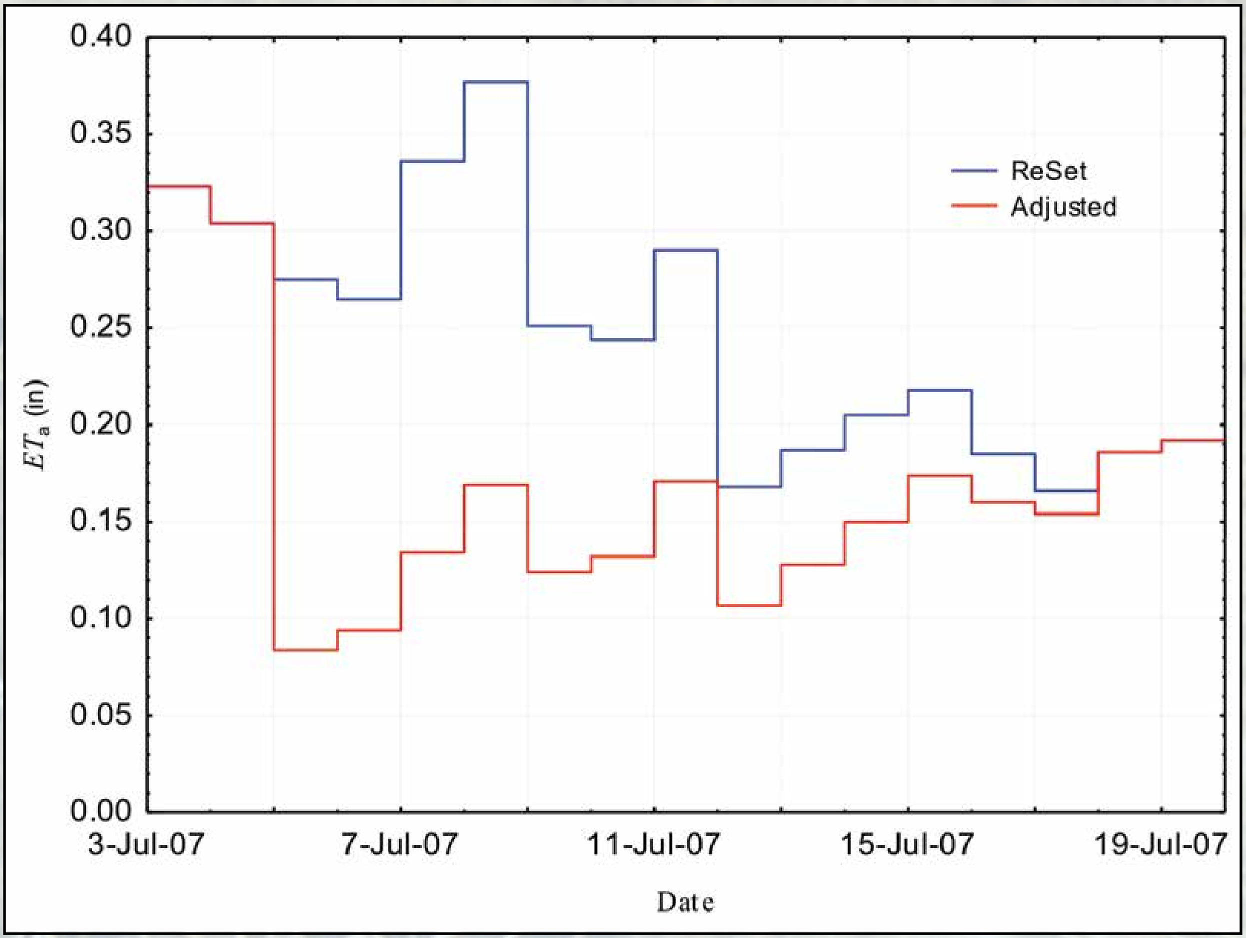


Figure 23. *Alfalfa ET_a adjusted for cutting compared to ReSET ET_a*

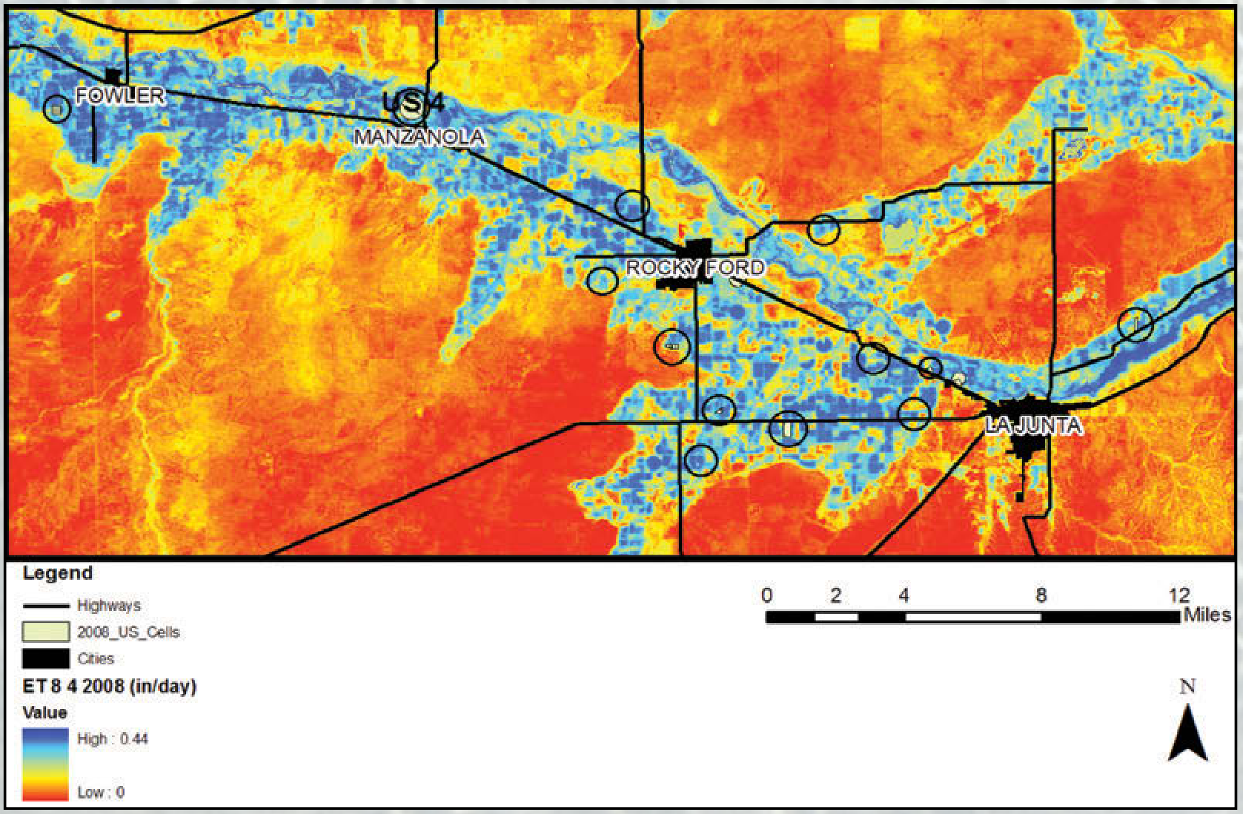


Figure 24. *ReSET-calculated ET_a in the Upstream Study Region on 4 August 2008 with study fields circled*

Where k_c is the crop coefficient. k_c for alfalfa just after cutting was assumed as 0.3 and was increased linearly until the next Landsat image date to simulate crop growth. Additional investigation is being conducted to determine the best procedure to account for alfalfa cutting dates in the seasonal ReSET ET_a estimate.

An example raster image of ReSET-calculated values of ET_a at 30 m × 30 m resolution is shown in Figure 24 for the Upstream Study Region for 19 July 2008. Figure 25 illustrates a close-up of field US4 within this image, illustrating the variability of ET_a within the field. A similar image for 28 July 2008 is shown in Figure 26 for the Downstream Study Region. A close-up view of fields DS8 and DS15 within this image is presented in Figure 27. Values of ET_a were averaged over the pixels within each monitored field cell to obtain estimates for use within the field water balance calculations.

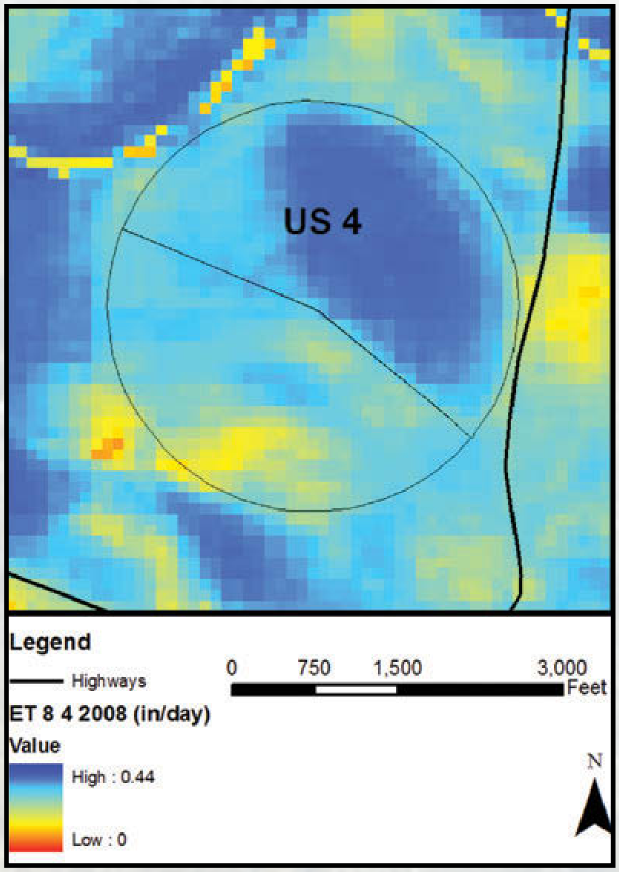


Figure 25. *ReSET-calculated ET_a in vicinity of field US4 on 4 August 2008*

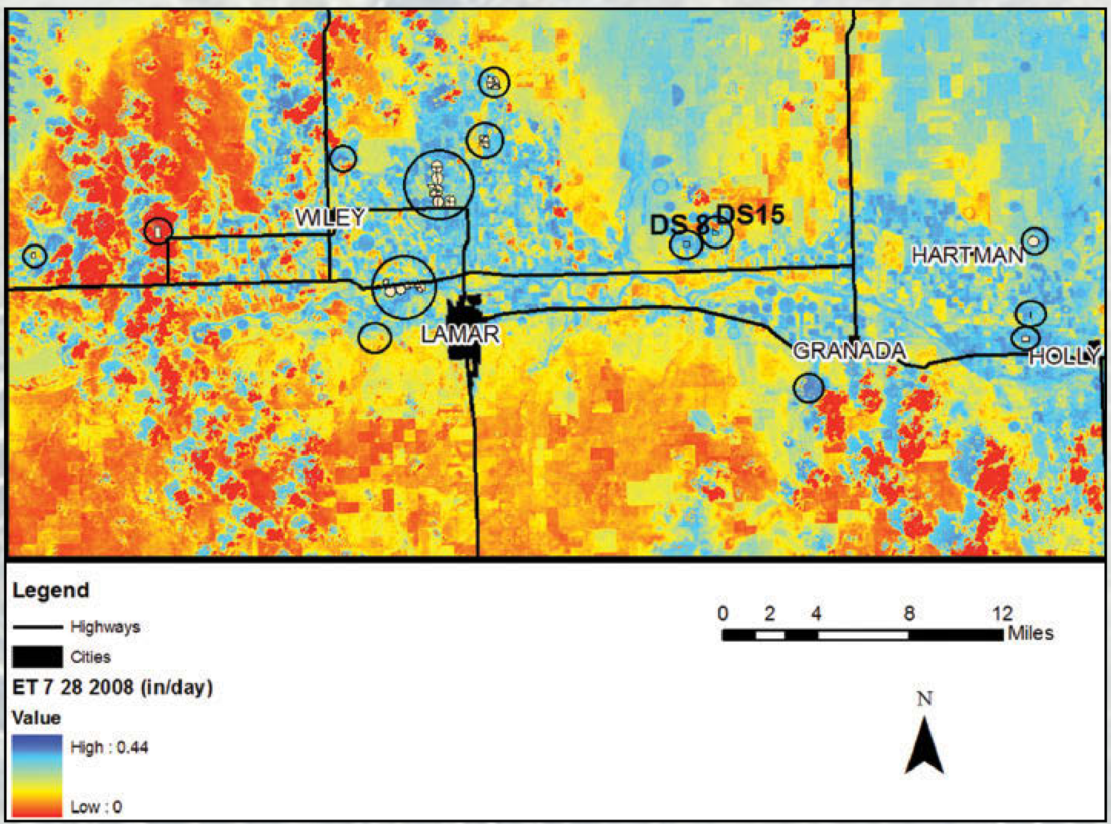


Figure 26. *ReSET-calculated ET_a in the Downstream Study Region on 28 July 2008 with study fields circled*

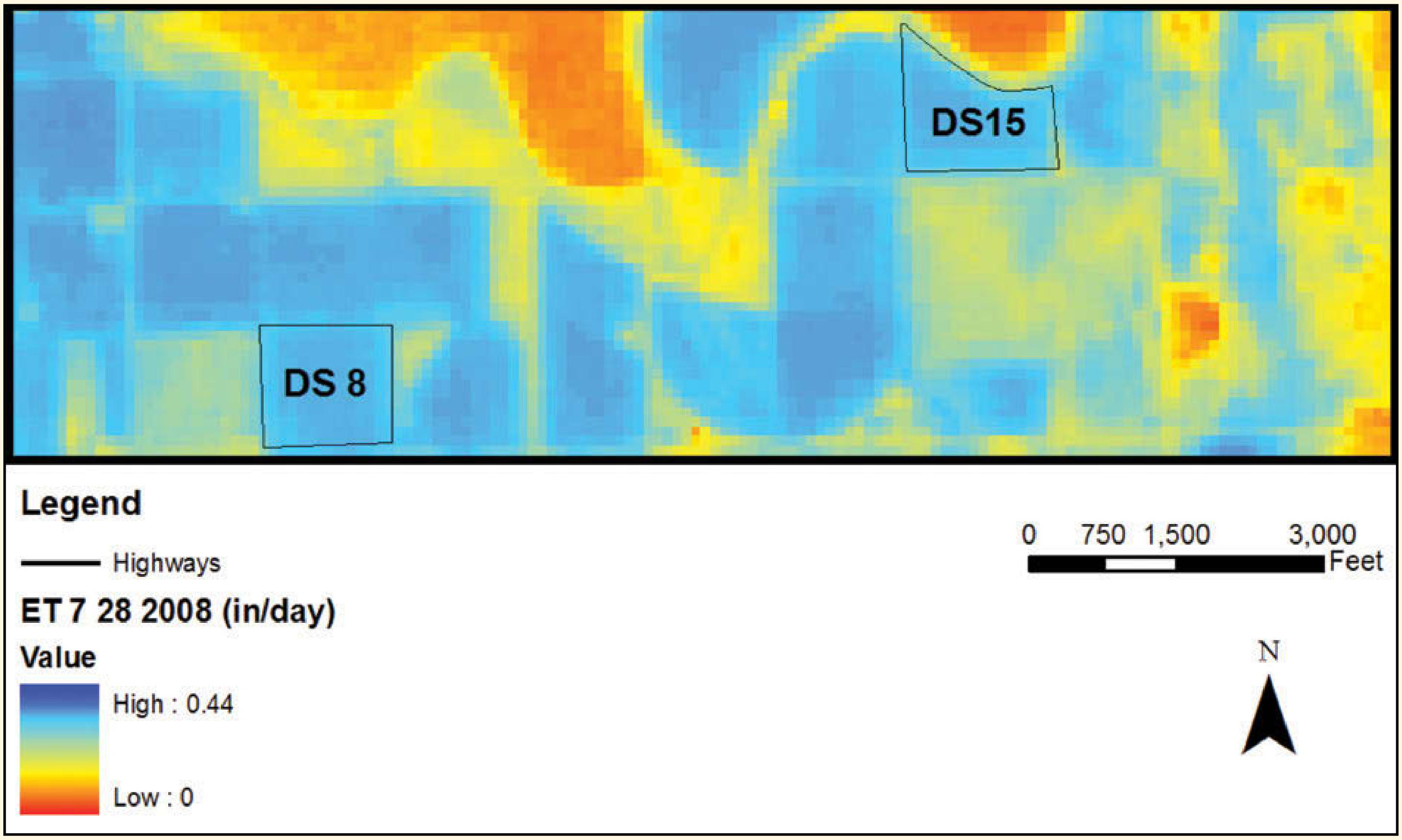


Figure 27. *ReSET-calculated ET_a in vicinity of fields DS8 and DS15 on 28 July 2008*

Soil Water Storage

One of the most important properties in evaluating irrigation water balance components and application efficiency is the water storage capacity of the soil root zone. When infiltrated irrigation water exceeds the soil water storage capacity at a given location in a field, excess water will percolate downward below the root zone as Q_{DP} and move toward the groundwater table. Between irrigation events the root zone soil water content will vary in response to ET, Q_P, and Q_U but is assumed to be limited by the storage capacity. If the soil water content drops too low, the crop will be unable to transpire sufficient water, crop growth and yield may decline and, under extended dry conditions, the crop will perish.

In the current study, the soil water storage capacity was defined using the total available water (TAW) in inches:

$$\mathrm{TAW} = D_{rz}\,(\theta_{fc} - \theta_{wp}) \qquad (9)$$

wherein D_{rz} = depth of soil root zone below ground surface, θ_{fc} = soil-water content at -⅓ bar matric potential (field capacity) expressed as a fraction of the bulk soil volume, and θ_{wp} = soil-water content at -15 bar matric potential (permanent wilting point) expressed as a fraction of the bulk soil volume. The actual stored volume of soil water (S_{SW}) at any given time, expressed in inches (volume per unit field area), was defined as $S_{SW} = D_{rz}\,\theta$ wherein θ = the actual soil water content, expressed as a fraction of the bulk soil volume. In calculating a water balance for a field over a time period Δt, the term ΔS_{SW} in Eq. (1) is defined as the change in S_{SW} over Δt.

In large regional-scale irrigation survey projects, it is common to estimate θ_{fc} and θ_{wp} using soil texture data. The method described by Saxton and Rawls (2006), based upon a very large USDA soils database, was used to do so in the current study. Soil textures were estimated for the monitored fields by taking soil samples and/or by using data from the USDA NRCS Soil Survey.

Estimation of Soil Texture from Field Samples

Samples for soil texture were gathered from six locations within each of about 44 of the monitored fields in 2008. The following procedure was used to determine the sample locations within a given field:

1. The USDA-NRCS Soil Survey Geographic (SSURGO) Database was used to create an "Area of Interest" (AOI) for each monitored field (USDA 2010). The subsequent soil map was used to determine the locations of soil samples collected on each field.
2. For fields with one primary soil type, samples were collected at locations near the midpoints of six sections of similar size within the field.
3. For fields with multiple soil types, soil sampling locations were distributed based generally upon a spatially weighted average of primary soil types within the field. For example, if a particular field contained two primary soil types (e.g., RoB, RoC) with soil type RoB comprising two-thirds of the field area and RoC comprising one-third of the field area, four soil samples were collected from within the RoB area and two soil samples were collected from within the RoC area.
4. For fields consisting of more than six primary soil types, soil samples were collected from the six soil type areas comprising the largest proportion of the total field area.
5. Soil types comprising less than 10 percent of the total field area generally were not sampled.

At each sampling location within a field the following procedure was used to collect soil samples for textural analysis:

1. The soil surface at each location was cleared of crop residue by hand or with a spade.
2. A Stihl® gas-powered earth auger (Figure 28) with an 18 inch by 1.5 inch diameter auger and two 18 inch extensions were utilized to bore to a depth of approximately 48 inches at each location. The auger generally was pulled from the hole five times per location to either remove soil from the auger flighting or to add extensions to the auger.
3. All soil augered to the ground surface (approximately 500 grams per location) was collected by hand or using a small spade and placed in a plastic double-lock freezer bag.

Figure 28. *Stihl® gas-powered earth auger used for soil sampling*

The hydrometer method of mechanical analysis was used in the soils laboratory at CSU to determine the fraction of clay, silt, and sand for each soil sample (Klute 1986). Soil texture classification then was determined based upon these relative fractions.

Estimation of Soil Texture from NRCS Soil Survey

Data from the USDA-NRCS Soil Survey Geographic (SSURGO) Database, using the Soil Data Mart web-based application, were extracted for each monitored field. These data include estimated soil texture, θ_{fc}, θ_{wp}, available water holding capacity (in inches of water per ft of soil), and bulk density.

Through the Soil Data Mart web-based application, satellite imagery of each field was overlain with a field boundary map to create an area of interest (AOI). For this AOI, weighted representative averages for each of the aforementioned soil properties and each soil type were calculated to a depth of 48 inches. Output from the Soil Data Mart included the following for each AOI (field):

- Summary of the soil type(s) present within the AOI (field) and the fractional contribution of each soil type to the total AOI
- USDA soil texture rating for each soil type
- Available water holding capacity (inch/inch) for each soil type, which is equivalent to TAW/D_{rz}
- Water content at -15 bar (permanent wilting point) expressed as percent of total volume at saturation for each soil type
- Water content at -⅓ bar (or field capacity) expressed as percent of total volume at saturation for each soil type
- Bulk density at -⅓ bar for each soil type
- Clay content (percent by weight of the soil material that is less than 7.87 x 10-5 inches in diameter) for each soil type
- Silt (percent by weight of the soil material that is greater than 7.87 x 10-5 inches and less than 1.97 x 10-3 inches in diameter) for each soil type
- Sand content (percent by weight of the soil material that is greater than 1.97 x 10-3 inches and less than 0.08 inches in diameter) for each soil type

Estimation of Average TAW

For fields in which soil samples were gathered, the models developed by Saxton and Rawls (2006) were used to estimate θ_{fc}, θ_{wp}, and other soil properties for each sample based upon texture. An average value of TAW was estimated for each monitored field using the values computed for all soil samples collected in each field.

Average soil water properties also were calculated for each monitored field using the data extracted from the USDA-NRCS Soil Survey Geographic (SSURGO) Database through the Soil Data Mart application. Average values for each soil property for each field then were calculated as weighted averages based upon the fractional contribution of each soil type to the total AOI.

Estimation of Soil Water Content

Estimation of average S_{SW} over areas encompassing several acres, where textural and structural characteristics often vary substantially, is a very difficult and expensive task. A large number of samples, across the areal extent of the field and with depth, usually are required for an accurate estimate at any given time. Such an effort was beyond the scope of this project; however, limited sampling of the monitored irrigated fields was conducted periodically over the course of the study. Typically, soil samples were collected in conjunction with soil salinity surveys that were conducted on each monitored field two to three times during each irrigation season. The methodology is described in a sequel section entitled “Soil Water Salinity and Soil Water Content Surveys”.

Upflux from Shallow Groundwater

Shallow groundwater tables can provide substantial upflux of water to the root zone of crops (Ayars et al 2006, Grismer and Gates 1988). The rate of upflux depends upon the ET rate, soil characteristics, soil water content, crop root characteristics, and depth to the water table. Following Liu et al (2006), the rate of upflux, q_u (mm/day), from a shallow water table to the root zone of an irrigated field was estimated as:

$$q_u = \begin{cases} q_{u_{max}}\left(D_{wt}, ET_p\right) \; if \; S_{SW} < S_{SW_S}\left(D_{wt}\right) \\ q_{u_{max}}\left(D_{wt}, ET_p\right)\left(\dfrac{S_{SW_c}\left(D_{wt}\right) - S_{SW}}{S_{SW_c}\left(D_{wt}\right) - S_{SW_S}\left(D_{wt}\right)}\right) \; if \; S_{SW_S}(D_{wt}) \le S_{SW} \le S_{SW_c}(D_{wt}) \\ 0 \; if \; S_{SW} > S_{SW_c}(D_{wt}) \end{cases} \qquad (10)$$

wherein $q_{u_{max}}(D_{wt},ET_P)$ is the maximum potential groundwater upflux rate (mm/day) and is a function of D_{wt} and ET_p, D_{wt} is the average water table depth (m) for the current time step, ET_p is the daily average potential crop evapotranspiration (ET) rate (mm/day) for the given crop and the current time step, S_{SW} is the average soil water content (mm) for the preceding time step, $S_{SW_s}(D_{wt})$ is the steady soil water content (mm) and is a function of D_{wt}, and $S_{SW_c}(D_{wt})$ is the critical soil water content at which upflux is initiated and is a function of D_{wt}. Note that variable names used herein are different than those used in Liu et al (2006). Values of q_u can be integrated over a selected time period Δt to obtain Q_U for water balance analysis.

In the current study, the value of $q_{u_{max}}$ in Eq. (10) was modeled as a function of D_{wt} and ET_a computed by ReSET:

$$q_{u_{max}}\left(D_{wt}, ET_p\right) = \begin{cases} ET_a \text{ if } D_{wt} < D_{wt_c} \\ a_1 D_{wt}^{b_1} \text{ if } D_{wt} > D_{wt_c} \end{cases} \tag{11}$$

wherein a_1 and b_1 are empirical parameters that depend upon soil texture, as presented in Table 7.

The critical water table depth, D_{wt_c}, may be estimated as the following linear function of ET_p:

$$D_{wt_c} = \begin{cases} a_2 ET_p + b_2 \text{ if } ET_p \leq 4 \text{ mm/day } [0.157 \text{ in/day}] \\ 1.4 \text{ if } ET_p > 4 \text{ mm/day } [0.157 \text{ in/day}] \end{cases} \tag{12}$$

The value of S_{SW_S} depends upon D_{wt} and the water content in the root zone at wilting point, $S_{SW_{WP}}$ (mm), and may be estimated from:

$$S_{SW_S}(D_{wt}) = \begin{cases} a_3 D_{wt}^{b_3} \text{ if } D_{wt} \leq 3m\ [9.84\ ft] \\ S_{SW_{WP}} \text{ if } D_{wt} > 3m\ [9.84\ ft] \end{cases} \tag{13}$$

Liu et al (2006) indicate that the parameter a_3 may be estimated as equal to $1.1(S_{SW_{FC}} + S_{SW_{WP}})/2$ where $S_{SW_{FC}}$ (mm) is the water content in the root zone at field capacity and $S_{SW_{WP}}$ (mm) is the water content at wilting point. The value of the parameter b_3 depends upon soil texture, as presented in Table 7.

Similarly, S_{SW_c} depends upon D_{wt} and may be estimated from:

$$S_{SW_c}(D_{wt}) = a_4 D_{wt}^{b_4} \tag{14}$$

Liu et al (2006) indicate that the parameter a_4 may be estimated as the value of $S_{SW_{FC}}$ for the given root zone depth. The value of the parameter b_4 depends upon soil texture, as presented in Table 7.

Infiltration Uniformity

During a typical surface irrigation event, water is introduced at the head end of the field where it begins its advance over the length of the field toward the tail end. At the tail end of the field, water ponds if the field is diked, or exits the field as tailwater runoff if the field is not diked. The surface flow finally recedes after the inflow at the head is cut off. The depth of infiltrated irrigation water at any point along the length of the field is directly related to the length of time that irrigation water is in contact with the soil surface and the soil infiltration properties at that location. This duration of time commonly is referred to as the intake opportunity time (τ) (Figure 29). Mathematically, τ is defined as the difference between the time of recession and the time of advance for any given point along the length of the field. At a given location, infiltration generally decreases from a maximum rate at the beginning of the infiltration process to a constant rate as the intake opportunity time increases. This constant rate of infiltration is called the steady-state (or basic) infiltration rate. In some cases, the duration of an irrigation event may not be long enough for the basic infiltration rate to be reached. A model commonly used to predict infiltration is the modified Kostiakov-Lewis equation:

$$z = k\tau^a + f_0\tau \tag{15}$$

wherein z = infiltration depth (inches), τ = intake opportunity time (minutes), f_0 = steady-state infiltration rate (inches/minute), and k, a = empirical coefficients (Elliott and Walker 1982).

Steady-state infiltration rate can be determined by 1) conducting infiltration tests in the field immediately prior to the irrigation, 2) subtracting the tailwater runoff flow rate from the inflow (applied irrigation) rate just prior to shutoff of inflow (assuming that the tailwater runoff flow rate has reached a relatively constant value), or 3) referencing published infiltration data based upon the soil type of the field. Using the inflow and tailwater hydrographs from the irrigation itself generally is considered the most accurate method of determining f_0 but only if the duration of the irrigation is long enough for the tailwater flow rate to reach a constant value. The coefficients k and a can be determined by 1) referencing published data based upon general soil characteristics in the field, 2) solving irrigation mass balance equations simultaneously for two points along the field length using field data for advance time, application rate, and f_0, as well as assumed values for subsurface flow shape

Table 7. *Parameter values for use in estimating q_u for three different soil textures (Liu et al., 2006)*

Parameter	Value for Silt Loam Soil	Value for Sandy Loam Soil	Value for Clay Loam Soil
a_1	4.6	7.55	1.11
b_1	-0.65	-2.03	-0.98
a_2	-1.3	-0.15	-1.4
b_2	6.6	2.1	6.8
b_3	-0.27	-0.54	-0.16
b_4	-0.17	-0.16	-0.32

and Manning's roughness coefficient, or 3) using an optimization algorithm that calibrates *k* and *a* values by minimizing the difference between measured parameters (such as advance time, tailwater hydrograph points, and recession times) and simulated parameters (found through solving equations of mass conservation and momentum conservation) (this method also can be used to solve for f_0) (Walker 2005). After measuring advance and recession times along the length of the field and determining *k*, *a*, and f_0, the infiltrated depth then can be calculated for any point along the length of the field.

The time, personnel, equipment, and financial requirements associated with collecting and analyzing field data for determining the parameters *k*, *a*, and f_0 for use in the Modified Kostiakov equation were infeasible for a large-scale study of this type. Instead, a more simplified approach was followed in which infiltration depth was considered to approximate a linear function of intake opportunity time.

The validity of the linear infiltration assumption was tested by comparing results from the SIRMOD® model of

surface irrigation which uses an optimization algorithm (Walker 2003) for seven closely monitored corn furrows in 2004. After comparison it was concluded that the most accurate application of the linear approximation was for irrigation events where set cutoff times, advance times, and recession times trended toward lower values. As these times increased, the accuracy in infiltrated depths near the head end of the field and near the tail end of the field decreased when modeled using a linear approximation. Based upon the scope of the current study and the infeasibility of calibrating empirical coefficients based upon measured data, the linear infiltration approximation was deemed suitable to meet the study objectives. However some sensitivity analysis was done and is presented in a section below.

The procedure for calculating infiltrated depths across surface-irrigated subfields is described below:

1. The following data for each irrigation event were entered into an Excel® spreadsheet:
   - Irrigation event start time (month, day, year, hour, minute)
   - Irrigation event end time (month, day, year, hour, minute)
   - Net applied volume (total diverted volume minus transit losses and pond losses where applicable)
   - Net tailwater runoff (total tailwater runoff volume minus transit losses where applicable)
   - Number of irrigation sets completed during the irrigation event [This value was (i) based upon examination of the tailwater runoff hydrograph when tailwater loss occurred, or (ii) calculated by dividing the total irrigated area width by generalized set widths when no tailwater loss occurred]
   - General advance time to tail end of field for each set [This value was (i) based upon examination of the tailwater hydrograph when tailwater loss occurred, or (ii) calculated as the sum of the average set cutoff time, which was calculated by dividing the irrigation duration by the number of completed sets, and the average

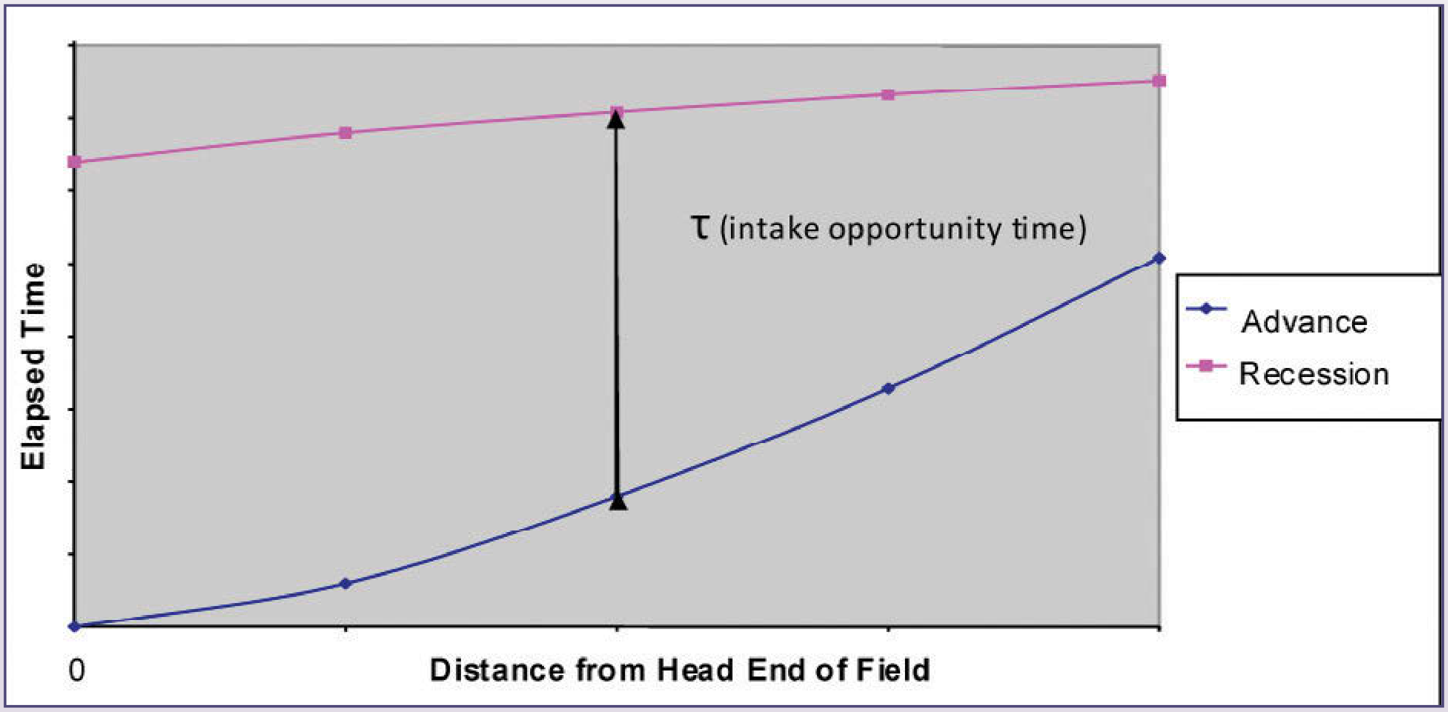


Figure 29. *Example plots of time of advance and time of recession of an irrigation stream along a field and the intake opportunity time*

recession time when no tailwater loss occurred. This calculation assumes that the advancing water front just reaches the tail end of the field, without creating tailwater runoff, before receding because of cutoff].

- Area irrigated during irrigation event
- Cells (subfields) irrigated during irrigation event
- General set width estimation
- Average recession time to bottom end of field (This value was based upon field length. The range of average recession times across all monitored fields was 20 minutes to 60 minutes based upon observations from CSU personnel).

2. The following parameters were calculated for the irrigation event assuming a linear infiltration depth function from the head end to the tail end of the field, lateral uniformity across the irrigated area, and linear advance and recession from the head to the tail end of the field (Figure 30):

- Average intake opportunity time at head end of field (τ_0)
- Average intake opportunity time at ⅓ of field length ($\tau_{L/3}$)
- Average intake opportunity time at ⅔ of field length ($\tau_{2L/3}$)
- Average intake opportunity time at tail end of field (τ_L)
- Infiltrated depth at field head end (z_0)
- Infiltrated depth at ⅓ of field length ($z_{L/3}$)
- Infiltrated depth at ⅔ of field length ($z_{2L/3}$)
- Infiltrated depth at tail end of field (z_L)

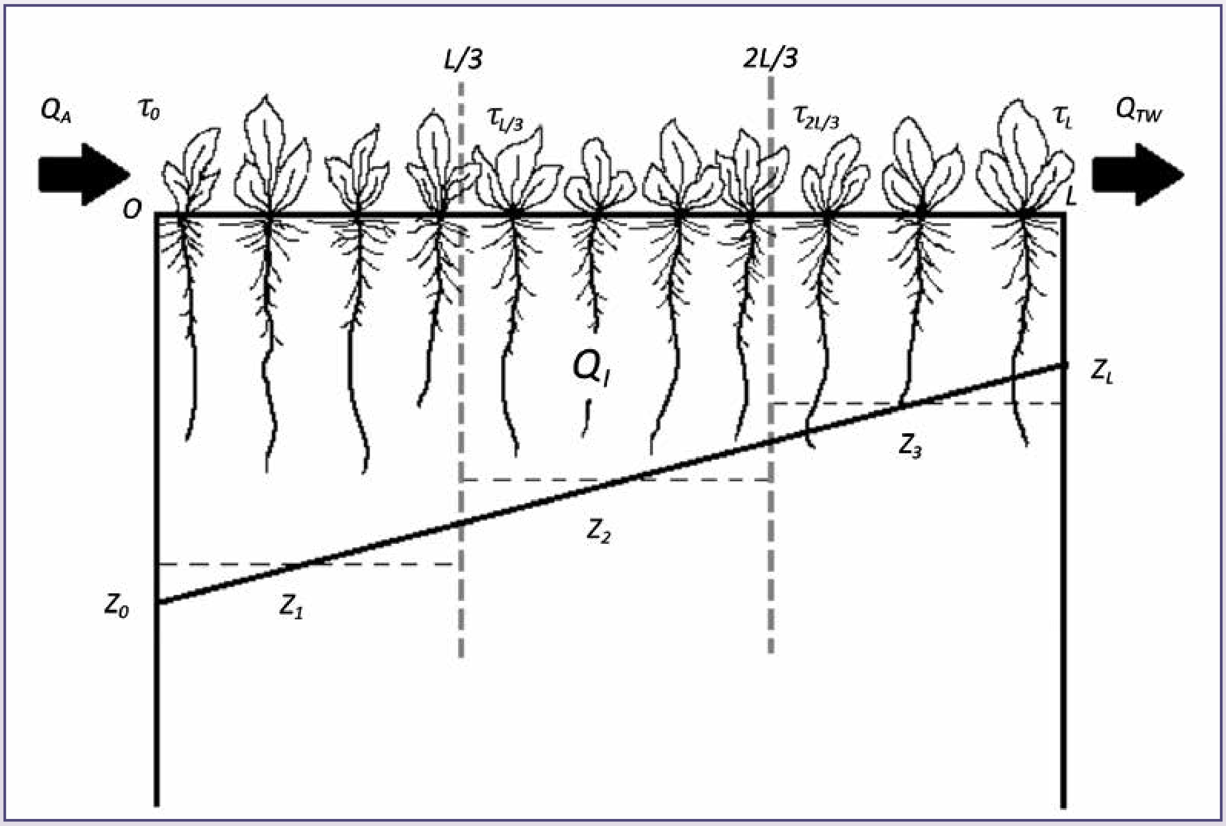


Figure 30. *Illustration of linear infiltration distribution approximation used in this study*

The calculation process consisted of solving for z_0 by changing values of z_L subject to the following constraints: $(z_L/ z_0) = (\tau_L/ \tau_0)$, and calculated total infiltrated volume equaled infiltrated volume estimated as the difference between field measurements of total applied irrigation volume, Q_A, and total tailwater runoff volume, Q_{TW}. This insured that mass balance was preserved throughout the calculation steps. Finally, average infiltrated depth (z_1, z_2, z_3) values were calculated for each ⅓ segment of the field based upon the geometric relationships between the infiltrated depths previously calculated.

The results that were transferred into the IDSCU irrigation mass balance model, described in the following section, included (1) average infiltrated depth values for each ⅓ segment of the field, (2) cells irrigated during an event, and (3) date of irrigation. For irrigation events spanning more than one day (for surface-irrigated fields) the first day of the irrigation was used for input into the IDSCU model. For sprinkler irrigated fields (for which irrigation events sometimes spanned several weeks or more) total infiltrated depth was divided by irrigation duration so that infiltrated depth values used in the IDSCU model were offered on a daily basis.

Deep Percolation

The IDSCU model (Garcia and Patterson 2009) was used to estimate various WBC values. The IDSCU Model was developed by the Integrated Decision Support (IDS) Group at Colorado State University. It contains a FORTRAN program for estimating ET_r and ET_p for specified crops, for solving Eqs. (1) and (2) for daily values of S_{SW} over the entire period of study within the irrigation season, and for daily values of Q_{DP} over time periods encompassing each irrigation event within the season. IDSCU also contains a Graphical User Interface (GUI) for processing and displaying input and output data.

Estimation of Q_{DP} for an irrigation event using IDSCU requires an estimate of S_{SW} prior to the first measured irrigation event, and daily input data on Q_A, Q_P, Q_{TW}, and Q_{ET}. Daily values of Q_U are computed within IDSCU as $Q_U = q_U \Delta t$ using Eqs. (7)-(11) with coefficients from Table 7 for the given soil type. Data on soil characteristics and crop root zone depth for determining TAW also are required. In IDSCU, if the total amount of Q_I during the period Δt of an irrigation event is enough to create a value of ΔS_{SW} that causes S_{SW} to exceed the value at field capacity $D_{rz}\theta_{fc}$, then Q_{DP} is assumed to occur as a result of the irrigation event and is calculated as $Q_{DP} = S_{SW}\text{-}D_{rz}\theta_{fc}$. In other words, it is assumed that gravity drainage will occur as deep percolation below the crop root zone to bring S_{SW} back to $D_{rz}\theta_{fc}$. To account for nonuniform infiltration, which typically occurs on surface irrigated fields, this water balance calculation is subdivided to different portions of the field as described in the preceding section.

To calibrate the IDSCU model, values for initial soil water content and TAW were adjusted to obtain a reasonable match between predicted and measured values of average S_{SW} on days when measured data from soil water surveys were available. Typically, data for one or two days of soil water surveys were available. On the average, the percent difference of predicted values of average S_{SW} from measured values was -15 percent over all fields and all irrigation seasons.

Sprinkler Evaporation and Drift

In the analysis described here, Q_I for sprinkler-irrigated fields was assumed to be equivalent to Q_A (exiting the sprinkler nozzles) less an assumed five percent loss to evaporation and wind drift (Howell 2006, Kansas State Univ. 1997).

Irrigation Application Efficiency

The term "irrigation efficiency" is widely used in relation to several aspects of irrigated agriculture and can be interpreted in several ways (Bos and Nugteren 1990). In this study we are concerned with irrigation application efficiency, E_a, as a measure of the performance of an individual irrigation event at the field scale. It is expressed here as a percentage and is defined as "The ratio of the amount of water stored in the actual or potential crop root zone to the total amount of water applied to the crop during a particular irrigation event." In simple terms, it can be thought of as the percentage of the total applied water that the crop can potentially consume in producing marketable yield. In equation form, irrigation application efficiency can be expressed for a time period Δt encompassing an irrigation event as (Hoffman et al 2007):

$$E_a = \Delta S_{SW}/Q_A \qquad (16)$$

There is no irrigation system that can apply water without water losses at the field scale. These losses may occur due to evaporation and wind drift during application, tailwater surface runoff, and DP. E_a is an indicator of efficiency on a field-scale level only; it does not consider conveyance losses from the water source to the irrigated fields. It may or may not consider the transit losses from small ditches within a field.

Irrigation Water Quality Sampling

Periodically, measurements were made of the EC (as specific conductance at 25ºC) and temperature of the irrigation water stream applied to a field and/or the tail water stream running off a field. A YSI® 30 Handheld Conductivity Meter (Figure 31), calibrated daily using a standard saline solution of known concentration, was used to make the measurements and the probe was rinsed with distilled water between measurements. Usually, only one measurement of irrigation water and tail water were made during a single irrigation event, but occasionally two measurements were made and averaged.

Total dissolved solids (TDS) were estimated from EC readings using equations developed from a companion CSU project in the LARV. This project collected water samples from numerous groundwater wells in the Upstream Study Region over the period 2006-2009 and in the Downstream Study Region over the period 2003 - 2009. About 142 surface water samples from Upstream and 427 surface water samples from Downstream were analyzed in the laboratory for specific salt ions and TDS, and regression equations were developed relating lab-determined TDS to field-measured EC in dS/m. The resulting power equations (statistically significant at a significance level $\alpha = 0.05$) used, for the Upstream and Downstream regions respectively, were:

$$\mathrm{TDS} = 868\mathrm{EC}-124.1,\ r^2 = 0.94 \qquad (17)$$

Figure 31. *YSI® 30 handheld conductivity meter used for measuring EC and temperature*

$$\mathrm{TDS} = 797\mathrm{EC}-111.0,\ r^2 = 0.77 \qquad (18)$$

Whenever possible, if EC measurements were not taken in the irrigation water stream during an irrigation event, the EC of the irrigation stream was assumed to be equal to the EC measured with a YSI® 30 meter by the companion CSU project in the supply canal at a sampling location nearest to the irrigated field and on a date closest to the irrigation event. For fields supplied from pumping wells, the EC measured in a groundwater monitoring well located in or near the field and closest to the supply well was used to estimate the EC of the irrigation water.

Shallow Groundwater Monitoring

The alluvial groundwater table generally is quite shallow in the LARV. Observation wells were drilled on or near each monitored field to measure the D_{wt}, EC (specific conductance at 25ºC), and temperature of the water table. These data provide information about the response of the groundwater to deep percolation from irrigation and about upflux of saline groundwater into the crop root zone.

A minimum of one observation well was installed within or adjacent to each monitored field except in cases where several monitored fields were immediately adjacent to one another. In such cases one well could serve to represent multiple fields. Over 50 percent of fields contained two or more observation wells. Observation well locations were chosen based upon the following criteria: (1) sites where vehicle/farm equipment traffic was minimal, (2) sites where surface water intrusion from irrigation channels, drainages, or pot holes was minimal, and (3) sites where wells could be located within a cropping area without searching for long periods of time (especially important in the case where observation wells were located within the cultivated field area and where well casings were level with the ground surface).

Observation wells were drilled to a maximum depth of 30 ft and with an average depth of approximately 20 ft. Well casing consisted of 2½” slotted (0.016 inch slot width with 3.1 in^2 slot area per lineal foot) schedule 40 PVC pipe with a removable female cap fitting placed at the top. Wells located outside of the field area were allowed casing heights that extended above the ground surface by several inches to several feet. Wells located within the field area typically were allowed casing heights level with the ground surface to deter damage to and from farm equipment. Soil surrounding each well casing was packed with a tamping bar and covered with bentonite clay on an annual basis to impede surface water intrusion.

Measurement of Water Table Depth

Observation wells generally were monitored on a bi-weekly basis from May through September and a monthly basis for the rest of the year. The value of D_{wt} was measured from the top of the well casing using a 100 ft open-spool tape with a small weight and calibrated Styrofoam float attached to the end (Figure 32). The casing height above the ground surface also was measured each time. Where applicable, D_{wt} data from other concurrent CSU groundwater studies were used to complement data collected in this project.

Figure 32. *CSU field technician measuring depth to water table in well on Field DS12 using an open-spool tape, 2005*

Measurement of Specific Conductance in Groundwater

Groundwater temperature and EC measurements were made using a YSI® 30 Handheld Conductivity Meter which was calibrated daily using a standardized saline solution. The probe was rinsed with distilled water between observation well readings. Typically, three sets of EC measurements were taken: near the water table, near the bottom of the well, and midway between the water table and the bottom of the well. The average of these three measurements was used to estimate EC of the groundwater in the well.

Total dissolved solids (TDS), or total salt ions in solution, were estimated from EC readings using equations developed from the companion CSU project in the LARV. About 363 groundwater samples from Upstream and 898 groundwater samples from Downstream were analyzed in the laboratory for specific salt ions and TDS, and regression equations were developed relating lab-determined TDS in mg/L to field-measured EC in dS/m. The resulting power equations (statistically significant at a significance level $\alpha = 0.05$) used, for Upstream and Downstream regions respectively, were:

$$TDS = 847.6EC^{1.06},\ r^2 = 0.93 \quad (19)$$

$$TDS = 1066.7EC^{0.93},\ r^2 = 0.83 \quad (20)$$

Soil Water Salinity and Soil Water Content Surveys

Field Measurement with Electromagnetic Induction Meters

Surveys to estimate soil water salinity were conducted on monitored fields throughout the duration of the project with two surveys completed on each field during 2004, 2005, and 2008 (typically in June and November) and three surveys completed on each field during 2006 and 2007 (typically in May, July, and November). Surveys for soil water salinity were conducted using EM38 electromagnetic induction meters developed by GeonicsTM, Ltd. (Mississauga, ON, Canada) and Garmin eTrex Legend® GPS units (Figure 33). When placed on the ground the EM38 induces an electromagnetic field that allows for measurement of bulk soil electrical conductivity (dS/m) at the site. At each site, measurements are made with the EM38 oriented both horizontally and vertically. The horizontal orientation measurement, EM_H, renders a bulk conductivity measurement to an effective depth of about 0.75 m and the vertical orientation measurement, EM_V, to an effective depth of about 1.5 m. The readings have an accuracy of about plus five percent at 30 mS/m.

EM38 meters were calibrated according to manufacturer's specifications prior to the start of surveying on each field. Battery levels were checked periodically throughout the surveying process and generally changed after about 15 hours of continuous use. During the surveying process, special care was taken by CSU personnel to wear attire that would not alter ground conductivity readings. This included the use of footwear not containing metal and the removal of metallic objects from their attire.

For fields rectangular or square in shape, geo-referenced soil water salinity surveys were initiated near one corner of the field with EM38 readings and GPS coordinates were obtained, using a Garmin eTrex Legend handheld GPS unit, at each point on a 150-ft square grid pattern throughout the field area. For fields with a total area less than 10 acres, EM38 readings and GPS coordinates were obtained at each point on a 100-ft square grid pattern throughout the field area. Surveys typically were started near one corner and followed a path adjacent to one field boundary to the opposite end of the field. A new path was started either 150 ft or 100 ft adjacent to the initial path and continued to the opposite end of the field. This process was continued from the starting field boundary to the opposite field boundary. For fields circular in shape (center pivots), geo-referenced soil water salinity surveys were initiated at a point between the two outside sprinkler towers with EM38 readings and GPS coordinates obtained each 150 ft on a circular-shaped path around the field area. Following the completion of the initial path, a new path was initiated at a point about 150 ft inwards from the first path. This process was continued from the outside boundary to the center point of the field.

Soil Water Content Measurements

Soil samples were collected for gravimetric soil water content analysis immediately following the completion of each soil salinity survey. The procedure below was followed:

1. Soil sampling locations were determined by visually dividing the field into four quadrants and identifying a location near the approximate midpoint of each quadrant as a sampling location.
2. The soil surface at each location was cleared of crop residue by hand or spade.
3. During the 2004-2007 seasons, Oakfield tube samplers (Figure 34) were used to extract soil samples from a depth of approximately 24 inches at each location. During the 2008 season, a Stihl® gas-powered earth auger with an 18 inch by 1.5 inch diameter auger and two 18 inch extensions was used to bore to a depth of approximately 48 inches at each location. The auger was generally pulled from the hole five times per location either to remove soil from auger flighting or to add extensions to the auger. For each sampling location, all extracted soil was collected from the sampler by hand or using a small spade, placed in a plastic double-lock freezer bag, and labeled.
4. In most cases, each sample was weighed within one hour following collection using a portable, electronic scale (ACCULAB® PP401).
5. Soil temperature at a six inch depth from the ground surface was measured at each sampling location using a digital thermometer (ACURITE® 00645W2).
6. Soil samples were allowed to air dry in a low humidity greenhouse environment at the CSU-Arkansas Valley Research Center near Rocky Ford, Colorado for approximately three weeks. Soil samples were not transferred from plastic bags for the drying process; the bags were simply opened and exposed to air.
7. Following the drying period, soil samples were weighed again, as were empty plastic sampling bags.
8. Air-dried gravimetric water content (WC_{AD}) was estimated for each sample using the following equation:

$$WC_{AD} = (W_{ws} - W_{ds})/(W_{ds} - W_{bag}) \qquad (21a)$$

wherein W_{ws} = weight of wet soil sample (including bag),

W_{ds} = weight of dry soil sample (including bag), and

W_{bag} = weight of plastic bag.

9. Oven-dried gravimetric water content (WC_{OD}) was estimated from WC_{AD} for each sample using the following method.

- Values of WC_{AD} were determined for a portion of 297 soil samples in 2008. Another portion of each of the same samples was placed in a can and dried in an oven to determine oven-dried water content as

$$WC_{OD} = (W_{ws} - W_{ds})/(W_{ds} - W_{can}) \tag{21b}$$

wherein W_{ws} = weight of wet soil sample (including can),
W_{ds} = weight of dry soil sample (including can), and
W_{can} = weight of metal can

- Statistical analysis revealed that on average, WC_{OD} exceeded WC_{AD} by 0.013 (about 8.8 percent). Thus, the following was used to estimate WC_{OD} from measured values of WC_{AD}:

$$WC_{OD} = WC_{AD} + 0.013 \tag{22}$$

Estimation of EC_e from EM38 Measurements

EM38 readings are affected by soil water content and soil temperature and must be adjusted. Values of EM_V measured in dS/m with the EM38 were converted to adjusted values, EM_V', using a temperature correction factor, f_{tc} (Richards 1954):

$$EM_V' = (f_{tc})EM_V \tag{23}$$

with f_{tc} =

$$1.8509 - 0.0516951(T) + 0.000858442(T^2) - 0.00000613535(T^3) \tag{24}$$

where T is the soil temperature (ºC) measured in the field in ºC. Finally, saturated paste extract soil salinity, EC_e was estimated using calibration equations developed by Wittler et al. (2006) for the Upstream and Downstream Study Regions. For fields in the Upstream region, EC_e in dS/m was estimated from: EC_e =

$$2.33 + 7.16(EM_V'/100)^{1.44} + 9.41WC - 23.18(EM_V'/100)(WC) \tag{25}$$

For fields in the Downstream region, EC_e in dS/m was estimated from: EC_e =

$$0.45 + 7.23(EM_V'/100)^{1.78} + 19.54WC - 34.06(EM_V'/100)(WC) \tag{26}$$

Figure 33. *CSU technician conducting EM38 survey on a field in the LARV*

Preparing Soil Salinity Maps

The ArcGIS 9.3 geographic information systems software was used to generate maps of EC_e for each field survey using kriging interpolation techniques. Kriging methods depend on mathematical and statistical models that rely on the notion of correlation between EC_e values at locations within a field based upon the distance between the locations. The procedure is described in Eldeiry and Garcia (2008).

Crop Yield Measurements

To estimate crop yield, crop biomass samples were collected on each of the monitored fields one to three times per season for the duration of the project. The procedure for collecting crop biomass samples is outlined below:

1. Crop biomass sampling locations were determined for each field in two ways:
   - If previous soil water salinity survey data were available for the field, six separate locations were chosen based upon the three areas of highest soil water salinity concentration and the three areas of lowest soil water salinity concentration.
   - If soil water salinity survey data were not available, the field was divided into six equal-sized areas with the approximate midpoint of each area considered the crop biomass sampling location.
2. For each sampling location, three different types of data were collected: crop biomass, EM38 measurements, and samples for soil water content. Methods used in taking EM38 measurements and gathering soil samples for estimating gravimetric soil water content are described in the section “Soil Water Salinity and Soil Water Content Surveys”. Biomass sampling was conducted as follows:
   - For alfalfa and alfalfa/grass mix crops, biomass samples were collected at each sampling location by either of the two following methods:

     i. If the crop had not been cut, a 3.3-ft (1 meter) square frame constructed of ½ inch thick steel rod was placed on the ground and all vegetation was hand-cut with scissors and hedge trimmers to a height of about one inch above ground level. All cut vegetation was then placed in a mesh onion sack (bushel size) for greenhouse drying. Biomass samples for wheat crops also were collected in this manner.

     ii. If the crop had been cut into windrows by the grower, a length of windrow (ranging from one ft to five ft) was measured, collected by hand, and placed in a mesh onion sack for greenhouse drying. In addition, the distance from the centerline of the windrow to the centerline of an adjacent windrow was measured and recorded for the purpose of calculating biomass/area values. For each sample within a given field, the length of windrow collected for drying was the same. Sampled areas varied between fields only and never between samples within a given field.
   - For row crops including corn (for grain or ensilage) and sorghum (for grain, ensilage, or forage), crop biomass samples were collected as follows:

     i. For each sampling location a number of plants were hand-cut (using a hacksaw) at a height of about one inch above the ground surface and placed into a mesh onion sack for greenhouse drying. For each sample within a given field, the number of plants collected for drying was the same. Sample sizes varied between fields only and never between samples within a given field.

Figure 34. *Oakfield tube sampler.*

ii. For each sampling location, a plant population count was conducted by measuring a 10-ft length of row and then counting the number of plants growing in that span.

3. Following the completion of sampling, crop biomass samples were allowed to air dry for a minimum of three weeks in a low humidity greenhouse environment at the CSU Arkansas Valley Research Center near Rocky Ford, Colorado. Following drying, crop samples were weighed.

The crop biomass data were normalized in order to make comparisons between fields. For alfalfa, the data were normalized by dividing measured yields by an estimated maximum yield per cutting of tons per acre. Colorado Agricultural Experiment Station (2008) provides data on the crop yields for a number of alfalfa variety trials from 2004-2006. On the average, the total yields from entire fields for three cuttings were found to be about 2.3 tons/acre per cutting. Therefore a maximum of three tons/acre was selected since in order to obtain an average of 2.3 tons/acre over an entire field the maximum for any one small plot in the field could be higher. Colorado Agricultural Experiment Station (2008) also reports the average biomass yields for corn silage planted on small plots to be about 32.8 tons/acre. Thus, a maximum of 33 tons/acre was used to normalize the corn biomass data obtained in this report

Sensitivity Analysis

Sensitivity of values of the deep percolation fraction, DPF = Q_{DP}/Q_A (percent), and E_a estimated by the IDSCU model to approximate errors in selected input parameters was investigated. The aim was to provide an estimate of the likely range of values that DPF and E_a could take on in light of the uncertainty in measuring and estimating some of the parameters deemed to play a key role in estimating losses of water due to downward percolation and associated efficiency of water application.

Sensitivity to Evapotranspiration, Infiltrated Irrigation Volume, and Soil Water Storage

The IDSCU model was run using values of ET_a, Q_I, initial S_{SW}, and TAW that constitute upper and lower ends of an estimate error bound. The error range between the upper and lower bound values for each parameter was defined as plus or minus a percentage of defined baseline parameter values, considered the best estimates, for each monitored field and each season. The error bound used for each of the considered input parameters was +/- 20% for ET_a, +/- 20% for Q_I, +/- 20% for initial S_{SW}, and +/- 20% for TAW. Adjustments to considered input parameters were conducted independently, with all other parameters maintained at their baseline values. Average values of DPF and E_a over all surface irrigation events and all sprinkler irrigated events were computed for both the upper and lower bound values of each considered input parameter. These values could be compared to those previously computed by IDSCU using baseline values for all parameters.

Sensitivity to Infiltration Distribution Pattern

Sensitivity to the infiltration distribution pattern on surface-irrigated fields also was investigated. To estimate sensitivity to the assumed linear distribution pattern, reasonable upper and lower bounds of the slope of the infiltration depth function were calculated. The upper bound was found by increasing the infiltrated irrigation depth for the baseline condition, computed as described in the section "Infiltration Uniformity", on the first third of the irrigated cell by 30 percent while simultaneously decreasing the infiltrated depth on the last third of the irrigated cell by 30 percent. The lower bound was defined in a similar fashion but with the increase and decrease occurring on opposite ends of the irrigated cell. Average values of E_a were calculated for each bound for all the surface irrigated events. Figure 35 depicts the assumed linear distribution associated with the upper and lower bounds, compared to that for the baseline condition.

Regional-Scale Modeling of Irrigation-Affected Flow and Salt Loading Processes

Though the number of irrigated fields monitored in this study was relatively large for an effort of this type, it was quite small compared to the total number of irrigated fields in the LARV. To examine the behavior of the irrigated stream-aquifer system over regional scales, a revised version of a computational groundwater model described by Burkhalter and Gates (2005, 2006) was applied to the Upstream and Downstream study regions. The modeled area in the Upstream Study Region encompassed about 125,000 ac, of which about 65,300 ac are irrigated. Downstream the modeled area covered about 136,300 ac, of which about 81,600 ac are irrigated. The flow component of the revised model, used in this study, uses an amended version of the MODFLOW saturated zone groundwater flow model (Harbaugh 2005) coupled with the UZF unsaturated zone model (Niswonger et al 2006). The governing flow equations are solved using finite-difference approximations applied to a computational grid size of 250 m by 250 m with two vertical layers and time steps of one week. The model has been calibrated and tested against a large data set gathered over the period 1999-2007 in the Upstream region and 2002-2007 in the Downstream region. The calibration targets include depth to the groundwater table at 88 sites Upstream and at 99 sites Downstream, groundwater return flows to tributaries and streams estimated by water balance calculations using stream flows measured at numerous gaging sites, measured seepage from irrigation canals, estimates of ET_a using ReSET and satellite data, and measured upflux from shallow groundwater tables under naturally-vegetated fields. Baseline estimates of Q_{DP} from the IDSCU model were used to estimate targets for recharge to the shallow water table aquifer computed by the regional models. Also, estimates of tailwater runoff fraction, TRF = Q_{TW}/Q_A (percent), from the field study were used to guide the estimation of values of Q_I for the regional model. The calibration period was April 1999 to March 2004 and the test period was April 2004 to October 2007 for the Upstream Study Region. For the Downstream region, the calibration period was April 2002 to March 2006 and the test period was April 2006 to October 2007. Distributed values of the following model parameters were adjusted by optimization using the UCODE automated parameter estimation software and/or by manual adjustment: horizontal saturated hydraulic conductivity, effective vertical saturated hydraulic conductivity in the unsaturated zone, soil saturated water content, specific yield, canal conductance, and tributary and stream conductance. Manual methods were used to adjust values of the following parameters: aquifer thickness, ET extinction depth (D_{wt} value at which groundwater upflux to ET ceases), ET_p adjustment factor, etc. Histograms of the residual differences between simulated and observed

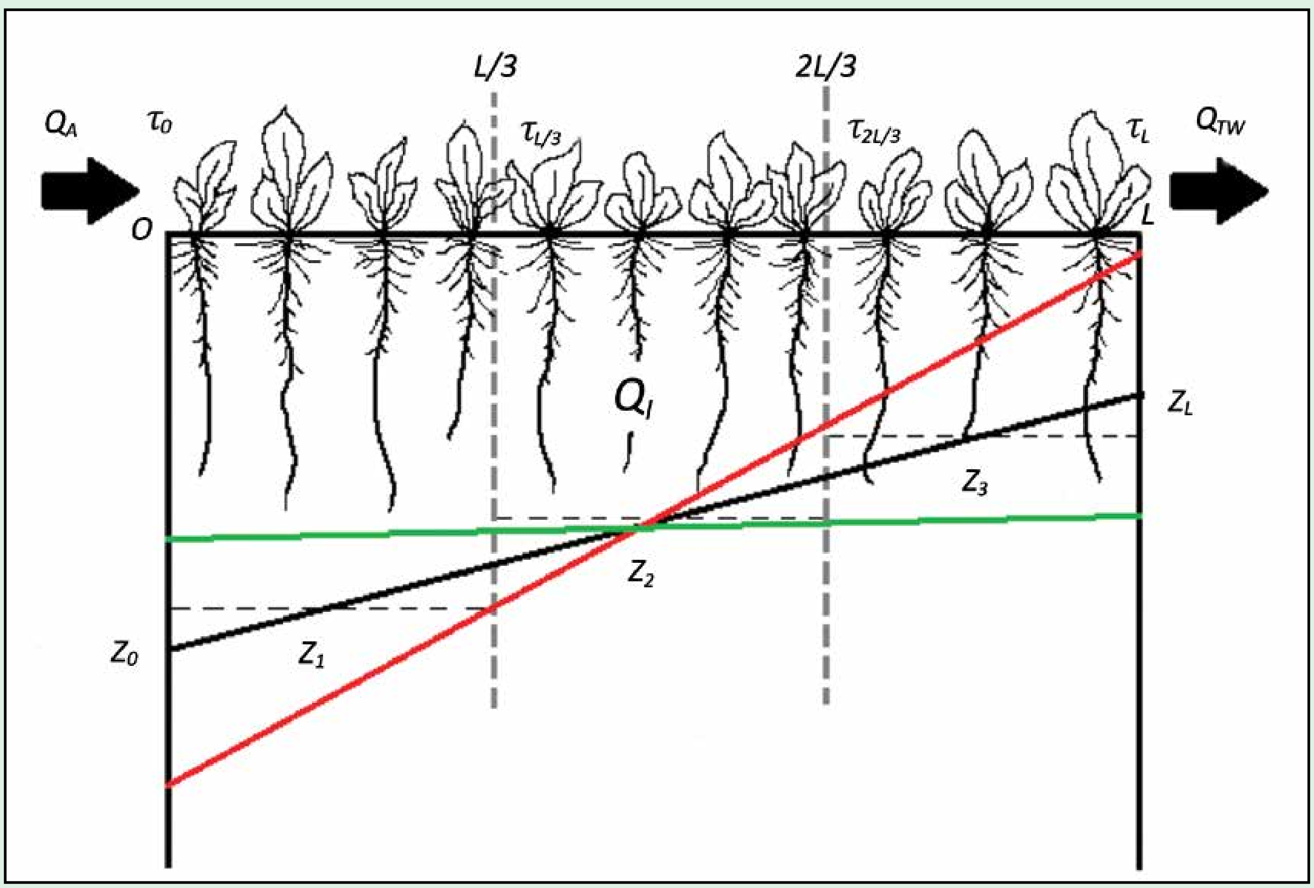


Figure 35. *Distribution Sensitivity: Assumed, upper (red) and lower (green) bounds for the slope of the linear infiltration distribution, compared to the assumed baseline (black) distribution*

values of D_{wt} for both calibration and test periods for the Upstream and Downstream region are shown in Figure 36. Figure 37 shows plots of simulated values of groundwater return flow along reaches of the Arkansas River, compared to estimates of total unaccounted-for return flow (which includes both groundwater and unaccounted-for surface water return flows) for both calibration and test periods for the Upstream and Downstream region. These figures reveal that the model is reasonably accurate in predicting groundwater head and groundwater return flow for the period of study. Work is currently underway to refine estimates of groundwater return flow. Detailed descriptions of the model will be available in an article under preparation by Morway et al. (2012).

For the current study, focus was given to regional model predictions of spatial and temporal distributions of recharge to the shallow aquifer as affected

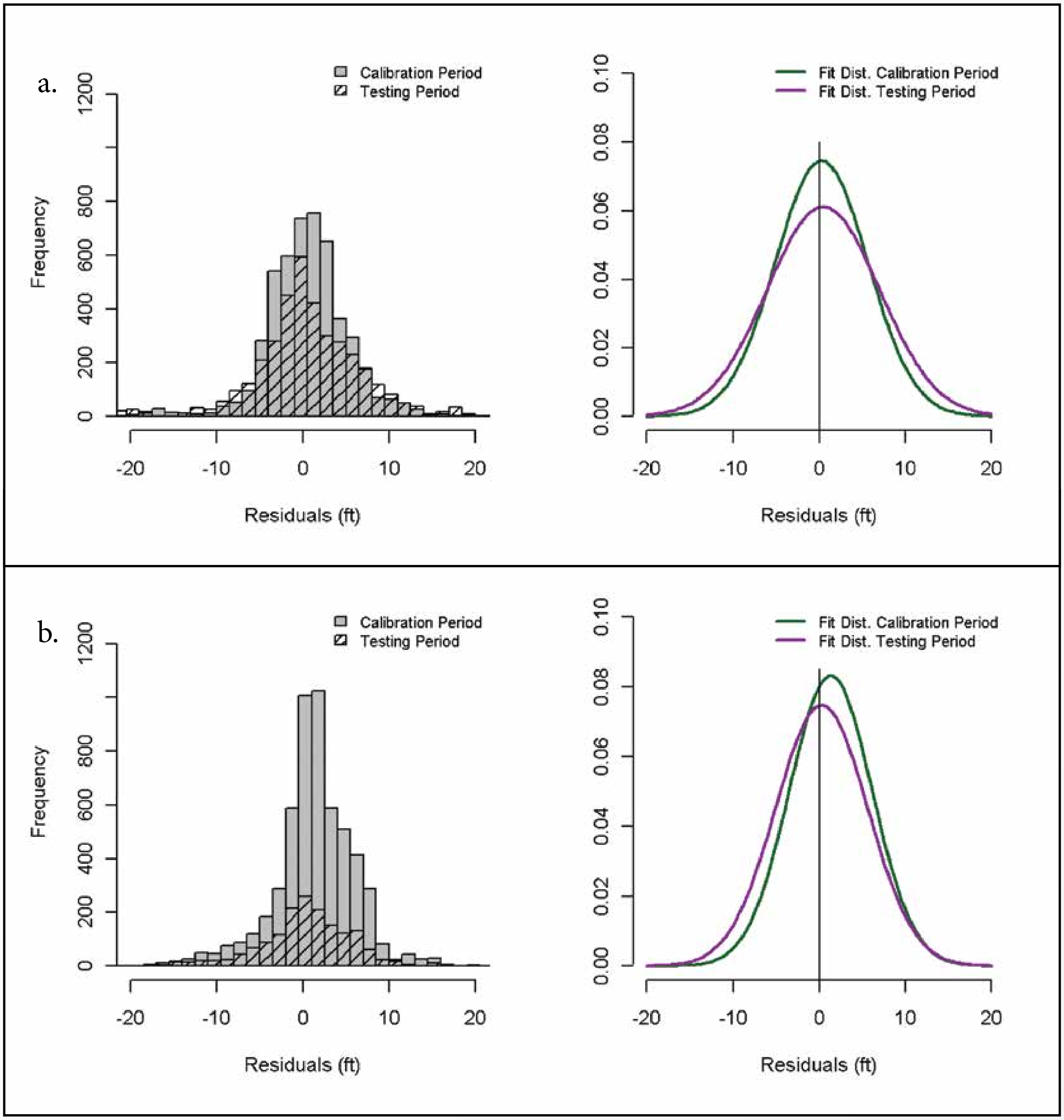


Figure 36. *Frequency histograms and fitted distributions of residuals (difference between simulated and observed values) of* D_{wt} *for (a) Upstream Study Region, and (b) Downstream Study Region*

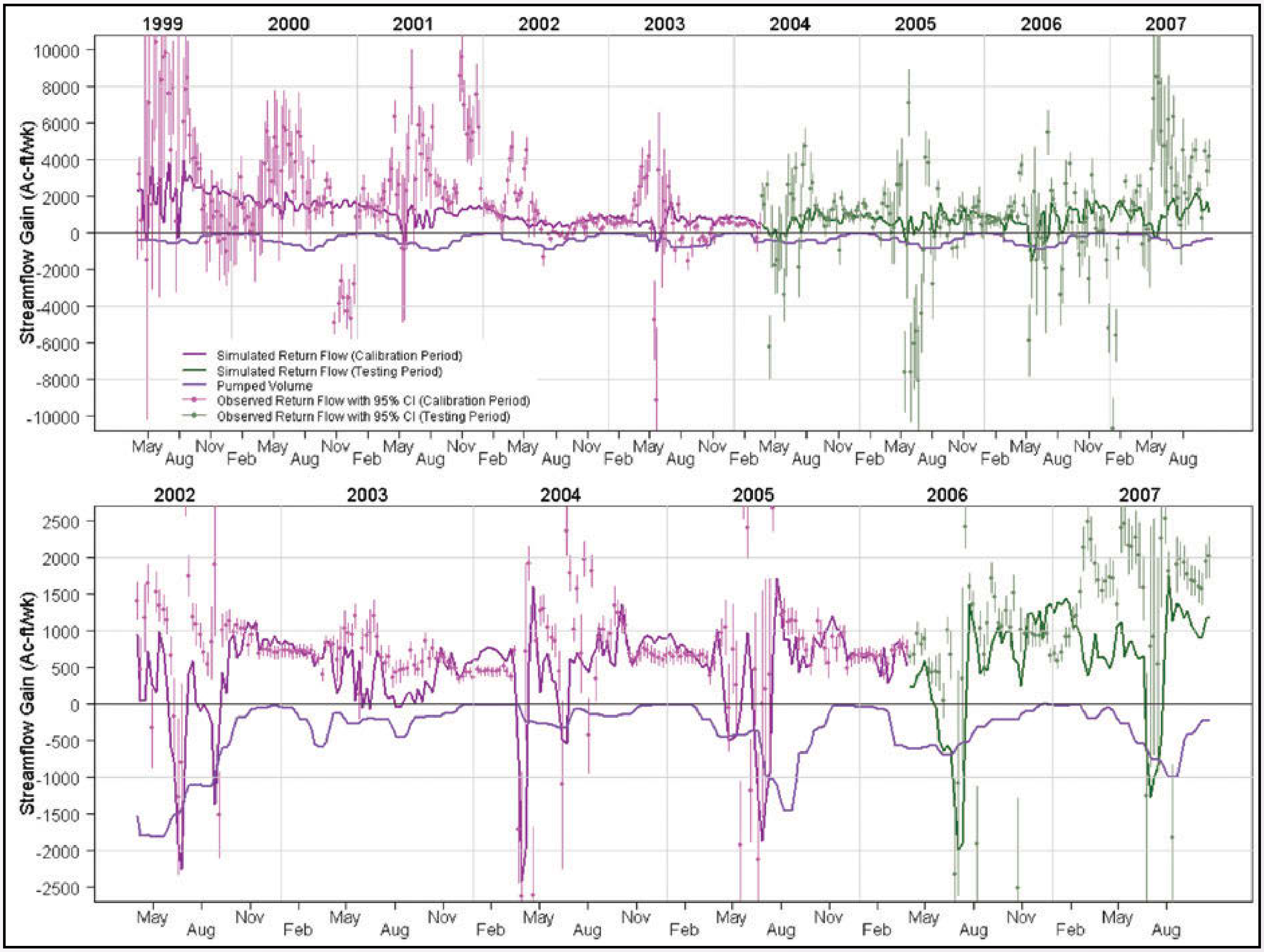


Figure 37. *Simulated weekly groundwater return flow to the Arkansas River compared to total unaccounted-for return flow (with 95 percent confidence intervals) estimated using stream gauges for calibration and testing periods for river reaches along the (a) Upstream Study Region, and (b) Downstream Study Region*

by deep percolation, non-beneficial water consumption due to upflux from the shallow aquifer under naturally-vegetated and fallow fields, and return flows and salt loads from groundwater to the main stem of the Arkansas River within the two study regions. These are key variables to understanding the effect of irrigation practices on the stream-aquifer system and on compliance with the Arkansas River Compact.

Salt loads in groundwater return flow to the Arkansas River were estimated for this study by multiplying predicted groundwater return flow rates by groundwater salt concentrations interpolated for each respective computational link along the river. Groundwater salt concentrations were extrapolated from measurements made by a companion CSU study in multiple observation wells distributed over the study regions. Current work is underway to improve salt load estimates through the use of calibrated and tested MT3D solute transport models in conjunction with the MODFLOW-UZF models of the study regions.

Results

Irrigation Water Balance Components and Efficiency

The WBC and E_a values computed for each field and each irrigation event within each irrigation season over the entire study period are summarized for the Upstream and Downstream surface-irrigated fields and sprinkler-irrigated fields in files on the IDAD. Summary statistics of measured or estimated Q_A, Q_I, TRF, DPF, and E_a values are presented in Table 8 for Upstream, Downstream, and total monitored fields for each of the seasons within the study period.

Precipitation

Histograms of Q_{PT} for each field, both Upstream and Downstream, over the entire study period are shown in Figures 38, 39 and 40. Figure 38 shows the total measured rainfall for selected periods within each of the 2004 and 2005 irrigation seasons for both Upstream and Downstream fields. Similar plots for selected periods within the 2006, 2007 and 2008 seasons are shown in Figures 39 and 40. The mean value of total seasonal Q_P for the selected periods over the entire study was 6.60 inches mean value, 1.98 inches minimum, and 14.87 inches maximum. The CV for Q_P was about 40 percent.

Irrigation Water Applied

Frequency histograms and fitted probability distribution functions of Q_A for surface-irrigation events over the entire study period are shown in Figure 41 for Upstream fields, Downstream fields, and the total of all fields. The mean values of Q_A for surface irrigation events on Upstream, Downstream, and total fields monitored were 7.4 inches, 9.1 inches, and 8.2 inches, respectively. For about 90 percent of the total surface irrigation events monitored, Q_A, ranged between 4.0 inches and 13.41 inches. The CV of Q_A for the total surface irrigation events was about 51 percent.

Histograms and fitted probability distribution functions of Q_A for sprinkler-irrigation events over the entire study period are shown in Figure 42 for Upstream fields, Downstream fields, and the total of all fields. For sprinkler irrigation events the mean values of Q_A on Upstream, Downstream, and total fields monitored were 2.0 inches, 2.3 inches, and 2.2 inches, respectively. Values of Q_A for about 90 percent of the total sprinkler irrigation events monitored ranged between 1.1 inches and 3.0 inches. The CV of Q_A for the total sprinkler irrigation events was about 72 percent.

Tailwater Runoff Fraction

TRF (%) values for all surface irrigation events are plotted as frequency histograms and fitted distribution functions in Figure 43 for Upstream fields, Downstream fields, and the total of all fields. The mean value for the Upstream, Downstream, and total surface irrigation events was 8.4 percent, 7.4 percent, and 8.0 percent, respectively. About 90 percent of the total TRF values ranged between about zero percent and 18.5 percent, and the CV for the total events was about 109 percent. No tailwater runoff was observed for sprinkler irrigation events during this study.

Infiltrated Water

For surface-irrigation events over the entire study period, frequency histograms and fitted probability distribution functions of Q_I are shown in Figure 44 for Upstream fields, Downstream fields, and the total of all fields. Mean values of Q_I for surface irrigation events on Upstream, Downstream, and total fields monitored were 6.7, 8.3, and 7.5 inches, respectively. Values of Q_I ranged between about 3.7 and 12.3 inches for about 90 percent of the total surface irrigation events monitored. The CV of Q_I for the total surface irrigation events was about 52 percent. Since there was no observed tailwater runoff for any of the sprinkler irrigation events, Q_I for sprinkler events were estimated as 95 percent of corresponding Q_A values accounting for air evaporation and wind drift losses.

Histograms and fitted probability distribution functions of Q_I for sprinkler-irrigation events over the entire study period are shown in Figure 45 for Upstream fields, Downstream fields, and the total of all fields. The mean values of Q_I for sprinkler irrigation events monitored on Upstream, Downstream, and total fields were 1.8 inches, 2.1 inches, and 2.1 inches, respectively. For about 90 percent of the total sprinkler irrigation events monitored values of Q_I ranged between 1.1 inches and 2.9 inches. The CV of Q_I for the total sprinkler irrigation events was about 72 percent.

Table 8. *Summary statistics for Q_A, Q_I, TRF, DPF, and E_a for all seasons over the study period*

	2004				2005				2006				2007				2008			
	Mean	*Min*	*Max*	*CV (%)*	*Mean*	*Min*	*Max*	*CV (%)*	*Mean*	*Min*	*Max*	*CV (%)*	*Mean*	*Min*	*Max*	*CV (%)*	*Mean*	*Min*	*Max*	*CV (%)*
Upstream																				
Surface Irrigation Events																				
No. of events	8				53				33				0				24			
Q_A (in)	7.4	3.7	13.8	49.5	6.9	2.2	16.4	46.6	7.9	2.0	14.9	50.0	-	-	-	-	7.9	0.9	18.7	49.6
Q_I (in)	6.8	3.6	13.6	52.7	6.2	2.2	14.3	43.2	7.1	1.8	14.5	51.3	-	-	-	-	7.2	0.9	17.2	45.9
TRF (%)	8.8	0.4	32.4	121.7	8.0	0.0	28.7	100.1	10.1	0.0	33.2	84.1	-	-	-	-	6.7	0.0	27.0	103.6
DPF (%)	35.9	0.0	73.6	75.7	15.8	0.0	81.6	115.8	18.0	0.0	58.2	105.0	-	-	-	-	24.4	0.0	64.9	86.3
E_a (%)	55.3	24.3	99.6	53.3	76.2	16.4	100.0	26.7	71.9	39.5	100	26.7	-	-	-	-	69.0	34.8	100.0	31.6
Sprinkler Irrigation Events																				
No. of events	0				11				15				0				36			
Q_A (in)	-	-	-	-	1.7	1.0	2.6	24.8	1.7	0.9	2.3	26.8	-	-	-	-	2.1	0.5	10.7	95.0
Q_I (in)	-	-	-	-	1.6	1.0	2.5	24.8	1.7	0.9	2.2	26.8	-	-	-	-	2.0	0.5	9.7	92.5
TRF (%)	-	-	-	-	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	-	-	-	0.0	0.0	0.0	-
DPF (%)	-	-	-	-	7.9	0.0	50.0	207.1	11.5	0.0	55.4	208.8	-	-	-	-	24.1	0.0	95.2	132.6
E_a (%)	-	-	-	-	87.1	45.0	95.0	18.8	83.5	29.6	95.0	28.6	-	-	-	-	71.0	4.8	95.0	44.7
Downstream																				
Surface Irrigation Events																				
No. of events	5				27				25				32				35			
Q_A (in)	3.2	2.7	4.5	24.0	9.5	2.2	23.3	43.8	7.8	1.6	21.7	57.7	10.3	4.5	26.3	52.4	9.2	2.7	16.2	36.4
Q_I (in)	3.1	2.7	4.2	21.0	8.2	2.0	19.4	45.9	7.3	1.5	21.7	60.8	9.5	4.4	26.0	55.9	8.6	1.4	16.2	41.7
TRF (%)	1.2	0.0	6.1	223.6	13.1	0.0	68.7	104.8	6.4	0.0	21.9	89.9	8.0	0.0	21.4	85.3	4.6	0.0	27.0	162.9
DPF (%)	0.0	0.0	0.0	-	26.9	0.0	67.7	85.2	34.2	0.0	89.1	85.4	26.8	0.0	86.3	87.6	31.1	0.0	86.1	82.0
E_a (%)	98.8	93.9	100.0	2.7	60.0	18.3	100.0	39.3	59.4	6.4	100.0	47.5	65.2	2.8	100.0	35.3	64.2	13.9	100.0	37.9
Sprinkler Irrigation Events																				
No. of events	0				19				25				44				128			
Q_A (in)	-	-	-	-	2.5	0.7	12.7	104.2	2.2	1.1	3.3	28.2	2.2	0.6	13.2	88.6	2.3	0.8	11.4	61.3
Q_I (in)	-	-	-	-	2.4	0.6	12.2	105.3	2.1	1.1	3.1	28.1	2.1	0.5	12.3	87.8	2.2	0.8	11.2	61.9
TRF (%)	-	-	-	-	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.0	-
DPF (%)	-	-	-	-	7.8	0.0	49.0	181.8	17.2	0.0	92.2	158.4	3.0	0.0	69.9	391.6	14.0	0.0	66.2	158.1
E_a (%)	-	-	-	-	87.2	46.0	95.0	16.3	78.2	2.8	95.0	34.6	92.0	25.4	95.0	12.7	81.0	16.9	95.0	27.2
Total																				
Surface Irrigation Events																				
No. of events	13				80				58				32				59			
Q_A (in)	5.8	2.7	13.8	61.3	7.8	2.2	23.3	48.2	7.9	1.6	21.7	52.9	10.3	4.5	26.3	52.4	8.7	0.9	18.7	41.7
Q_I (in)	5.4	2.7	13.6	61.6	6.9	2.0	19.4	46.7	7.2	1.5	21.7	55.3	9.6	4.4	26.0	55.9	8.1	0.9	17.2	41.8
TRF (%)	5.8	0.0	32.6	158.2	9.7	0.0	68.8	108.0	8.5	0.0	33.3	90.1	8.0	0.0	21.4	85.4	5.6	0.0	27.2	129.9
DPF (%)	22.1	0.0	73.6	124.9	19.5	0.0	81.6	105.0	25.0	0.0	89.0	100.4	26.8	0.0	86.3	87.6	28.4	0.0	86.1	84.0
E_a (%)	72.1	24.5	100.0	42.7	70.8	16.5	100.0	32.1	66.5	6.5	100.0	36.2	65.1	2.8	100.0	35.3	66.0	13.9	100.0	35.1
Sprinkler Irrigation Events																				
No. of events	0				30				40				44				164			
Q_A (in)	-	-	-	-	2.2	0.7	12.7	95.1	2.0	0.9	3.3	29.5	2.2	0.6	13.2	88.6	2.3	0.5	11.4	68.8
Q_I (in)	-	-	-	-	2.1	0.6	12.2	96.2	1.9	0.9	3.1	29.4	2.1	0.5	12.3	87.8	2.2	0.5	11.2	68.5
TRF (%)	-	-	-	-	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.0	-
DPF (%)	-	-	-	-	7.8	0.0	50.0	188.0	15.1	0.0	92.2	172.1	3.0	0.0	69.6	391.6	16.2	0.0	95.2	153.4
E_a (%)	-	-	-	-	87.2	45.0	95.0	16.9	80.2	2.8	95.0	32.1	92.0	25.4	95.0	12.7	78.8	4.8	95.0	31.4

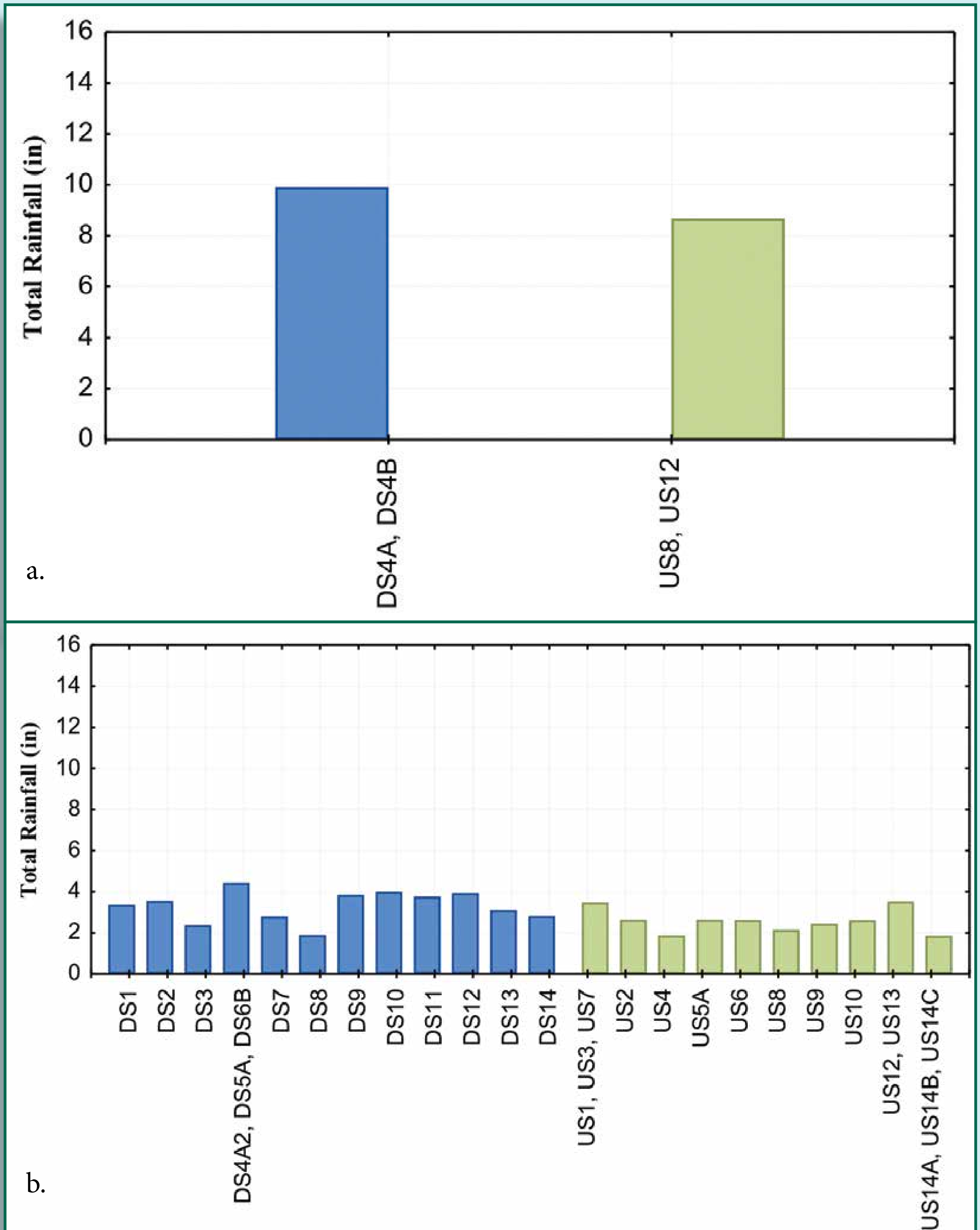


Figure 38. *Total rainfall measured on monitored fields for (a) 25 May-30 Sep 2004, (b) 30 Jun-28 Sep 2005*

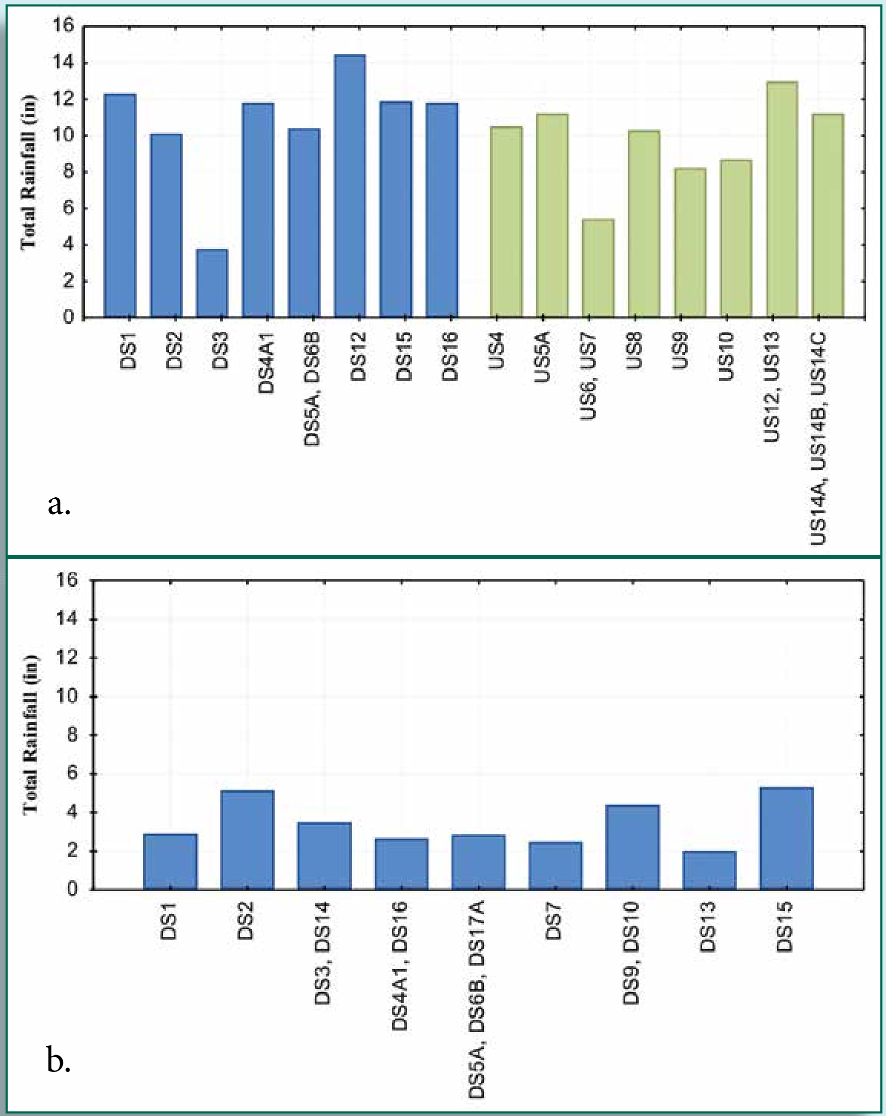


Figure 39. *Total rainfall measured on monitored fields for (a) 8 Apr-11 Oct 2006, and (b) 17 May-9 July 2007*

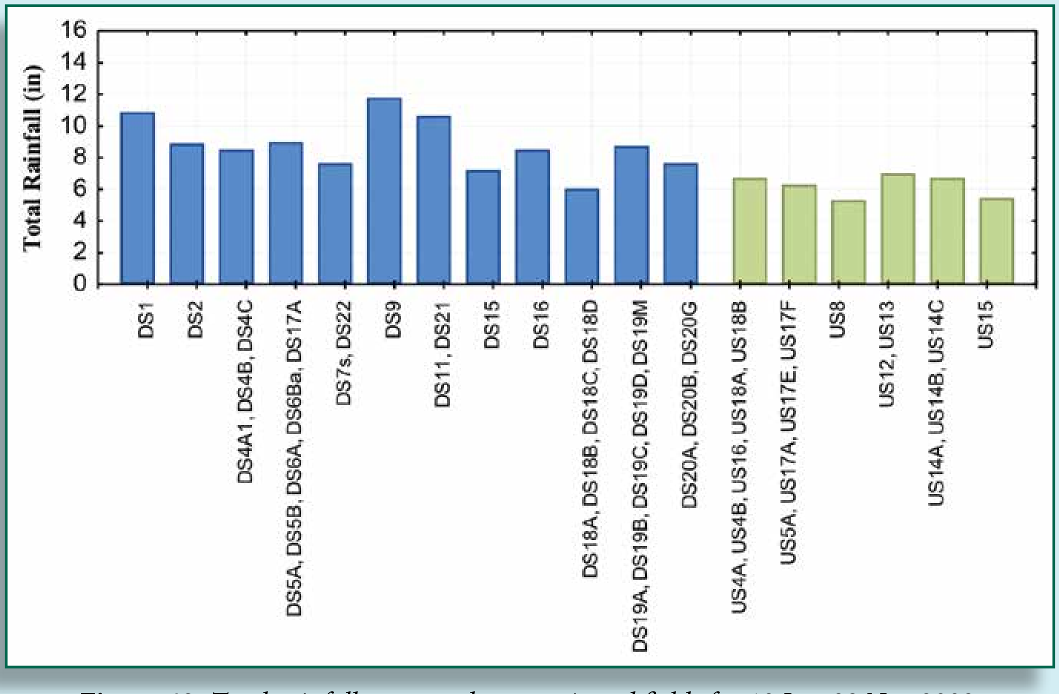


Figure 40. *Total rainfall measured on monitored fields for 12 Jun-29 Nov 2008*

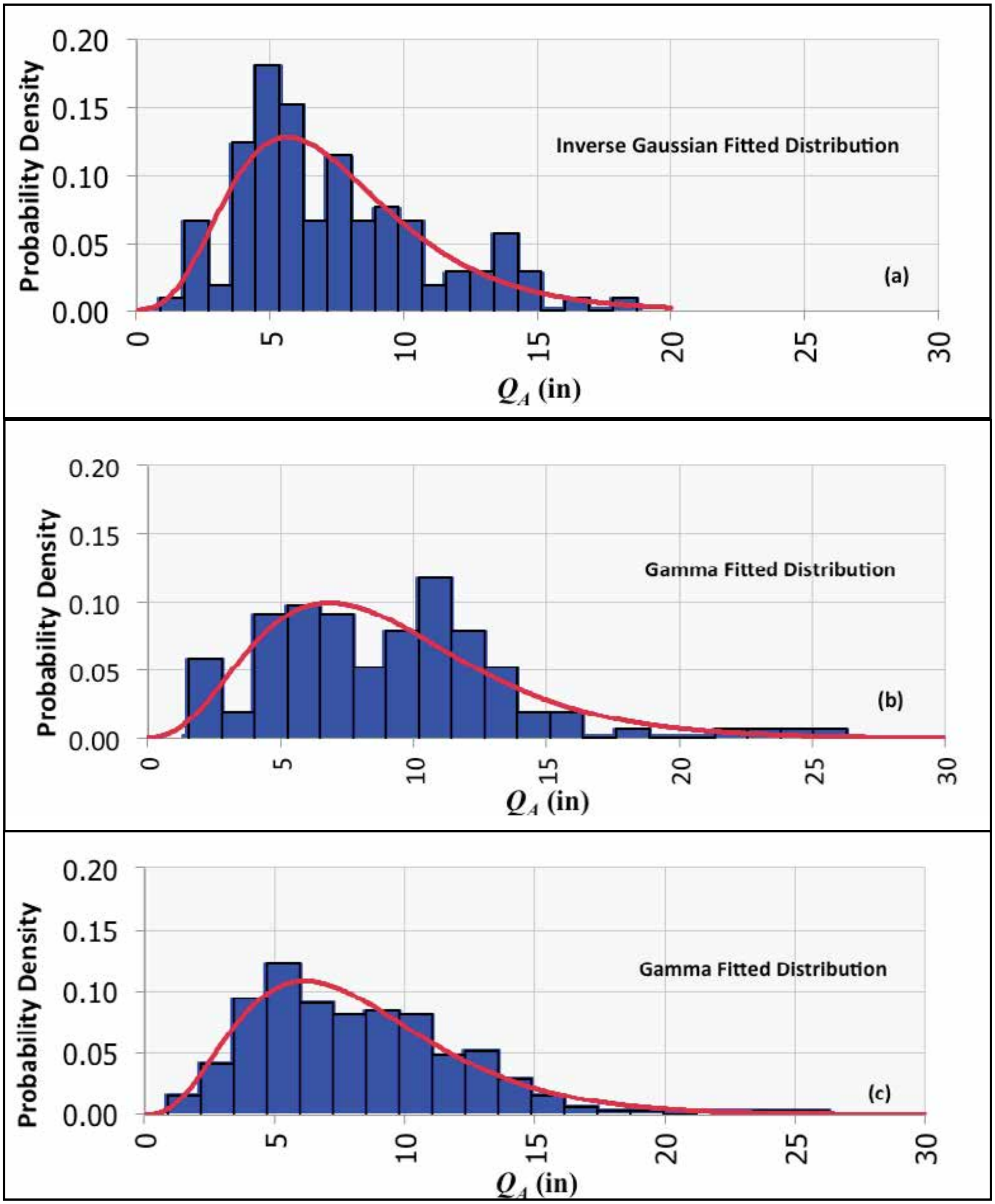


Figure 41. *Histogram and fitted probability distribution of Q_A for (a) Upstream, (b) Downstream, and (c) total surface irrigation events over the entire study period*

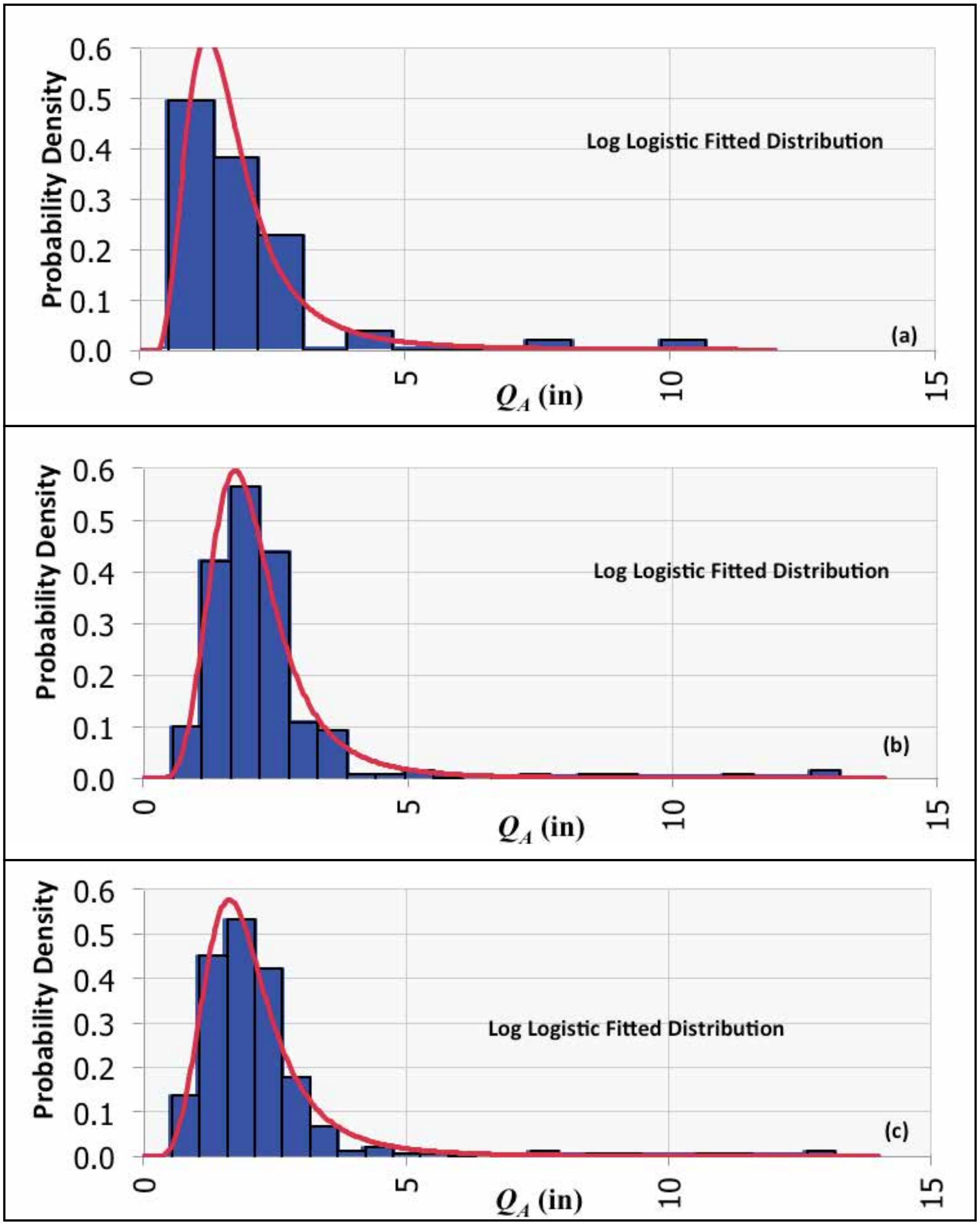


Figure 42. *Histogram and fitted probability distribution of Q_A for (a) Upstream, (b) Downstream, and (c) total sprinkler irrigation events over the entire study period*

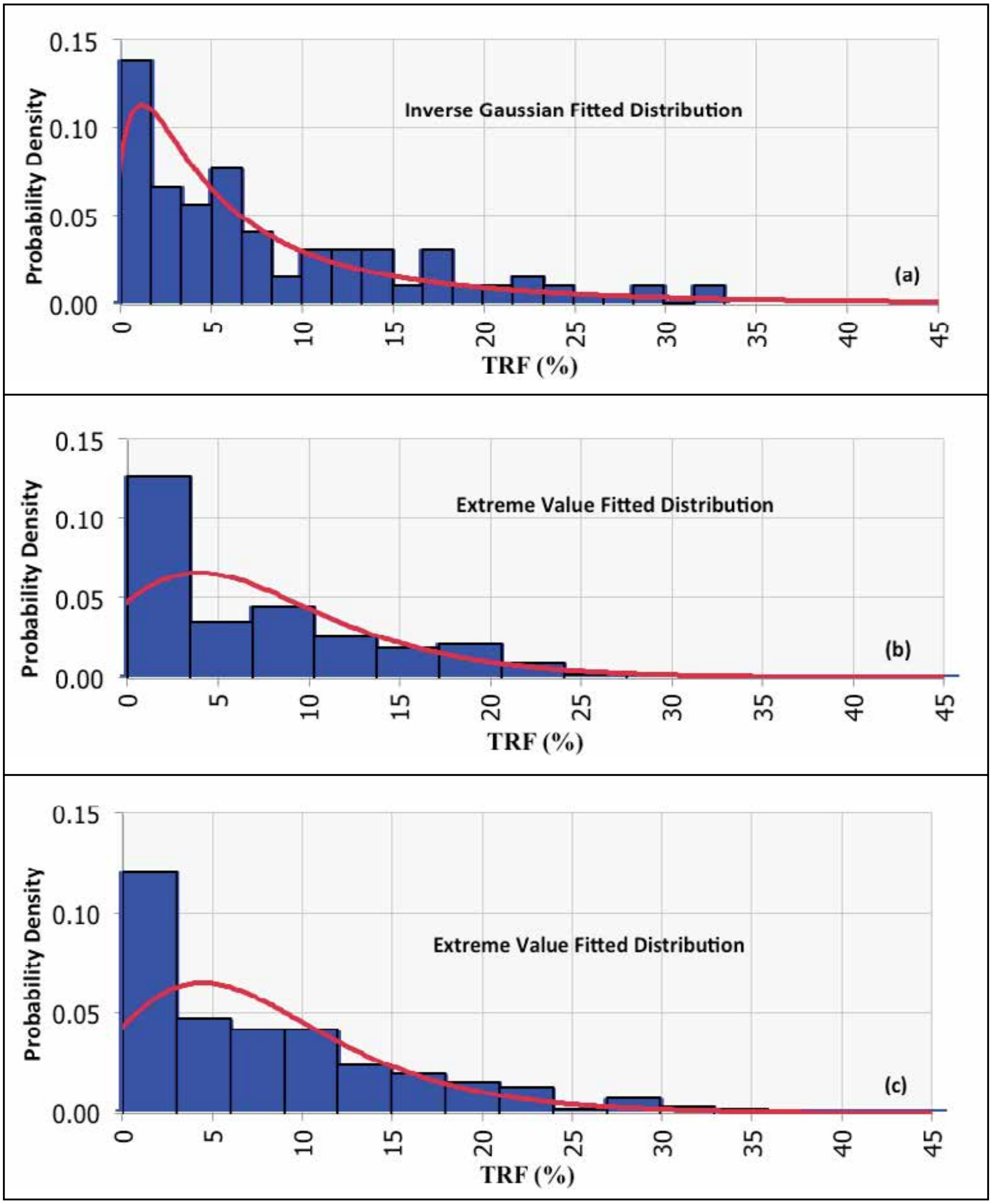


Figure 43. *Histogram and fitted probability distribution of TRF for (a) Upstream, (b) Downstream, and (c) total surface irrigation events over the entire study period*

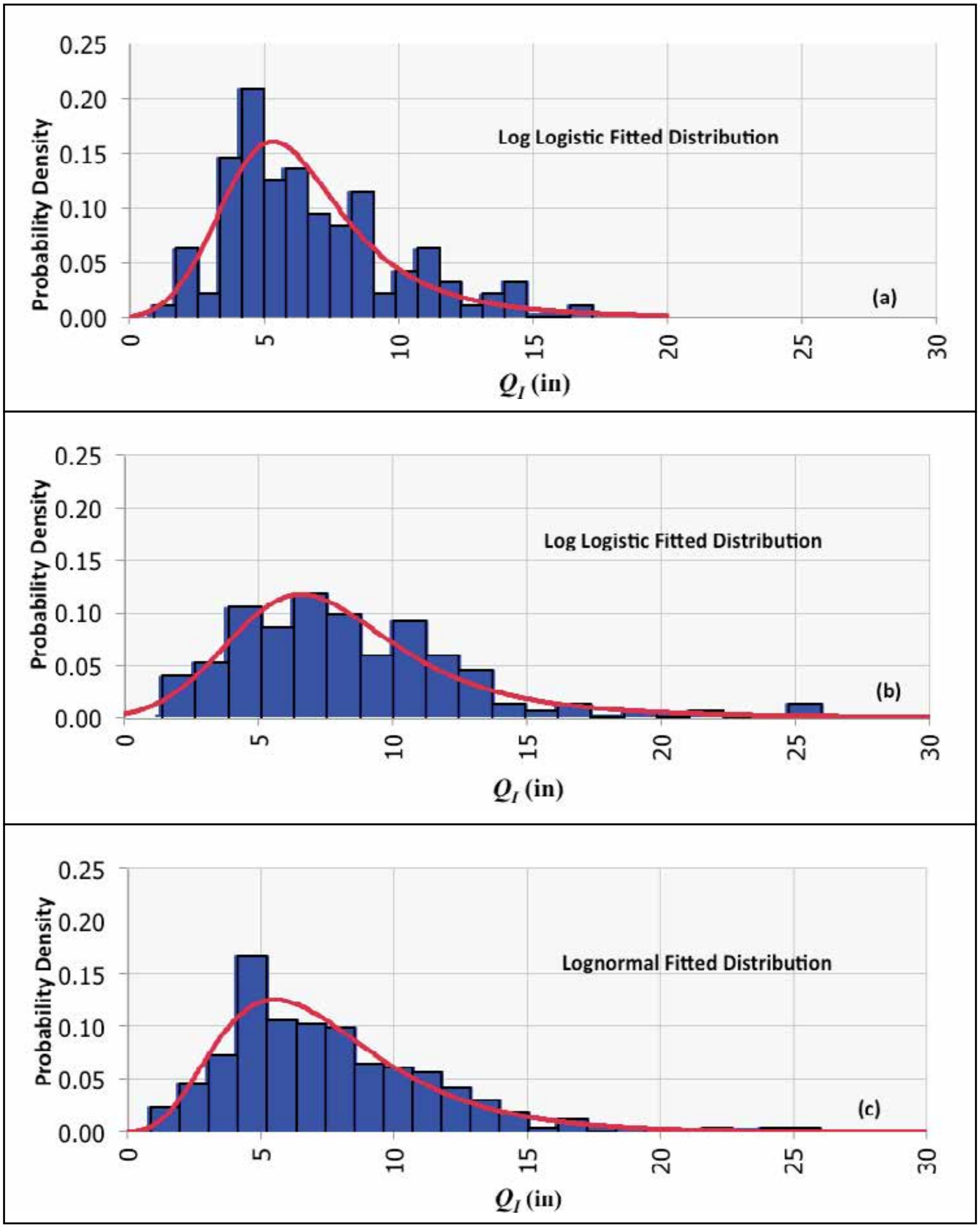


Figure 44. *Histogram and fitted probability distribution of Q_I for (a) Upstream, (b) Downstream, and (c) total surface irrigation events over the entire study period*

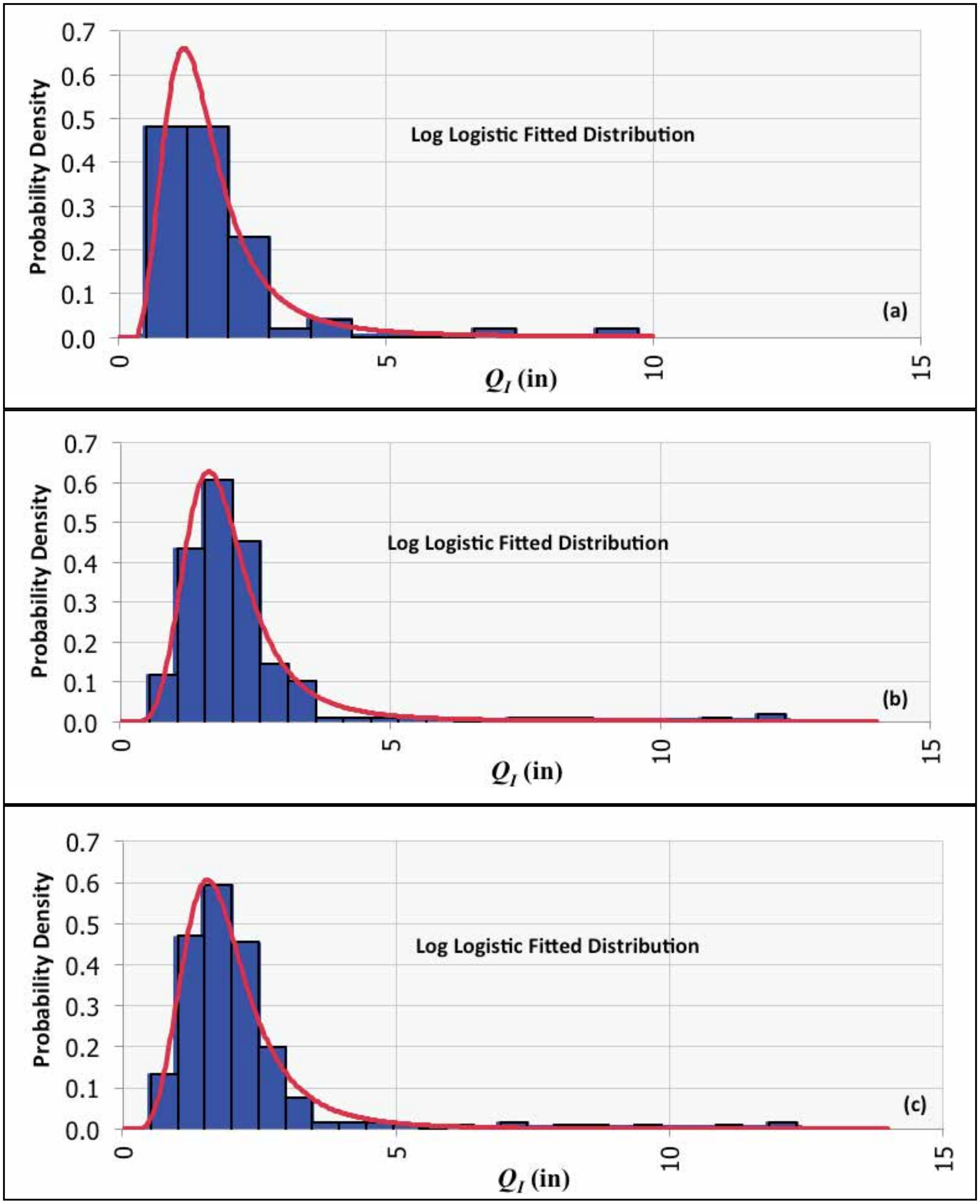


Figure 45. *Histogram and fitted probability distribution of Q_I for (a) Upstream, (b) Downstream, and (c) total sprinkler irrigation events over the entire study period*

Deep Percolation Fraction

Values of DPF (percent) for all surface irrigation events are plotted as frequency histograms and fitted distribution functions in Figure 46 for Upstream fields, Downstream fields, and for all fields. The mean value for the Upstream, Downstream, and total surface irrigation events was 19.5 percent, 27.7 percent, and 24.1 percent, respectively. About 90 percent of total DPF values ranged between about 0.0 percent and 60.0 percent, and the CV for the total events was about 97 percent.

For sprinkler-irrigation events, histograms and fitted probability distribution functions of DPF over the entire study period are shown in Figure 47 for Upstream fields, Downstream fields, and the total of all fields. The mean values of DPF for sprinkler irrigation events monitored on Upstream, Downstream, and total fields were 18.2 percent, 11.6 percent, and 13.0 percent, respectively. For about 90 percent of the total sprinkler irrigation events monitored values of DPF ranged between 0.0 percent and 55.1 percent. The CV of DPF for the total sprinkler irrigation events was about 176 percent.

Crop Evapotranspiration

Daily values of ET_r, ET_p, and ET_a estimated for the overall periods modeled by IDSCU for each irrigated field are summarized in files the available ARIDAD. Example plots of cumulative seasonal ET_r estimated with field atmometers, ET_p calculated using the ASCE Standardized Equation, and ET_a estimated from ReSET, are shown for portions of the 2008 season for fields US4B, US8, and US12 in Figure 48. Figure 49 presents similar plots for fields DS1, DS6B, and DS16. The plots reveal that typically seasonal values of ET_p for particular crops are less than seasonal values of ET_r, reflecting the effects of varying crop types and stages of growth. Also, values of ET_a are less than values of ET_p, possibly indicating the effects of salinity, available soil water, and cultural practices on limiting crop ET.

Upflux from Shallow Groundwater Table

Mean values of Q_U for Upstream, Downstream, and total fields are 8.8 percent, 3.3 percent and 5.5 percent of ET_a, respectively. In about 97 percent of Upstream fields Q_U was estimated to contribute to ET_a. In the Downstream region 84 percent of the monitored fields had Q_U that contributed to ET_a.

Irrigation Application Efficiency

About 90 percent of monitored surface irrigation events had computed values of E_a between 35.2 percent and 97.8 percent. For surface-irrigation events over the entire study period, frequency histograms and fitted probability distribution functions of E_a are shown in Figure 50 for Upstream fields, Downstream fields, and the total of all fields. The mean values for the Upstream, Downstream, and total surface irrigation events were 72.1 percent, 64.9 percent, and 67.9 percent, respectively. There were a number of deficit surface irrigations that were observed during the study, which yielded very little deep percolation and high values of E_a. Values of E_a for sprinkler irrigation events were routinely very high, averaging about 76.9 percent Upstream and 83.5 percent Downstream with an overall average of 82.0 percent, since there were no observed tailwater runoff losses and estimated DP losses typically were very low. Values of E_a for surface and sprinkler irrigation in the LARV are comparable to typical average values of 65 percent for surface graded furrow irrigation and 85 percent for center pivot sprinklers (with spray heads without end guns) reported by Howell (2003). Howell (2003) reports “attainable” efficiencies of 75 percent and 95 percent for these respective irrigation methods.

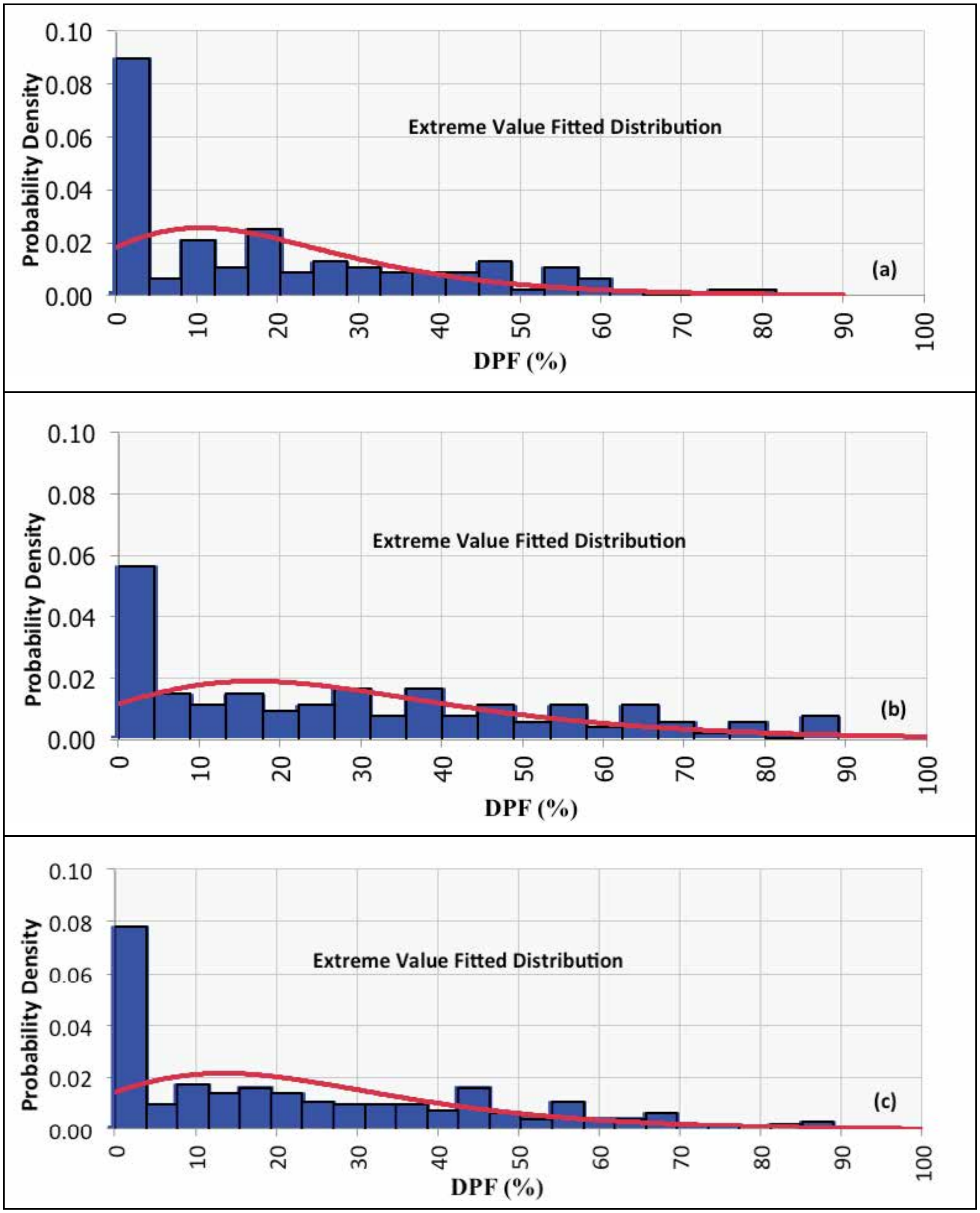


Figure 46. *Histogram and fitted probability distribution of DPF for (a) Upstream, (b) Downstream, and (c) total surface irrigation events over the entire study period*

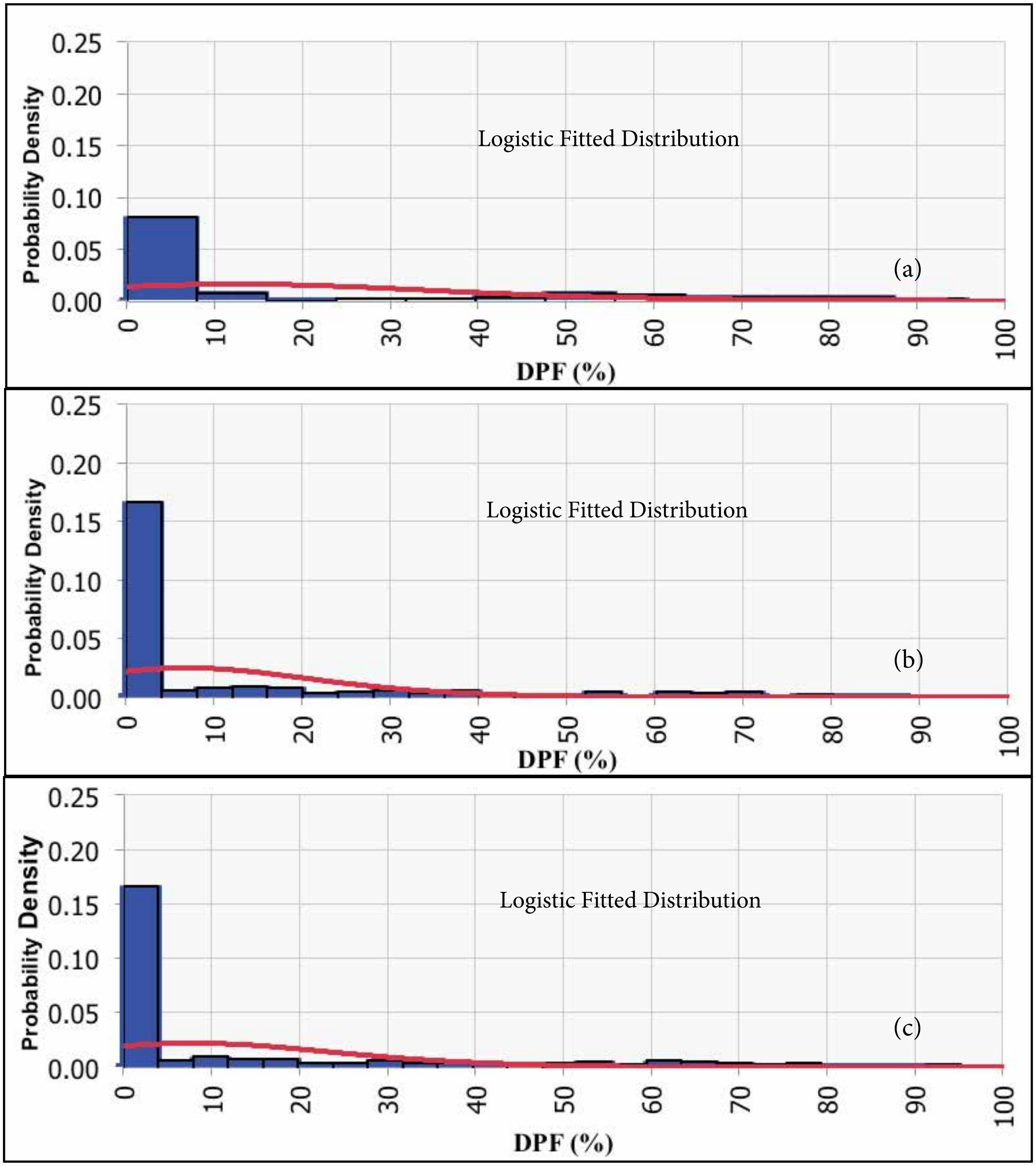


Figure 47. *Histogram and fitted probability distribution of DPF for (a) Upstream, (b) Downstream, and (c) total sprinkler irrigation events over the entire study period*

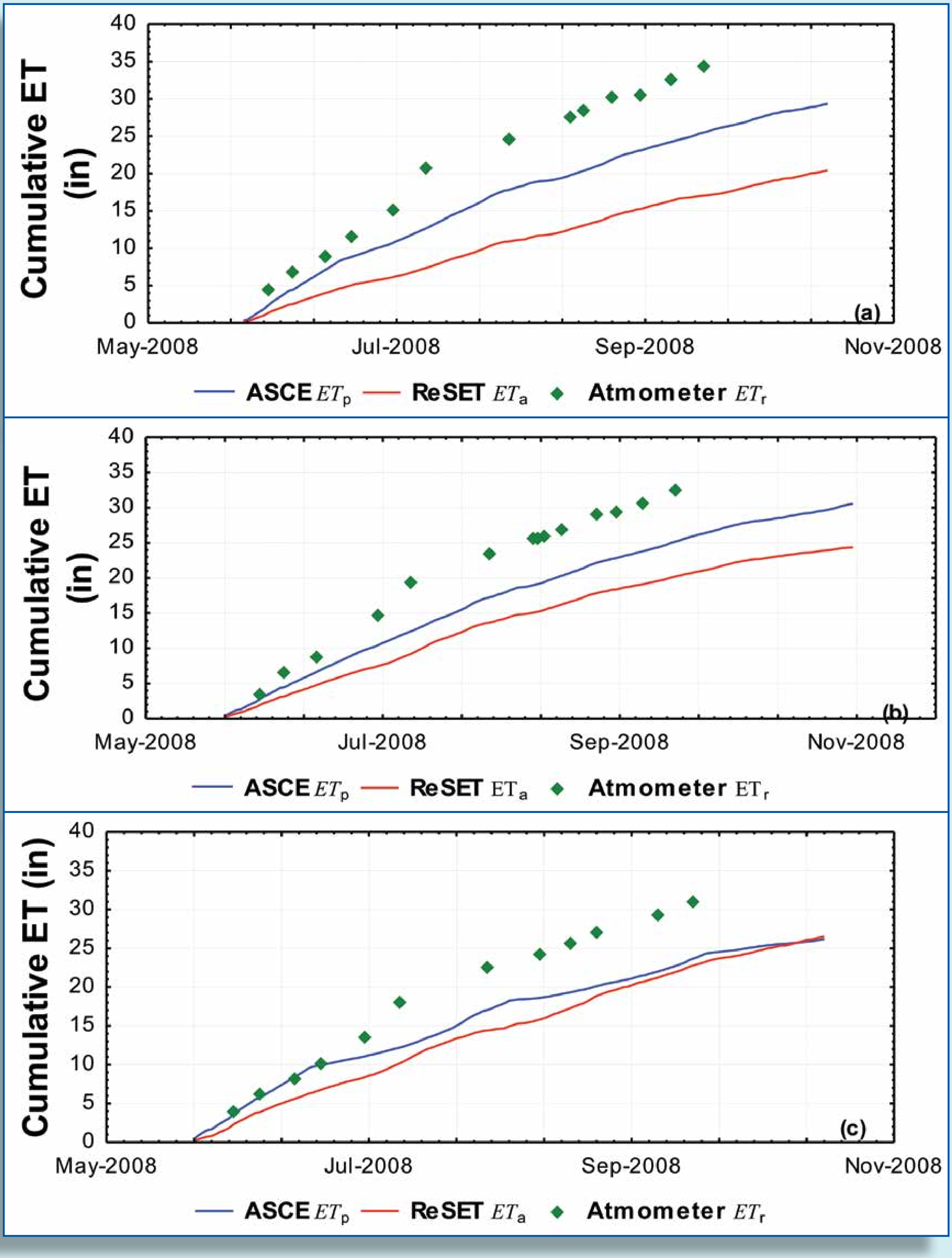


Figure 48. *ET_r estimated from field atmometers, ET_p calculated with the ASCE Standardized Equation, and ET_a estimated with ReSET, for portions of the 2008 irrigation season for (a) field US4B (b) field US8, and (c) field US12*

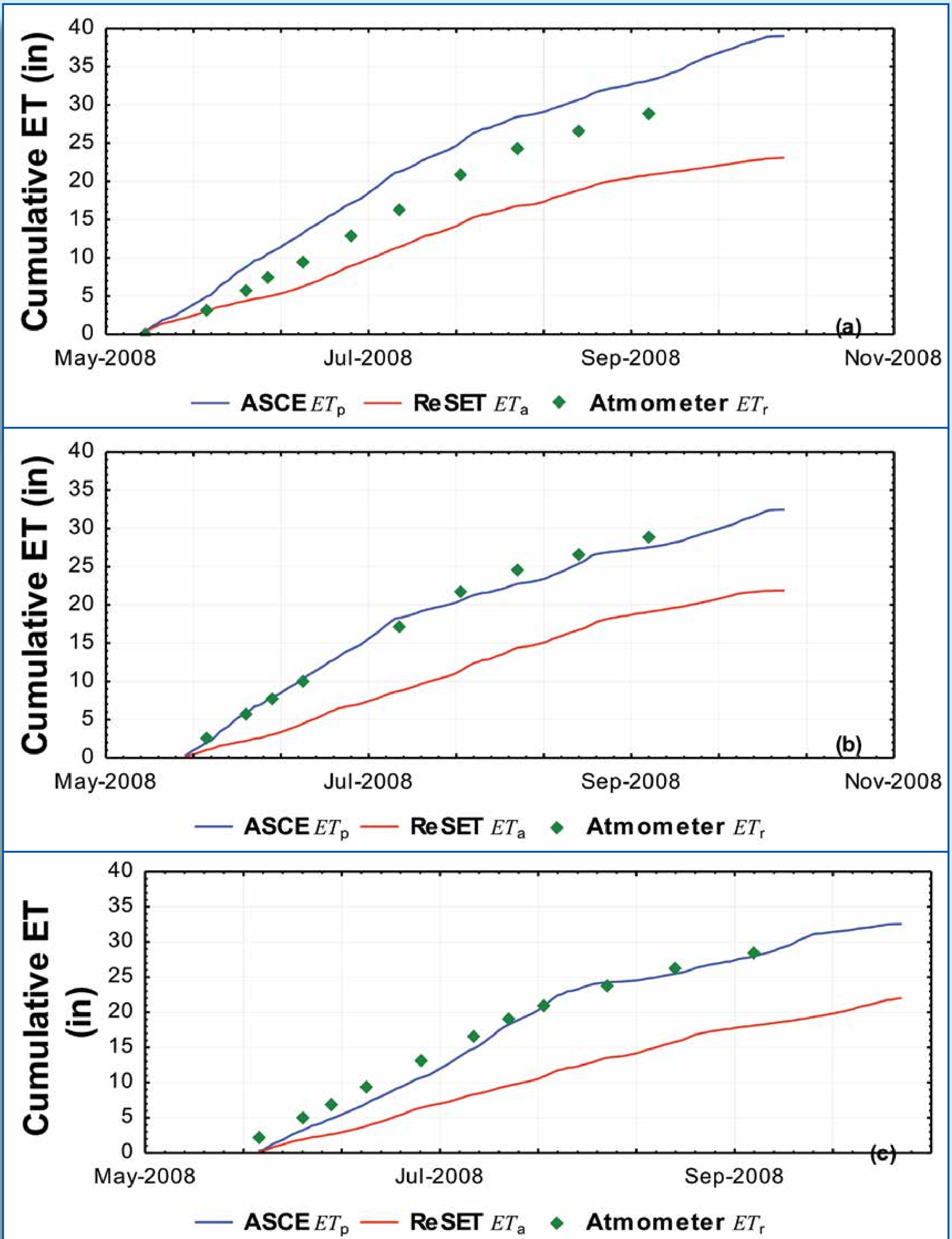


Figure 49. *ET_r estimated from field atmometers, ET_p calculated with the ASCE Standardized Equation, and ET_a estimated with ReSET, for portions of the 2008 irrigation season for (a) field DS1, (b) field DS6B, and (c) field DS16*

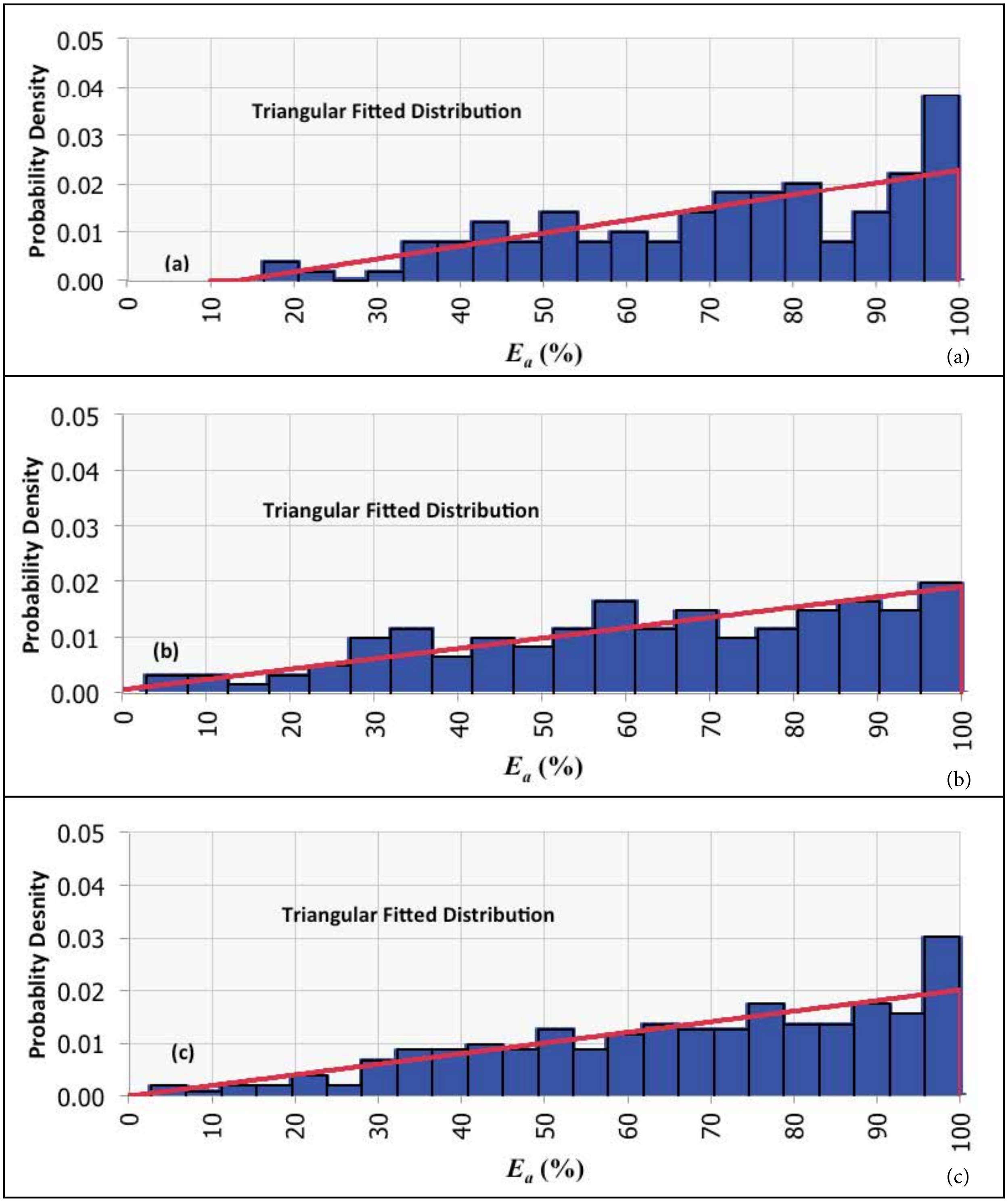


Figure 50. *Histogram and fitted probability distribution of E_a (%) for (a) Upstream, (b) Downstream, and (c) total surface irrigation events over the entire study period*

Salt Concentration and Loading to and from Fields

Summary statistics of estimated TDS concentrations in applied irrigation water and in tail water are presented in Table 9 for a number of surface irrigation events Upstream and Downstream. Similar statistics for sprinkler irrigation events are given in Table 10. TDS levels in sprinkler irrigation water in the Upstream region are markedly higher than those in surface water since the source for all but one of the eight sprinklers is groundwater pumping wells. On the other hand, the sprinklers in the Downstream region are supplied by canal water.

The higher the DPF value for a given irrigation event, the greater is the potential for leaching of salts out of the root zone soil profile. In fact, DPF often is referred to as the "leaching fraction" (Hoffman and Shalhevet 2007). Assuming the overall average DPF value of about 24 percent for surface irrigation, TDS levels in applied surface irrigation in the study regions typically would be acceptable for moderately sensitive crops under well-drained conditions (Pratt and Suarez 1990). However, many of the fields are underlain by shallow saline water tables which contribute upflux of dissolved salt back into the soil root zone. For sprinkler irrigated fields, with average DPF of only 13.0 percent and with higher TDS levels in applied irrigation water, the hazard to crop productivity is even greater, especially for fields irrigated from groundwater pumping wells.

Table 11 presents statistics of estimated salt loads in applied irrigation water, tail water runoff, and infiltrated water for surface irrigation events Upstream and Downstream. Average applied salt load per irrigation event was about 997 lb/ac over all investigated surface irrigated fields Upstream and about 2,480 lb/ac Downstream. Similar statistics are presented in Table 12 for sprinkler irrigation events. Over all investigated sprinkler irrigated fields, average applied salt load per irrigation event was about 1,217 lb/ac Upstream and about 446 lb/ac Downstream.

Field Soil Water Salinity

Box and whisker summary plots of the statistics of EC_e values estimated from EM38 surveys conducted midseason (typically July or August) on Upstream fields are presented in Figures 51 and 52. Figures 53 - 55 present the EC_e estimated from midseason EM38 surveys conducted on Downstream fields. Figure 56 presents example contour maps of EC_e for two surveyed fields. Similar maps of soil water salinity for surveys on the other fields are provided in files on the available ARIDAD.

The average EC_e in monitored fields within the Upstream Study Region ranged from 1.8 dS/m to 9.3 dS/m over all surveys conducted during the study period. Averages in Downstream fields were considerably higher, ranging from 2.7 dS/m to 12 dS/m. Figures 51 - 55 indicate that many of the fields contained areas where soil salinity exceeded the threshold of three to five dS/m above which crop yields typically are reduced for corn and alfalfa. Preliminary data on crop yields in relation to EC_e are presented in a following section.

Table 9. *TDS in applied irrigation water and tail water for investigated surface irrigation events Upstream and Downstream*

Year	Number of Irrigation Events	TDS (mg/L) Minimum	Maximum	Average
Upstream Study Region				
Applied Irrigation Water				
2004	8	521.7	975.7	633.9
2005	57	300.4	710.1	424.6
2006	41	172.8	5421.9	795.1
2008	24	115.5	1059.5	304.5
All Years	130	115.5	5421.9	532.2
Tail Water				
2004	-	-	-	-
2005	-	-	-	-
2006	-	-	-	-
2008	20	160.6	1040.8	409.7
All Years	20	160.6	1040.8	409.7
Downstream Study Region				
Applied Irrigation Water				
2004	5	842.5	1078.4	975.1
2005	29	692.7	3107.3	1308.0
2006	33	628.2	2657.3	1340.2
2007	37	158.9	3140.4	1090.2
2008	44	525.8	3175.3	987.7
All years	148	158.9	3175.3	1154.3
Tail Water				
2004	-	-	-	-
2005	-	-	-	-
2006	-	-	-	-
2007	9	756.5	1419.1	1037.3
2008	11	471.2	1354.9	969.2
All years	20	471.2	1419.1	999.9

Table 10. *TDS in applied irrigation water and tail water for investigated sprinkler irrigation events Upstream and Downstream*

Year	Number of Irrigation Events	TDS (mg/L) Minimum	Maximum	Average
Upstream Study Region				
Applied Irrigation Water				
2004	-	-	-	-
2005	15	511.3	4157.2	1264.9
2006	15	336.8	3509.5	1239.6
2008	38	298.6	2888.6	1692.2
All Years	68	298.6	4157.2	1498.1
Tail Water				
2004	-	-	-	-
2005	-	-	-	-
2006	-	-	-	-
2008	-	-	-	-
All Years	-	-	-	-
Downstream Study Region				
Applied Irrigation Water				
2004	N/A	N/A	N/A	N/A
2005	12	691.9	899.1	783.7
2006	27	628.2	1559.8	1031.7
2007	54	67.5	1592.4	864.5
2008	150	483.1	2884.2	816.0
All years	243	67.5	2884.2	849.1
Tail Water				
2004	-	-	-	-
2005	-	-	-	-
2006	-	-	-	-
2007	-	-	-	-
2008	-	-	-	-
All years	-	-	-	-

Table 11. *Salt load in applied irrigation water, tail water, and infiltrated water for investigated surface irrigation events Upstream and Downstream*

	Salt Load (lb/ac)				Salt Load (lb/ac)		
Year	Minimum	Maximum	Average	Year	Minimum	Maximum	Average
Upstream Study Region				**Downstream Study Region**			
Applied Irrigation Water				**Applied Irrigation Water**			
2004	507.5	1672.5	1015.0	2004	657.0	850.3	744.6
2005	187.8	1909.4	676.3	2005	353.4	8226.9	3056.7
2006	72.6	11813.6	1617.5	2006	220.1	9945.9	2587.2
2007	-	-	-	2007	4.0	10522.7	2609.0
2008	92.5	4491.8	691.1	2008	308.9	7349.7	2108.3
All Years	72.6	11813.6	996.7	All years	4.0	10522.7	2480.0
Tail Water				**Tail Water**			
2004	-	-	-	2004	-	-	-
2005	-	-	-	2005	-	-	-
2006	-	-	-	2006	-	-	-
2007	-	-	-	2007	95.4	505.4	253.3
2008	0.0	357.9	83.9	2008	17.6	503.4	259.3
All Years	0.0	357.9	83.9	All years	17.6	505.4	256.6
Infiltrated Water				**Infiltrated Water**			
2004	-	-	-	2004	-	-	-
2005	-	-	-	2005	-	-	-
2006	-	-	-	2006	-	-	-
2007	-	-	-	2007	1126.8	505.4	2562.4
2008	92.1	4133.9	642.6	2008	625.1	503.4	1747.6
All Years	92.1	4133.9	642.6	All years	625.1	505.4	2114.3

Table 12. *Salt load in applied irrigation water, tail water, and infiltrated water for investigated sprinkler irrigation events Upstream and Downstream*

	Salt Load (lb/ac)				Salt Load (lb/ac)		
Year	Minimum	Maximum	Average	Year	Minimum	Maximum	Average
Upstream Study Region				**Downstream Study Region**			
Applied Irrigation Water				**Applied Irrigation Water**			
2004	N/A	N/A	N/A	2004	-	-	-
2005	145.8	18429.9	2657.3	2005	126.9	848.8	337.0
2006	103.3	1844.2	475.9	2006	154.8	1172.8	525.6
2007	-	-	-	2007	0.3	4118.7	439.7
2008	56.9	6983.4	940.2	2008	0.0	2666.0	442.5
All Years	56.9	18429.9	1216.6	All years	0.0	4118.7	445.9
Tail Water				**Tail Water**			
2004	-	-	-	2004	-	-	-
2005	-	-	-	2005	-	-	-
2006	-	-	-	2006	-	-	-
2007	-	-	-	2007	-	-	-
2008	-	-	-	2008	-	-	-
All Years	-	-	-	All years	-	-	-
Infiltrated Water				**Infiltrated Water**			
2004	-	-	-	2004	-	-	-
2005	-	-	-	2005	-	-	-
2006	-	-	-	2006	-	-	-
2007	-	-	-	2007	-	-	-
2008	-	-	-	2008	-	-	-
All Years	-	-	-	All years	-	-	-

Water Table Depth and Salinity

Values of D_{wt} and EC measured in wells within the monitored fields reveal significant variability over the seasons, within each season, and from field to field. Figure 57 illustrates D_{wt} readings for wells in field DS11 during 2008, illustrating the degree of spatial and temporal variability within the fields. Figures 58 through 61 present “box and whisker” plots of averaged D_{wt} measured in Upstream and Downstream fields over the study period. These values represent averages over all wells within a given field and indicate the degree of temporal variability within the respective irrigation seasons. Dry well observations were not considered in this analysis. Fields not displayed on Figures 58 through 61 had wells that were dry for the entire observation period.

Figure 62 depicts an example of seasonal variation of EC among wells for field DS11 during 2008. Box and whisker plots of average EC measured on Upstream and Downstream fields over the study period are given in Figures 63 through 66, respectively. These EC values are averaged among all wells in a particular field. Fields not displayed on Figures 63 through 66 had wells that were dry for the entire observation period.

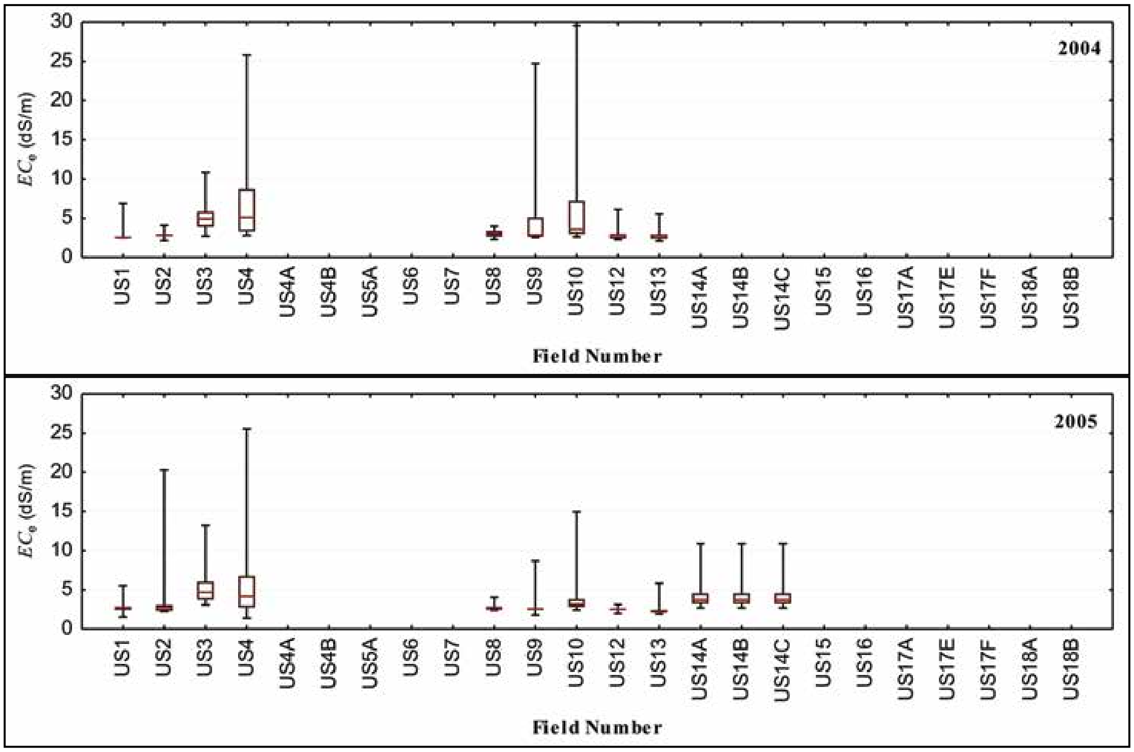


Figure 51. *Box and whisker plots of EC_e estimated from midseason EM38 surveys on monitored fields in the Upstream Study Region in 2004 and 2005. Midline represents the median value; upper and lower edges of box represent 75 percentile and 25 percentile values, respectively; and upper and lower whiskers represented maximum and minimum values, respectively.*

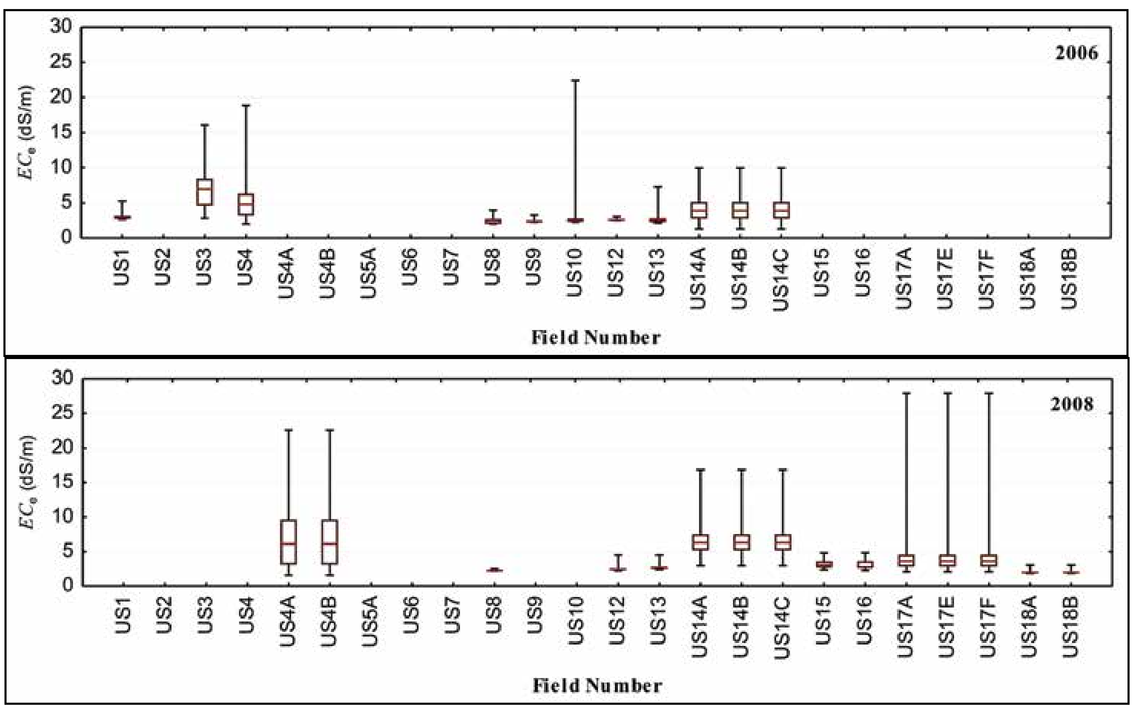


Figure 52. *Box and whisker plots of EC_e estimated from midseason EM38 surveys on monitored fields in the Upstream Study Region in 2006 and 2008. Midline represents the median value; upper and lower edges of box represent 75 percentile and 25 percentile values, respectively; and upper and lower whiskers represented maximum and minimum values, respectively. Plots for fields US4, US5A, US9, US12, US14A, US14B, and US14C for 2006 are for values surveyed in June (July or August surveys were not available). The plot for field US7 for 2006 is based upon values surveyed during November.*

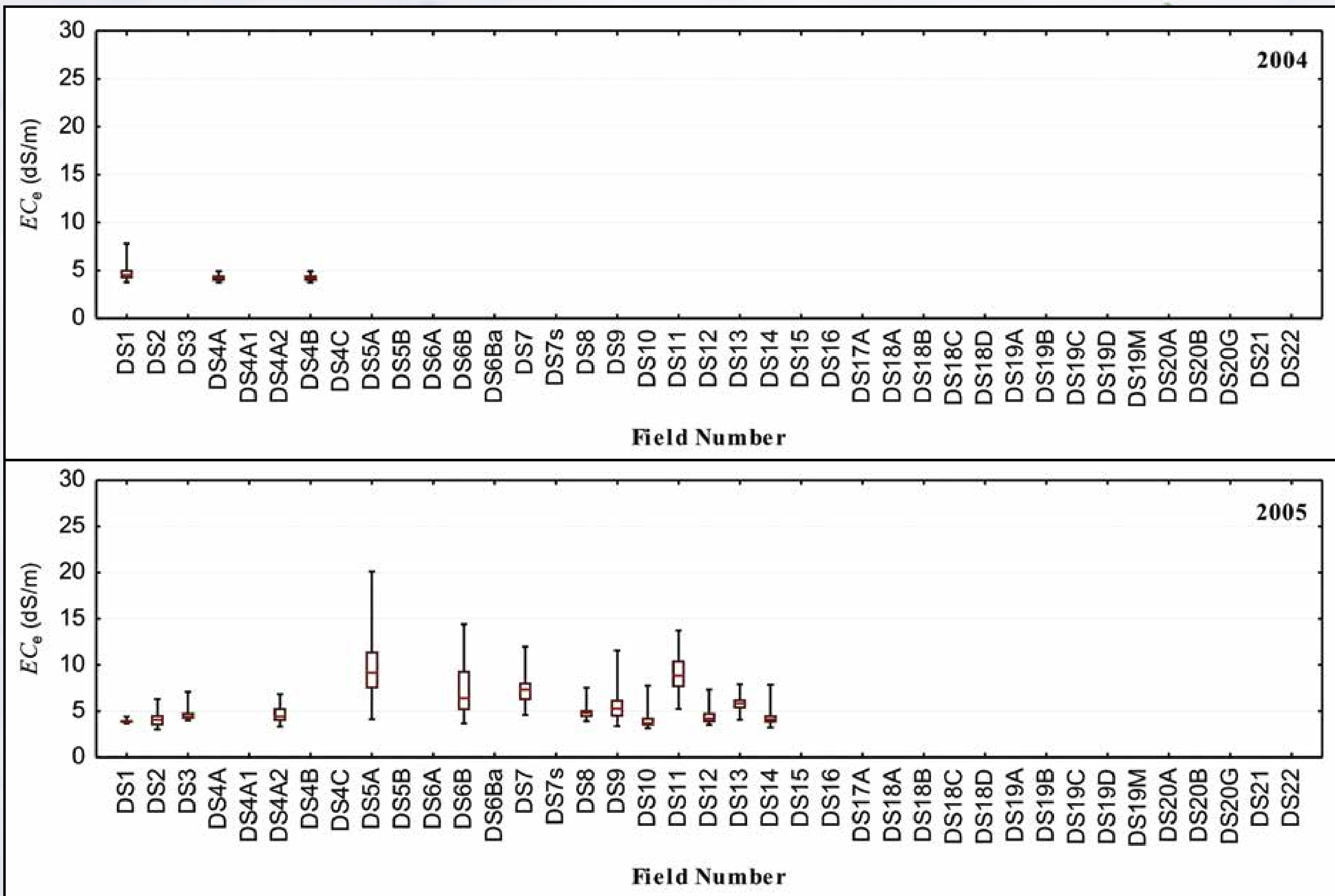


Figure 53. *Box and whisker plots of EC_e estimated from midseason EM38 surveys on monitored fields in the Downstream Study Region in 2004 and 2005. Midline represents the median value; upper and lower edges of box represent 75 percentile and 25 percentile values, respectively; and upper and lowerwhiskers represented maximum and minimum values, respectively.*

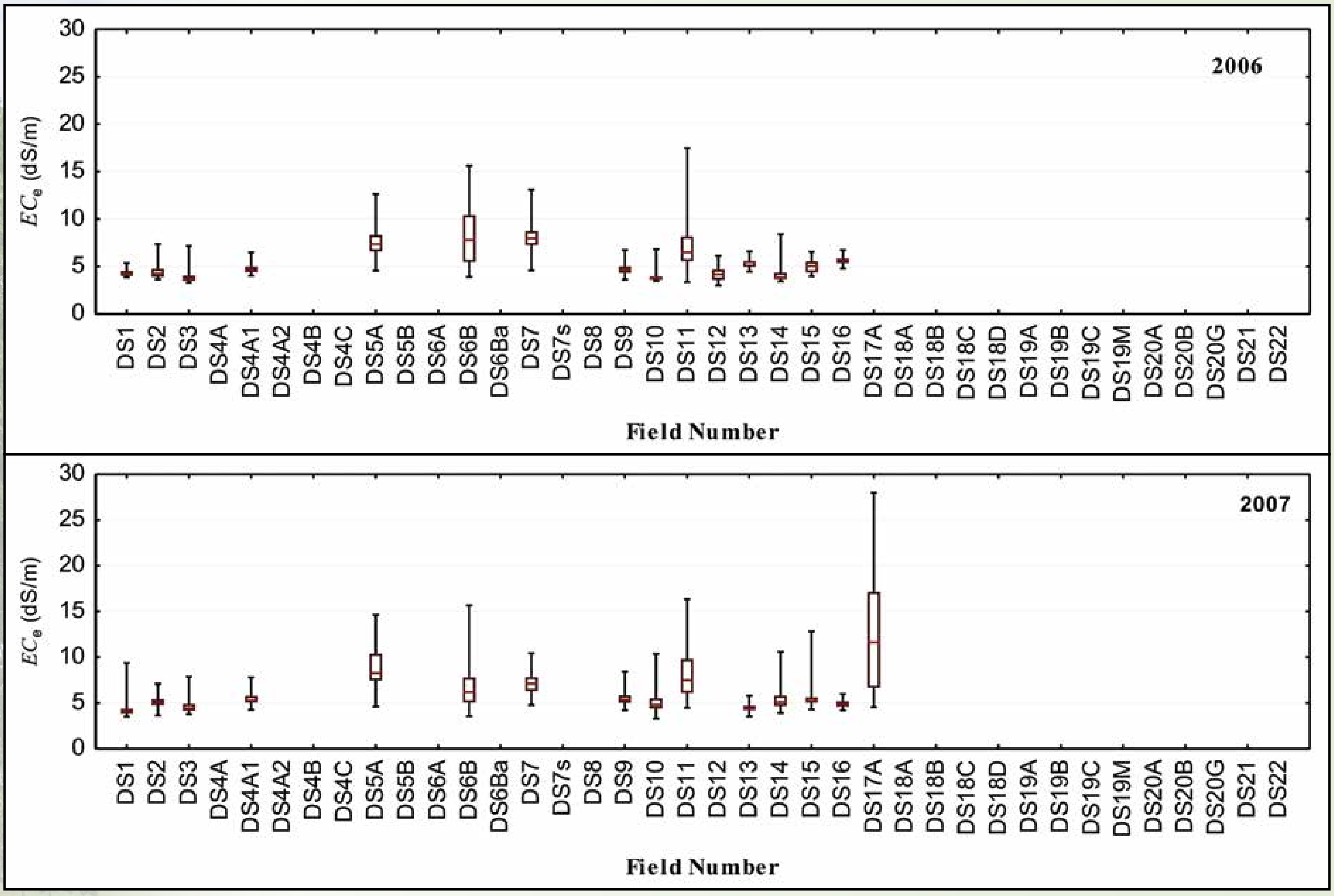


Figure 54. *Box and whisker plots of EC_e estimated from midseason EM38 surveys on monitored fields in the Downstream Study Region in 2006 and 2007. Midline represents the median value; upper and lower edges of box represent 75 percentile and 25 percentile values, respectively; and upper and lower whiskers represented maximum and minimum values, respectively. The plot for field DS1 for 2006 are for values surveyed in June (July or August surveys were not available), for field DS13 for values surveyed during May, and for fields DS15 and DS16 for values surveyed during December.*

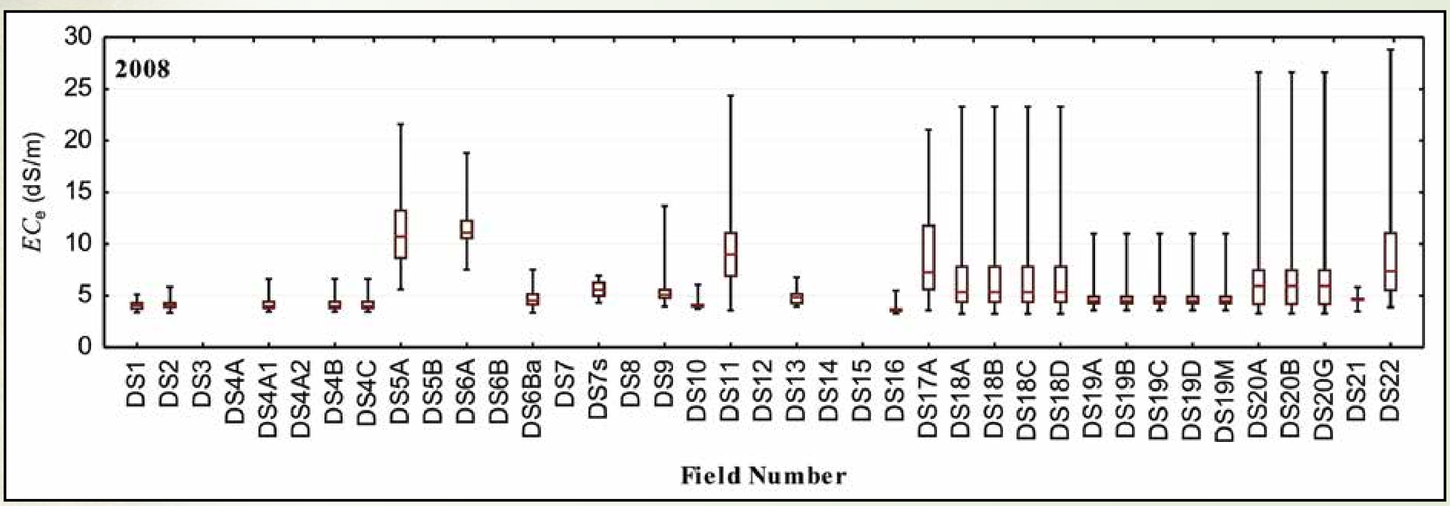
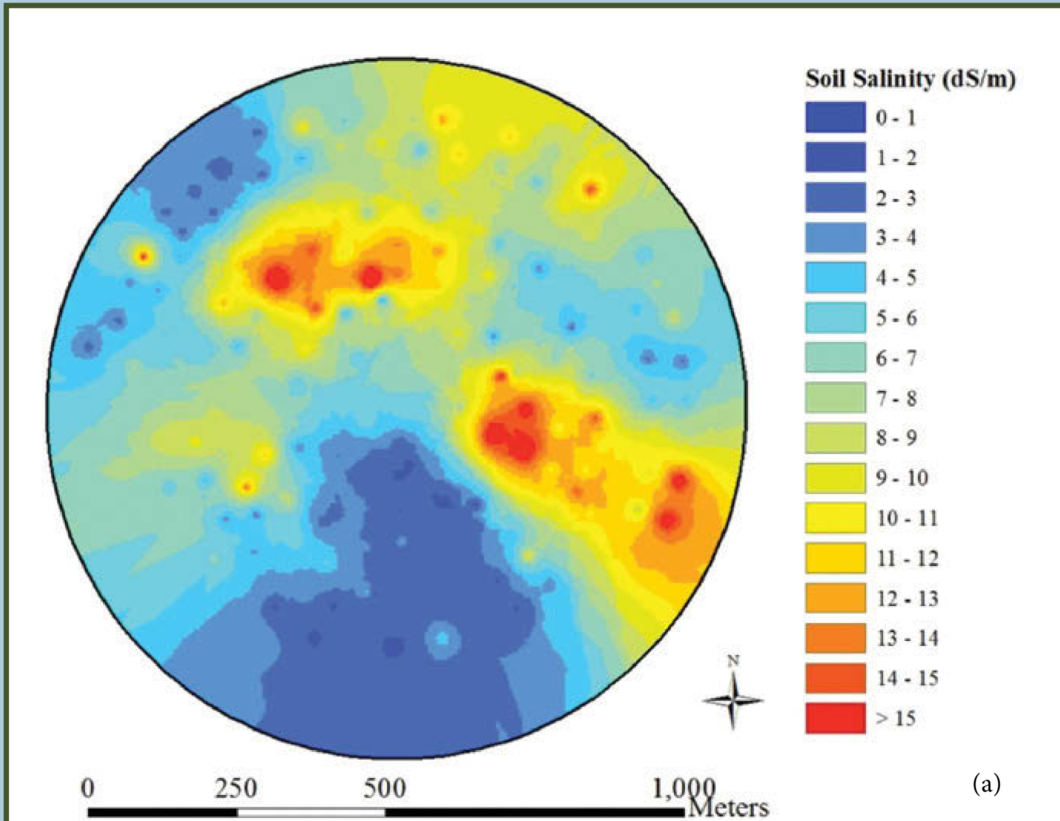


Figure 55. *Box and whisker plots of EC_e estimated from midseason EM38 surveys on monitored fields in the Downstream Study Region in 2008. Midline represents the median value; upper and lower edges of box represent 75 percentile and 25 percentile values, respectively; and upper and lower whiskers represented maximum and minimum values, respectively.*



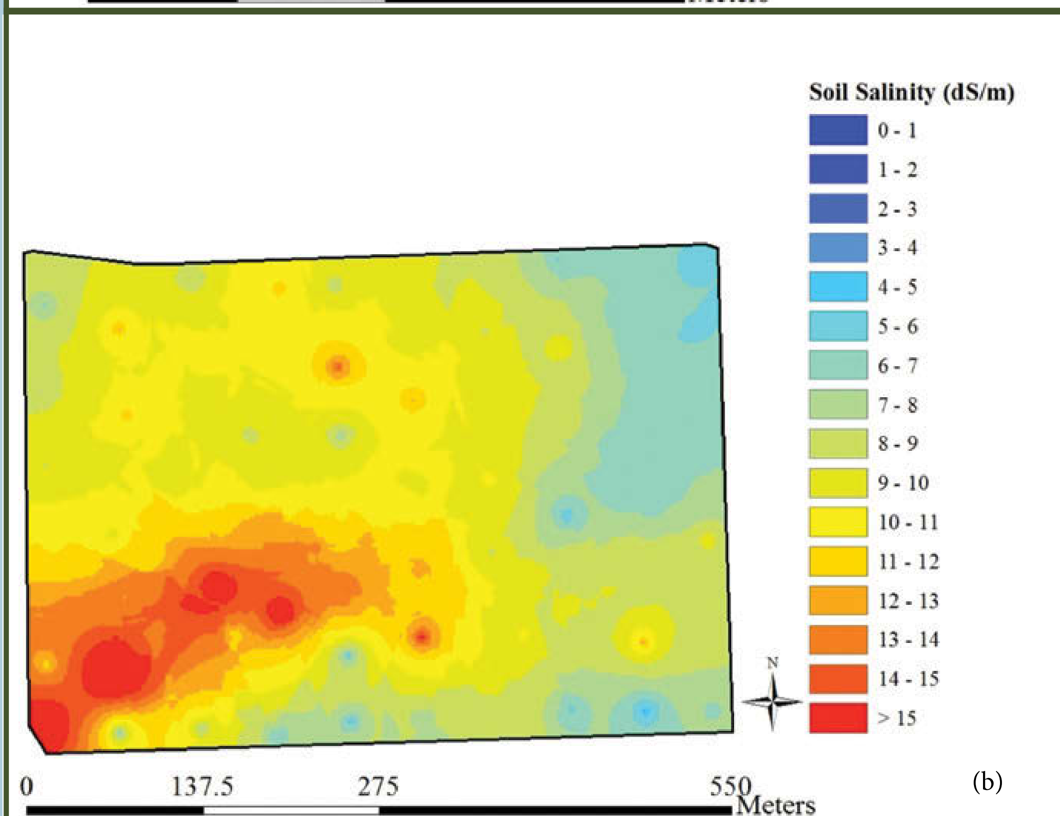


Figure 56. *Color contour maps of EC_e estimated from (a) the July 8, 2008 EM38 survey for field US04, and (b) the June 3, 2008 EM38 survey for field DS11*

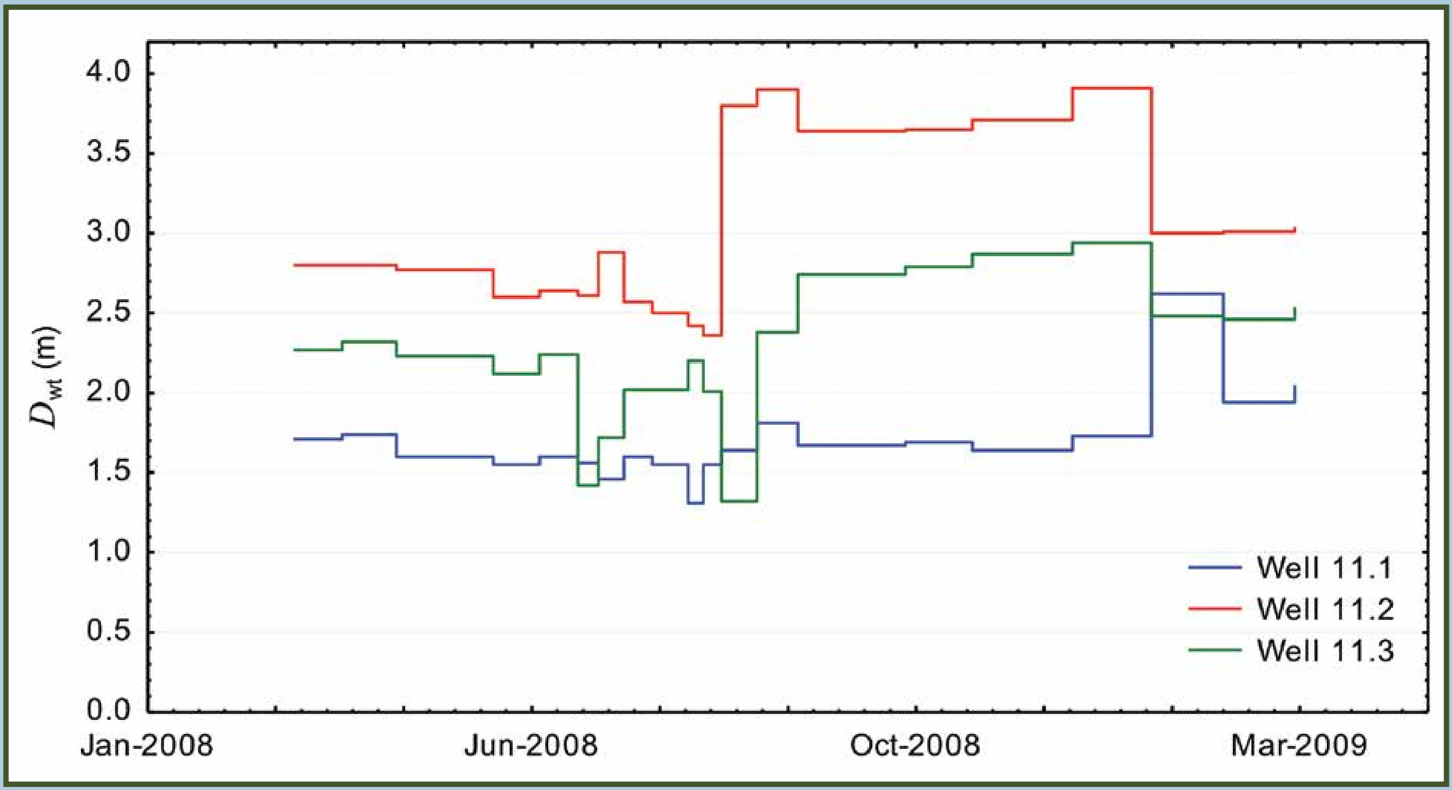


Figure 57. *Seasonal variation of D_{wt} in three wells within field DS11 during 2008 and into spring 2009*

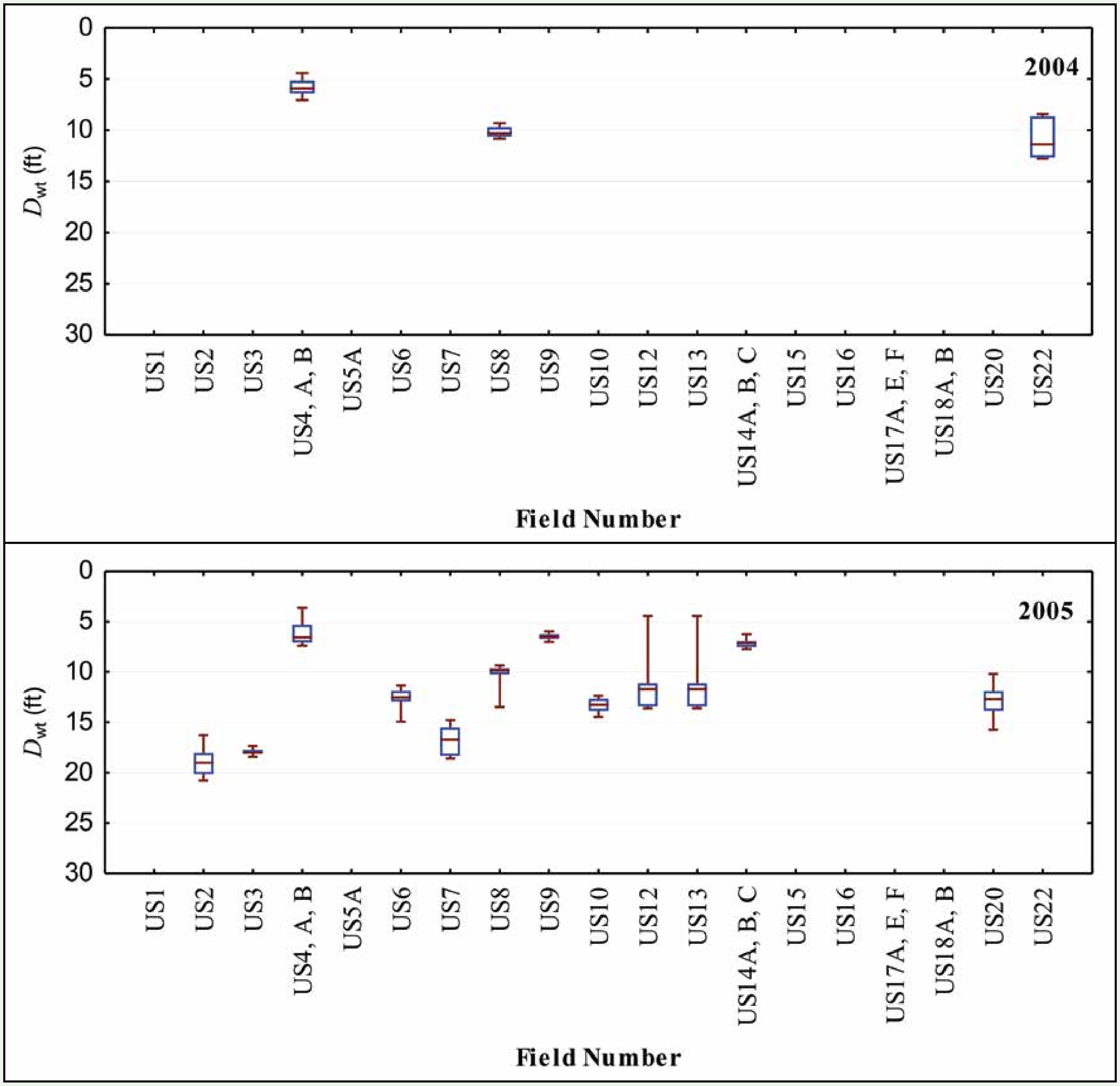


Figure 58. *Box and whisker plots of D_{wt} values measured on fields in the Upstream Study Region for years 2004 and 2005. Midline represents the median value; upper and lower edges of box represent 75 percentile and 25 percentile values, respectively; and upper and lower whiskers represented maximum and minimum values, respectively.*

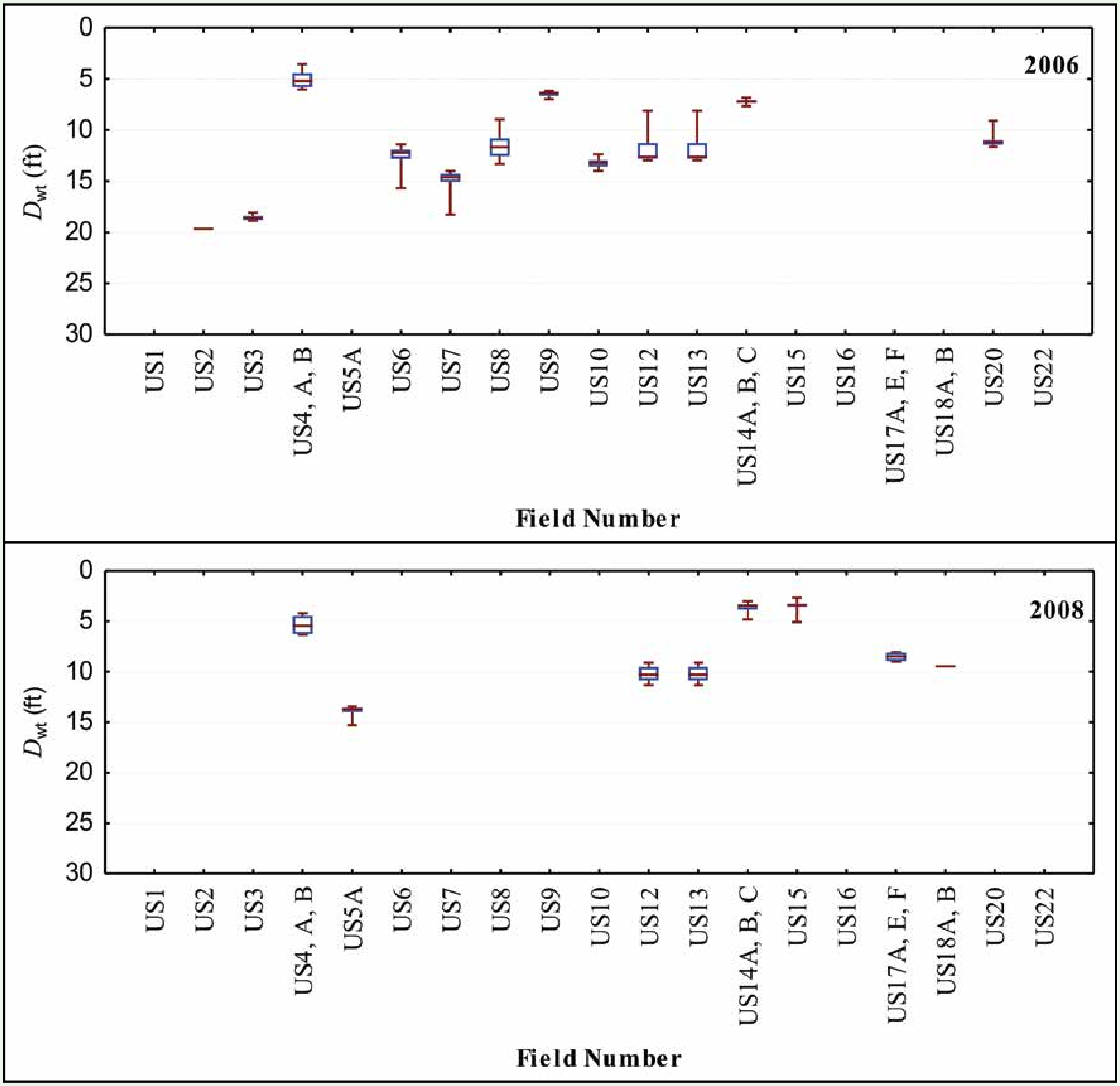


Figure 59. *Box and whisker plots of D_{wt} values measured on fields in the Upstream Study Region for years 2006 and 2008. Midline represents the median value; upper and lower edges of box represent 75 percentile and 25 percentile values, respectively; and upper and lower whiskers represented maximum and minimum values, respectively.*

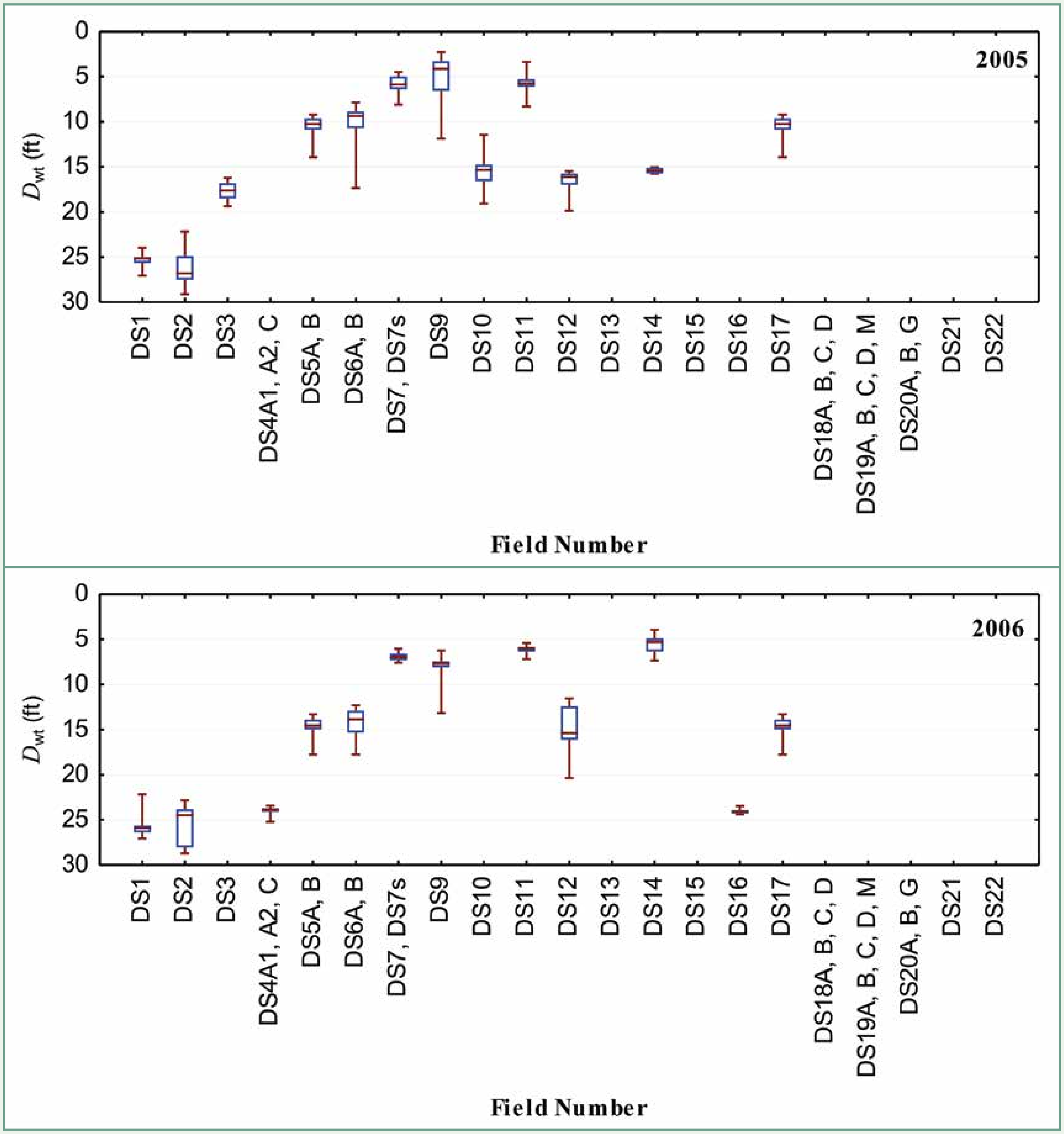


Figure 60. *Box and whisker plots of D_{wt} values measured on fields in the Downstream Study Region for years 2005 and 2006. Midline represents the median value; upper and lower edges of box represent 75 percentile and 25 percentile values, respectively; and upper and lower whiskers represented maximum and minimum values, respectively.*

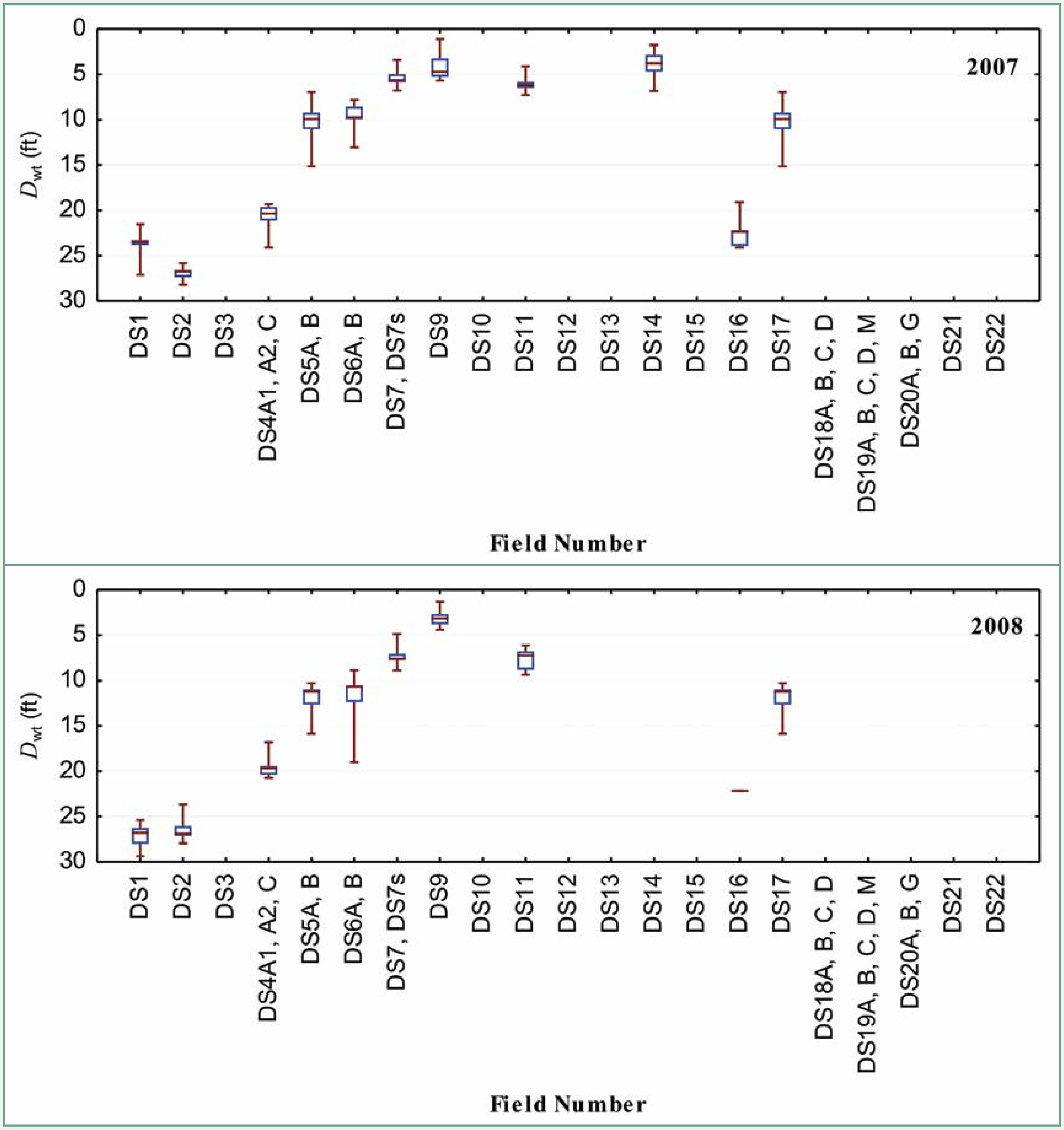


Figure 61. *Box and whisker plots of D_{wt} values measured on fields in the Downstream Study Region for years 2005, 2006, 2007, and 2008. Midline represents the median value; upper and lower edges of box represent 75 percentile and 25 percentile values, respectively; and upper and lower whiskers represented maximum and minimum values, respectively.*

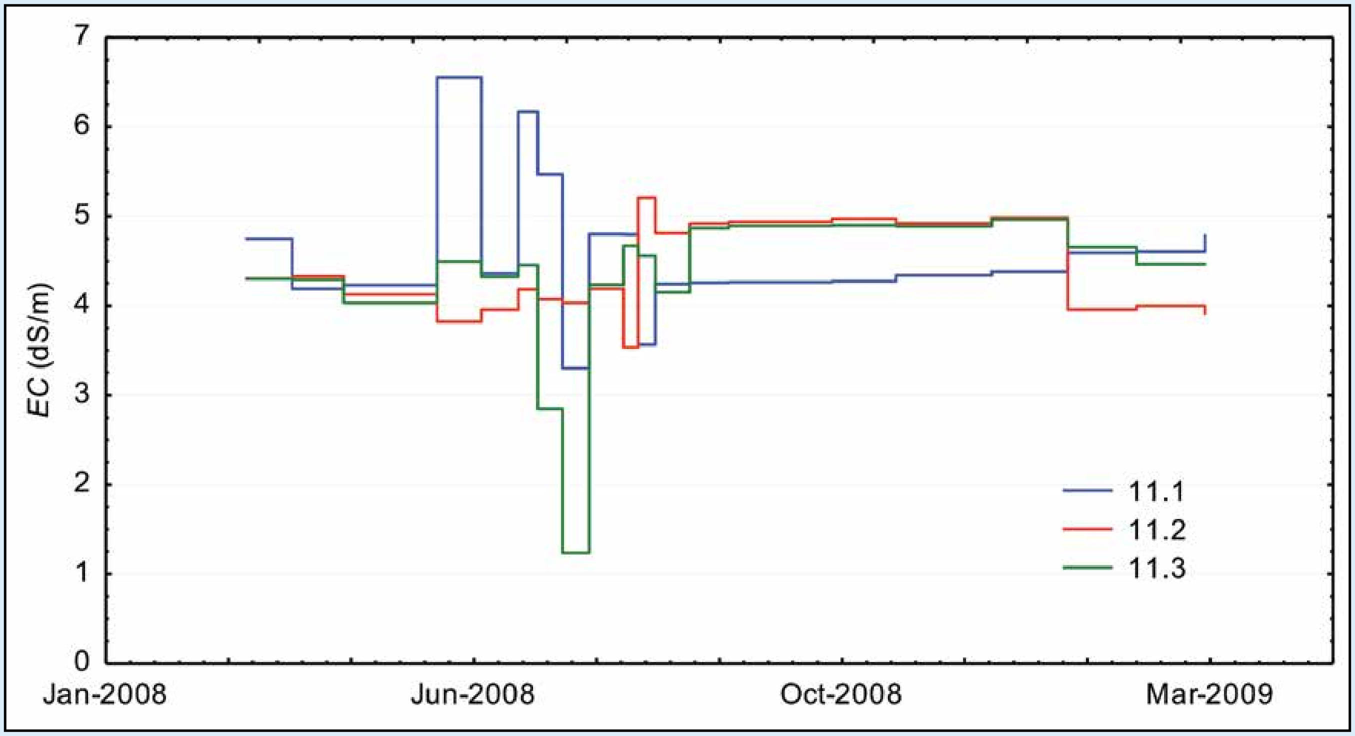


Figure 62. *Seasonal variation of EC in three wells within field DS11 during 2008 and into spring 2009*

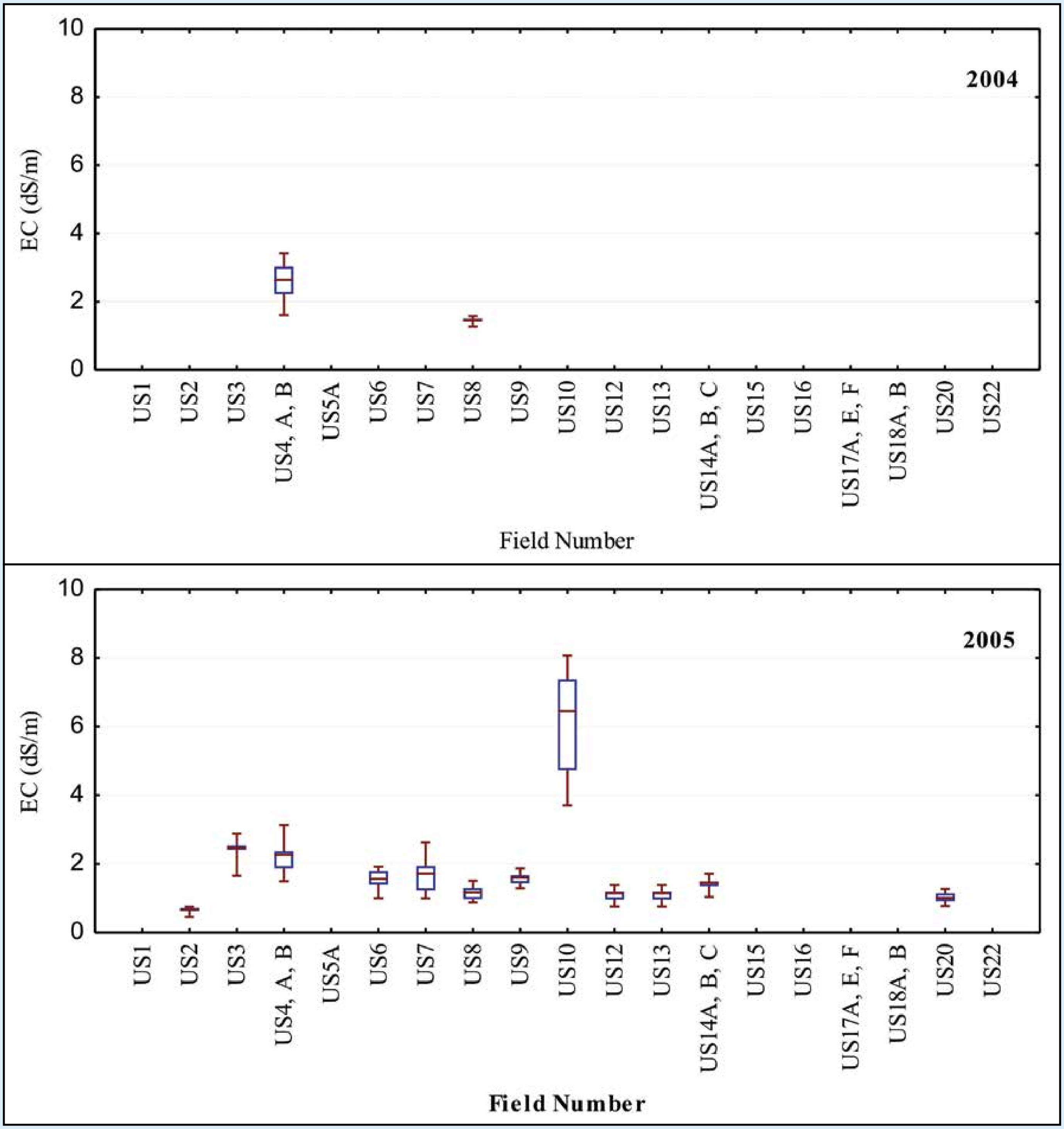


Figure 63. *Box and whisker plots of EC values measured on fields in the Upstream Study Region for years 2004 and 2005. Midline represents the median value; upper and lower edges of box represent 75 percentile and 25 percentile values, respectively; and upper and lower whiskers represented maximum and minimum values, respectively.*

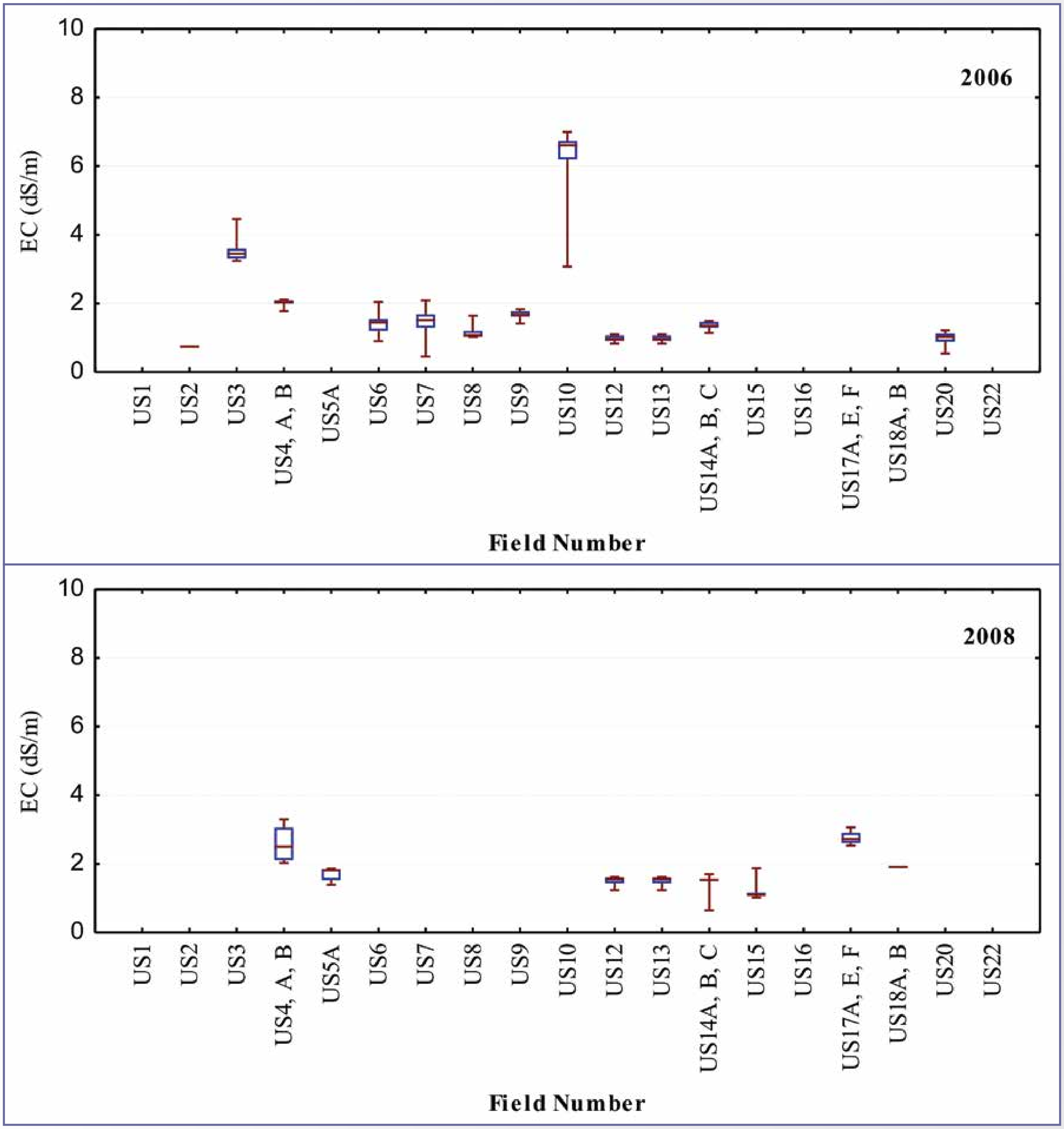


Figure 64. *Box and whisker plots of EC values measured on fields in the Upstream Study Region for years 2006 and 2008. Midline represents the median value; upper and lower edges of box represent 75 percentile and 25 percentile values, respectively; and upper and lower whiskers represented maximum and minimum values, respectively.*

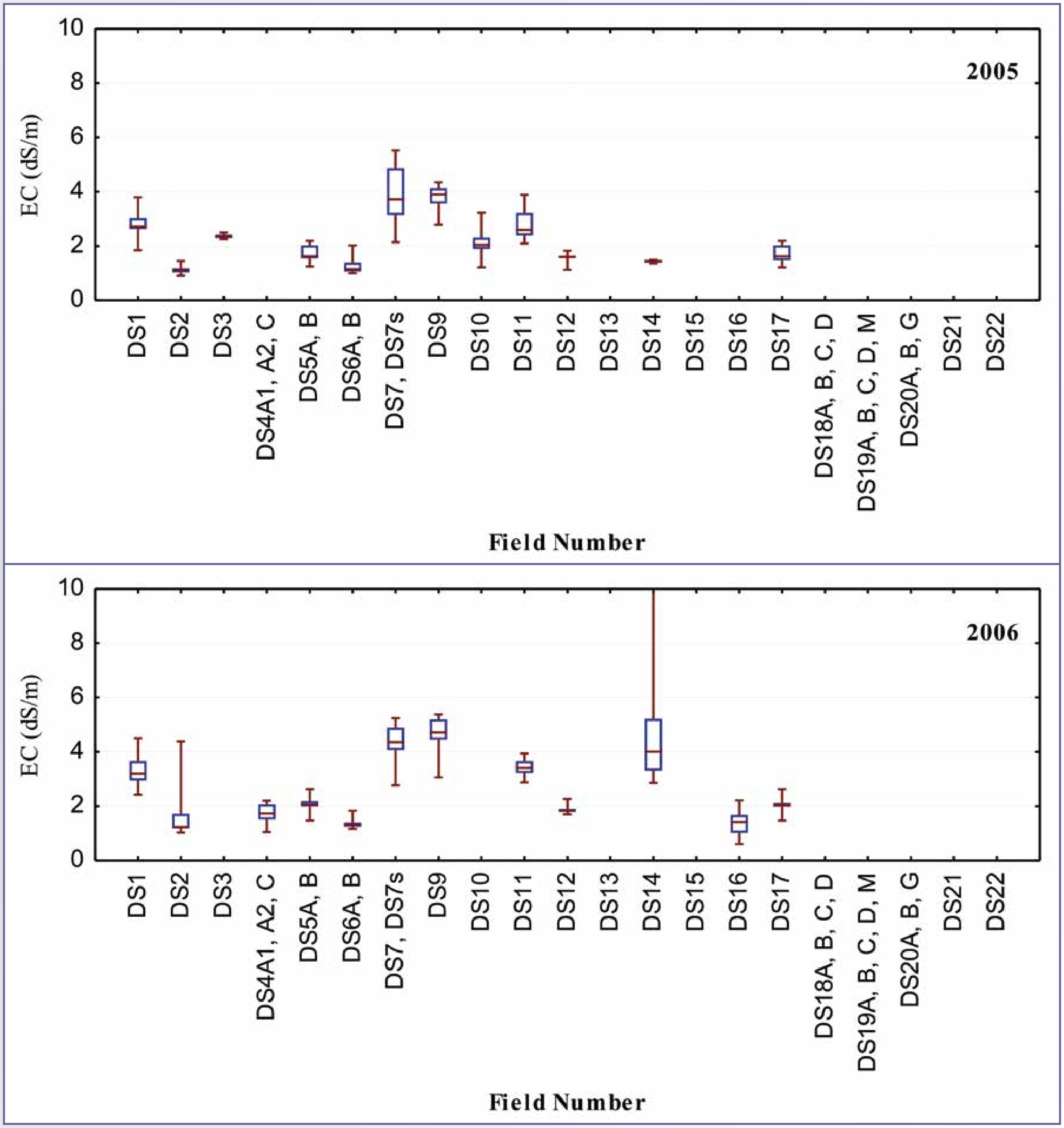


Figure 65. *Box and whisker plots of EC values measured on fields in the Downstream Study Region for years 2005 and 2006. Midline represents the median value; upper and lower edges of box represent 75 percentile and 25 percentile values, respectively; and upper and lower whiskers represented maximum and minimum values, respectively.*

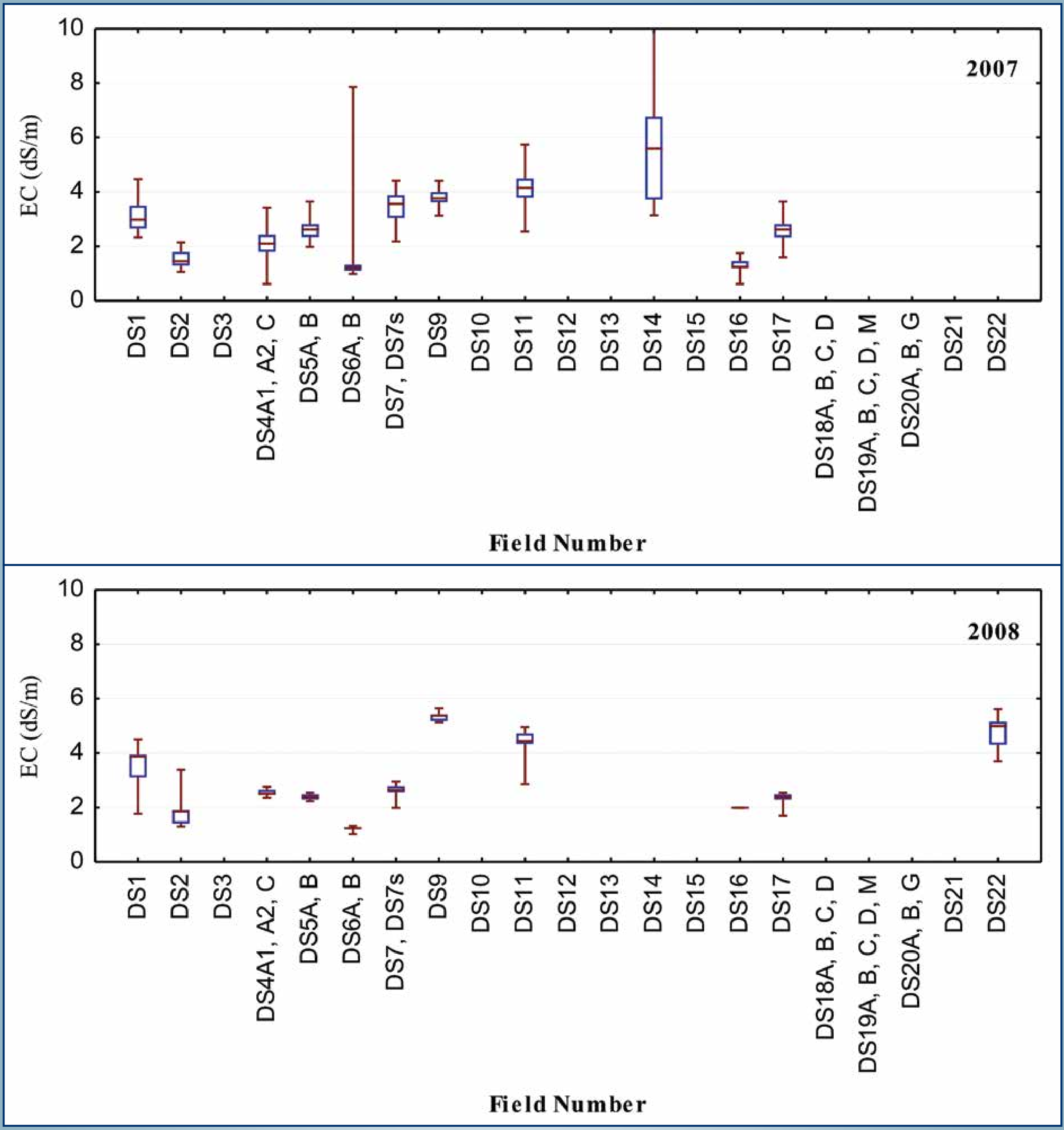


Figure 66. *Box and whisker plots of EC values measured on fields in the Downstream Study Region for years 2007 and 2008. Midline represents the median value; upper and lower edges of box represent 75 percentile and 25 percentile values, respectively; and upper and lower whiskers represented maximum and minimum values, respectively.*

Crop Yield and ET in Relation to Soil Water Salinity and Irrigation

Crop Biomass in Relation to Soil Water Salinity

Based upon controlled field experiments, the marketable yield of agricultural crops is well-known to be adversely affected by high concentrations of soil salt. This primarily is due to depressed osmotic potential that inhibits the ability of the crop roots to extract water from the soil pores, thereby reducing ET_a, but also is due to nutritional inhibition and toxic effects of certain soil salts on crop physiology (Wallender and Tanji 2012). The current study allowed the effects of soil water salinity on crop yield to be investigated for farmer-managed irrigated fields. Normalized crop biomass measured at locations within sampled fields, used as an indicator of relative crop yield, is plotted in Figure 67 against corresponding EC_e values estimated from EM38 measurements at the same locations for corn fields in the Upstream and Downstream Study Regions. Similar plots for alfalfa fields are presented in Figure 68. The relationships displayed in each plot indicate a general trend of decreasing crop yield with increasing EC_e. There is considerable scatter in the data due, especially at lower EC_e values (2-4 dS/m), to a number of other factors that influence crop yield such as crop variety, amount of fertilizer applied, type of soils, pest management, weed management, irrigation amount, etc. Crop yield appears to clearly diminish for EC_e > 4 to 6 dS/m.

Average values of D_{wt}, groundwater EC, EC_e, and normalized crop biomass were computed over all measurements within an irrigation season for each monitored field. Pearson correlation, r, between these averages for each variable was computed using the Statistica® 9.0 software. The value of r can vary between -1 and 1 with r = -1 indicating perfect inverse correlation and r = 1 indicating perfect direct correlation between two variables. A statistically significant value of r (at p = 0.05) between average normalized crop biomass and average D_{wt} was computed as 0.40, which is moderate. Statistically significant weak to moderate r values of -0.28 and -0.31 were computed between average normalized crop yield and average groundwater EC and between average normalized crop yield and average EC_e, respectively. These results reveal the tendency of crop yield to be adversely affected by shallow water tables, and high groundwater and soil water salinity concentrations.

Crop Biomass in Relation to Irrigation

Values of r also were computed between average values of Q_A, E_a, DPF, and TRF, and average normalized crop yield on monitored fields. Values of r between average E_a, DPF, and TRF and average normalized crop yield were not statistically significant. The r between average Q_A and average normalized crop yield was statistically significant with a weak to moderate value of 0.25. This indicated that, in general, for the fields and seasons studied, crop yield tended to increase with increased average applied irrigation depth.

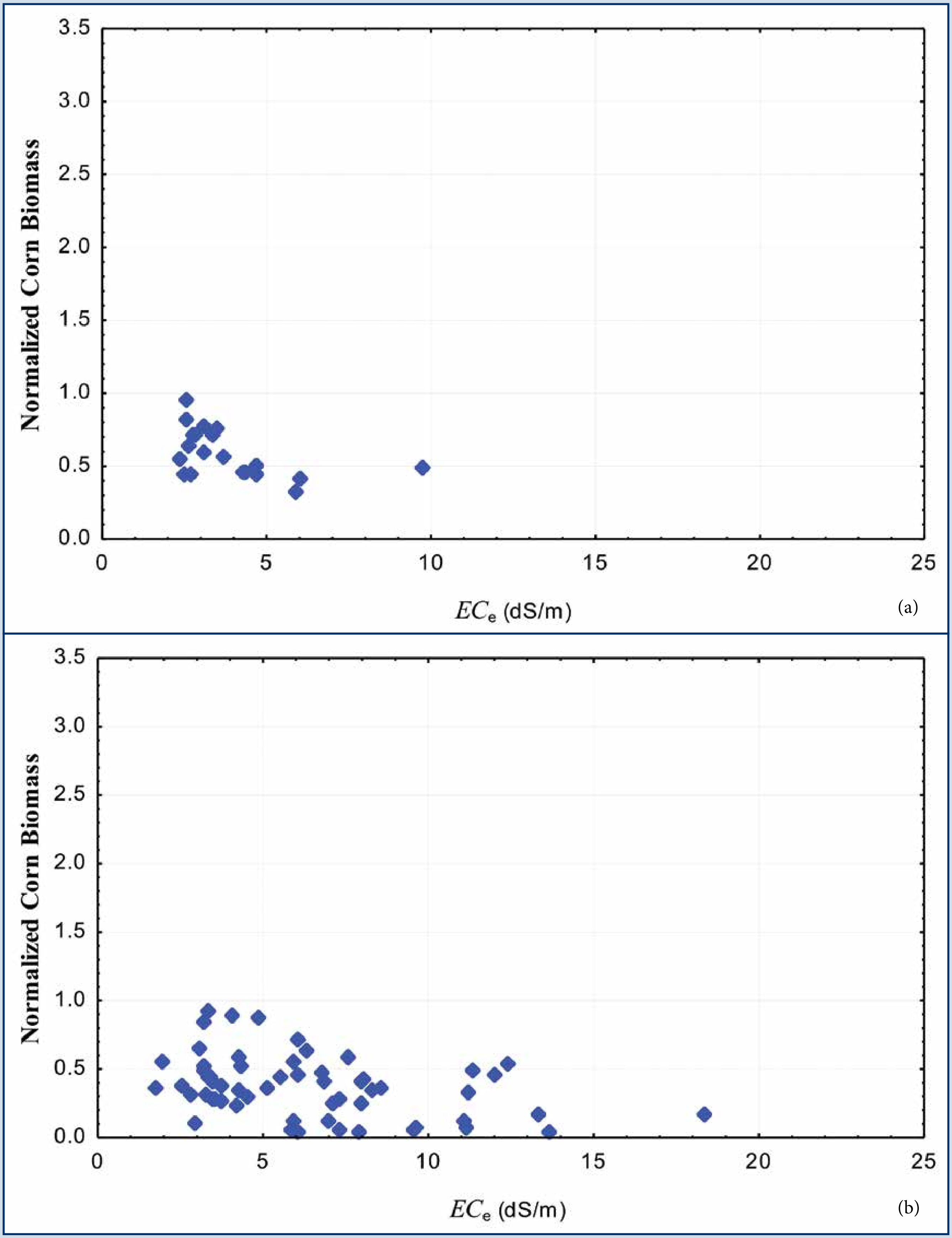


Figure 67. *Normalized corn biomass versus EC_e measured at locations within surveyed fields in (a) Upstream Study Region, and (b) Downstream Study Region*

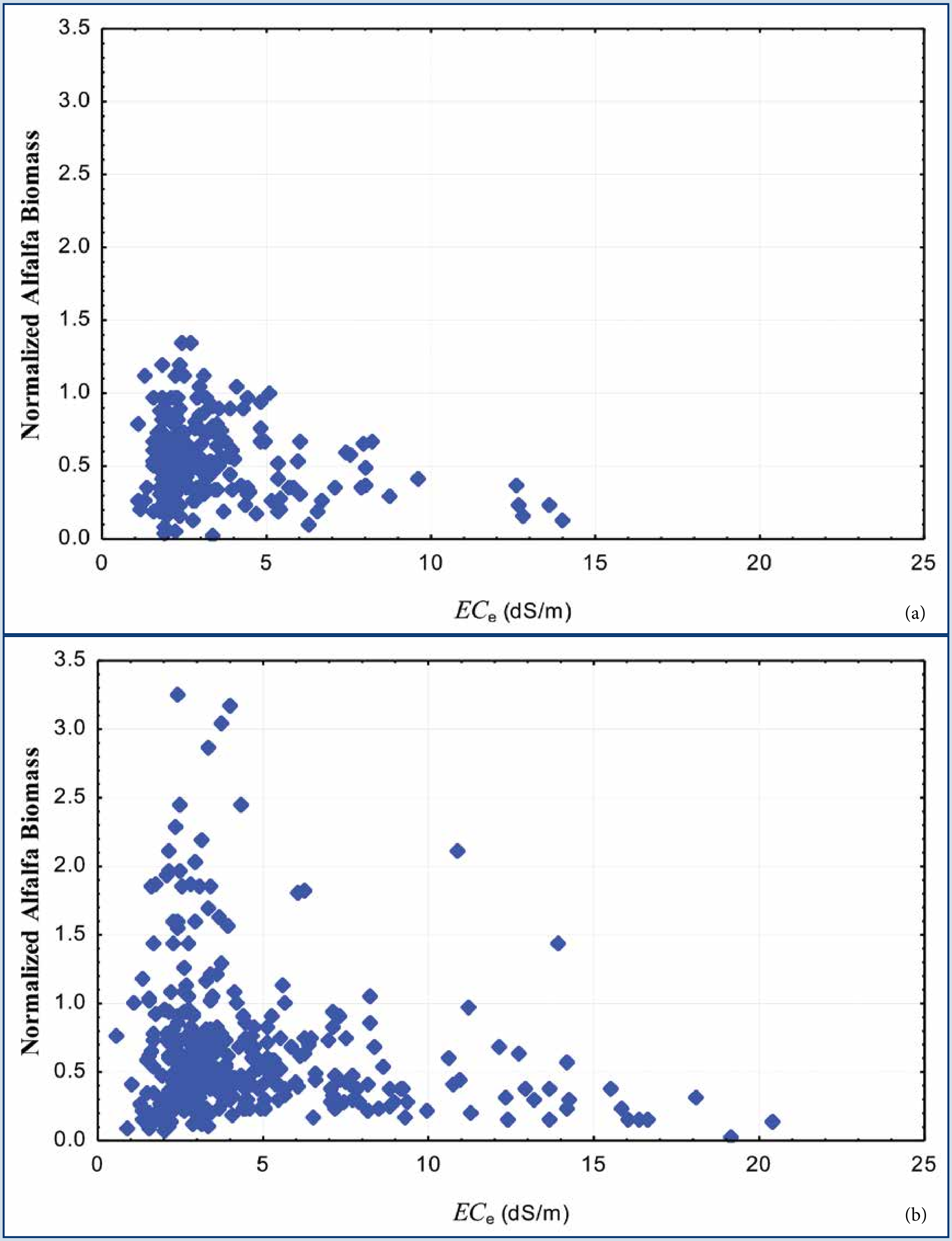


Figure 68. *Normalized alfalfa biomass versus EC_e measured at locations within surveyed fields in (a) Upstream Study Region, and (b) Downstream Study Region*

ET_a in Relation to Soil Water Salinity

The output of the ReSET model is a raster layer for the whole satellite image with the calculated values of ET_a for a 24 hour period in units of millimeters/day. A study of the possible effect of EC_e on ET_a in the study regions was conducted. Relationships were explored between ET_a values estimated with ReSET and values of EC_e estimated from EM38 measurements made at sample sites located with GPS. Data were used from field surveys conducted in the current study and from field surveys conducted in companion CSU projects. The ReSET ET_a raster layer first was clipped to the boundaries of the selected fields for a satellite image date closest to the date when EM38 field measurements were made. The clipped ReSET ET_a raster layer was converted to GIS polygons with each polygon retaining the model calculated ET_a value. The GIS ET_a polygons were then overlaid on the locations where EM38 measurements were made to estimate EC_e. Using a tool developed in ArcGIS, the statistical mean of the EM38 locations within each ET polygon was calculated and this information was added to the table of attributes of the GIS ET_a polygon coverage. Nonlinear regression was used with the Statistica® 9.0 software to develop a best-fit relationship with a reverse S-curve form:

$$ET_a = \hat{a} + \frac{\hat{b}}{1 + exp\,[\hat{c}\left(EC_e - \hat{d}\right)]} \quad (27)$$

wherein $\hat{a}$, $\hat{b}$, $\hat{c}$, and $\hat{d}$ are empirical coefficients determined using least-squares optimization.

Figure 69 shows Equation (27) fitted to data for six corn fields surveyed over the period 1999-2006. The relationships reveal the tendency for ET_a at locations within a field to decrease as EC_e increases. The reduction in ET_a is negligible or small at lower EC_e values with a steeper decrease in ET_a occurring over a range of EC_e values, followed by a gradual decrease or approach to a constant ET_a at higher EC_e levels. At these higher values of EC_e the crop likely is severely impacted and a significant portion of ET_a is made up of evaporation from the soil surface rather than transpiration. The steep reduction in ET_a appears to occur at EC_e values ranging between 2.5 to five dS/m. This corresponds closely to the threshold value of about 3.7 dS/m reported by Maas (1990) at which the yield of corn in gypsiferous soils, like those common to the LARV, begins to diminish. Similar studies are underway for alfalfa fields in the LARV.

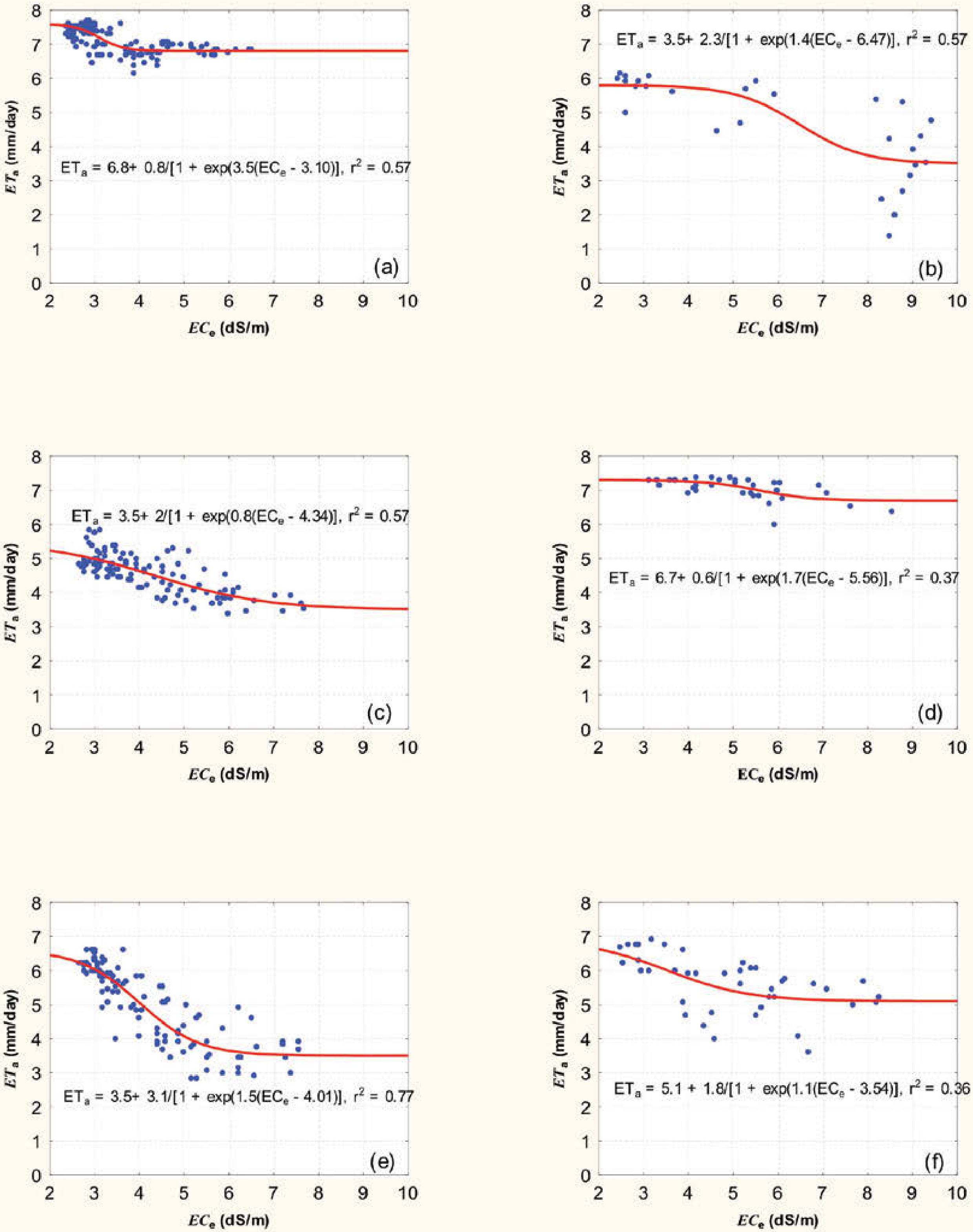


Figure 69. *ET_a estimated with ReSET from satellite imagery versus measured EC_e for (a) field US17, July 1999; (b) field US20, July 2001; (c) field US80, June 2001; (d) field DS106, July 2005; (e) field US80, July 2001; and (f) field US38, July 2006. Fitted regression curves with r^2 values are shown on each plot.*

Sensitivity Analysis

Sensitivity of Deep Percolation Fraction and Application Efficiency to Parameter Errors

The sensitivity of estimated DPF for surface and sprinkler irrigation events to errors in ET_a, Q_I, initial S_{SW}, and TAW is illustrated in Figure 70 for all monitored surface irrigation events and for all monitored sprinkler irrigation events. The plots in this figure illustrates the range of average DPF values calculated over all irrigation events for the considered range of values associated with possible errors in each input parameter to the IDSCU model. Generally, DPF values calculated by IDSCU are most sensitive to expected independent errors in the sink and source parameters, ET_a and Q_I, than to errors in the soil water storage parameters, S_{SW} and TAW. Estimated values of DPF could be expected to vary as much as about 12 percentage points due to these errors.

Similar plots illustrating the sensitivity of E_a for to errors in ET_a, Q_I, initial S_{SW}, and TAW is illustrated in Figure 71 for all monitored surface and sprinkler irrigation events. Similar to DPF, ET_a is most sensitive to expected errors in ET_a and Q_I, indicating possible variation in estimated ET_a values as much as about 12 percentage points.

Sensitivity of Application Efficiency to Infiltration Distribution Pattern

The sensitivity of estimated E_a to errors in the estimated slope of linear infiltration distribution for surface irritation events is as much as three percentage points for Upstream fields and as much as 2.5 percentage points for Downstream fields. Hence, estimates of E_a are relatively insensitive to the estimated slope of linear infiltration distribution.

Recharge to and Upflux from Groundwater

The spatial distributions of predicted average D_{wt} in the Upstream Study Region over the irrigation seasons within the period 1999-2007 and in the Downstream Study Region over the irrigation seasons within 2002-2007 are shown in Figure 72. Figure 73 presents the spatial distribution of predicted total average recharge to the groundwater table, resulting from deep percolation and from canal seepage, for corresponding seasons Upstream and Downstream. Similarly, Figure 74 illustrates corresponding spatial distributions of upflux from the groundwater table to ET_a. Comparison of Figures 73 and 74 with Figure 72 reveals the correspondence between higher recharge rates and lower D_{wt} (shallower water table) and between lower D_{wt} and higher upflux rates.

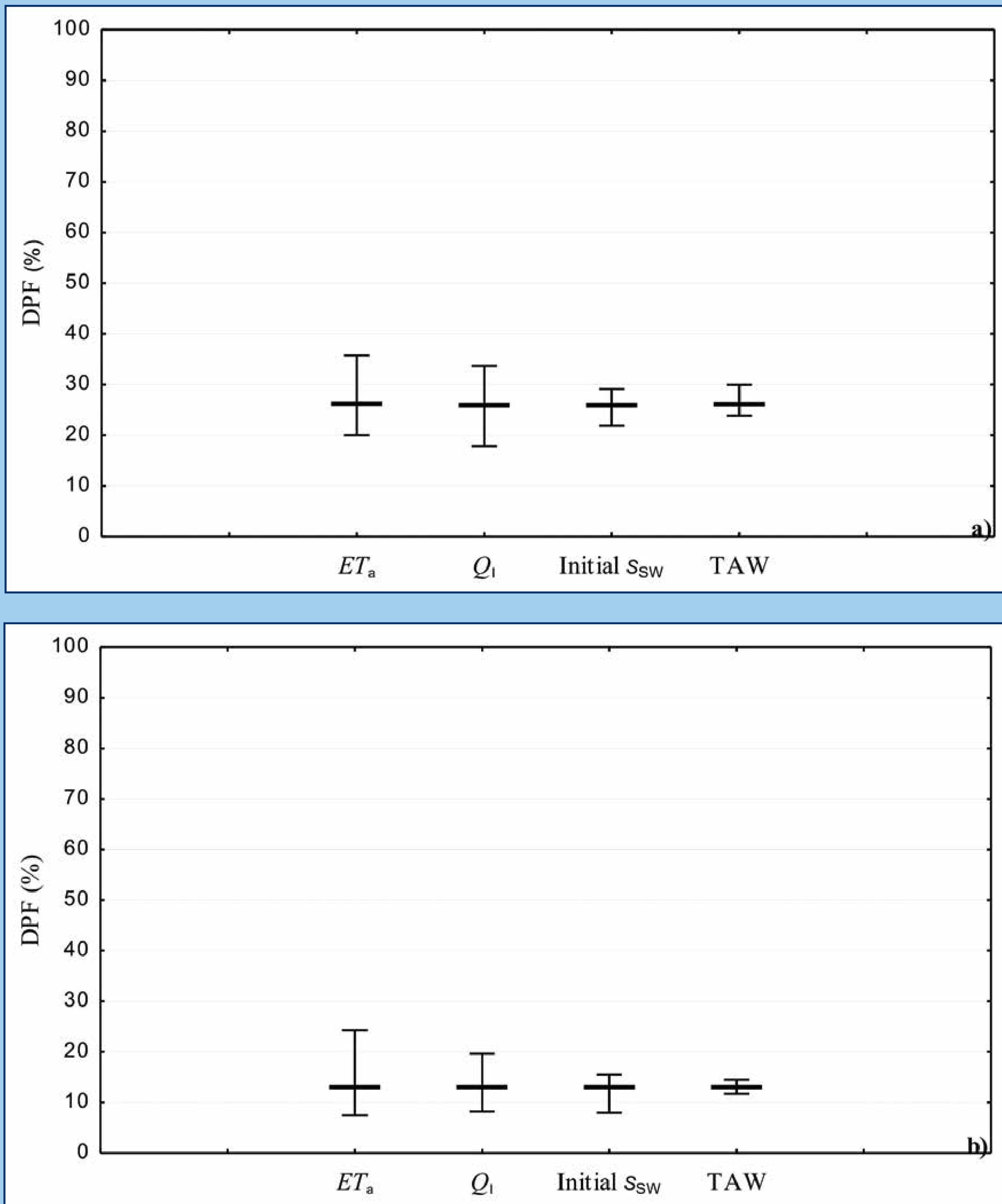


Figure 70. *Range and baseline average values (horizontal bar) of DPF calculated over the considered range of values associated with errors in ET_a, Q_I, initial S_{SW}, and TAW for (a) all surface irrigation events Upstream and Downstream, and (b) all sprinkler irrigation events Upstream and Downstream*

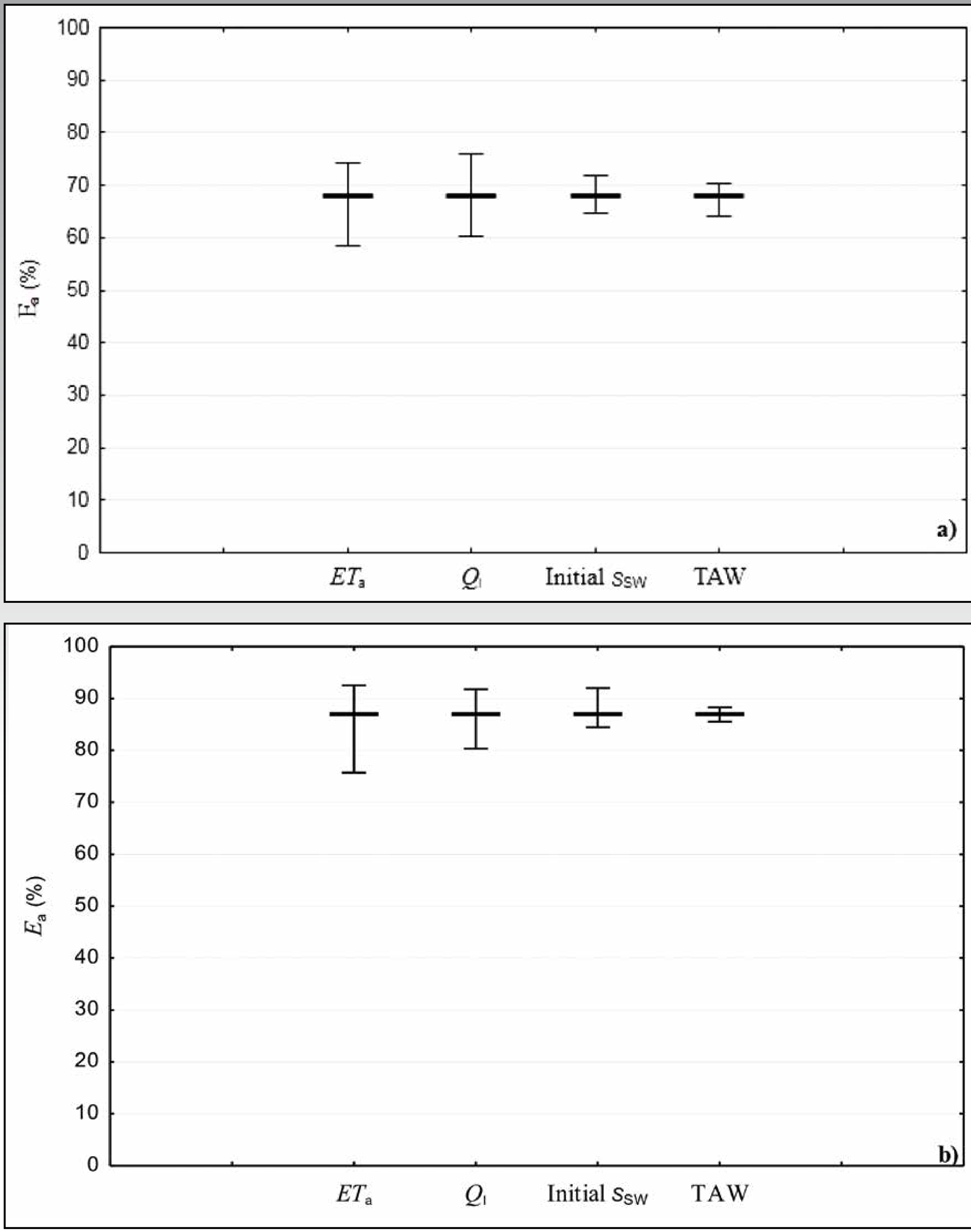


Figure 71. *Range and baseline average values (horizontal bar) of E_a calculated over the considered range of values associated with errors in ET_a, Q_I, initial S_{SW}, and TAW for (a) all surface irrigation events Upstream and Downstream, and (b) all sprinkler irrigation events Upstream and Downstream*

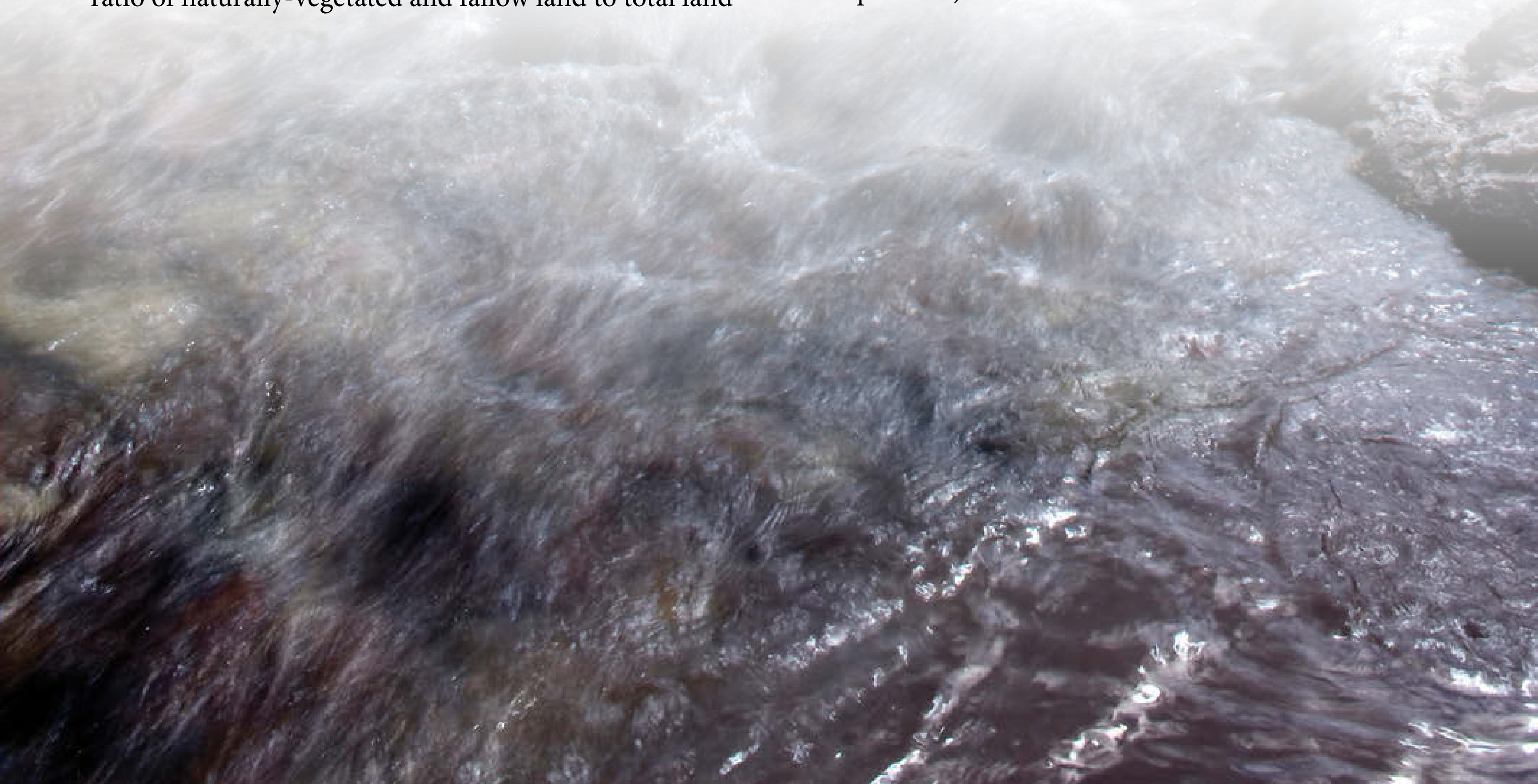
Plots of spatial average infiltrated water ($Q_I + Q_P$) and recharge to the groundwater table are shown in Figure 75 for the modeled periods for the Upstream and Downstream Study Regions. Predicted recharge rates to the groundwater table under irrigated fields average 0.10 in/day over irrigation seasons within 1999-2007 Upstream. Average predicted recharge rates over the seasons 2004, 2005, 2006, and 2007 are 0.08, 0.11, 0.09, and 0.16 in/day, respectively. This represents about 39 percent, 47 percent, 39 percent, and 53 percent of infiltrated water, respectively, over these irrigation seasons. In the Downstream region, predicted recharge rates averaged 0.06 in/day over the irrigation seasons within 2002-2007. Over 2004, 2005, 2006, and 2007 predicted recharge rates Downstream are 0.05, 0.07, 0.05, and 0.08 in/day, respectively, which are about 30 percent, 41 percent, 31 percent, and 41 percent of infiltrated water, respectively.

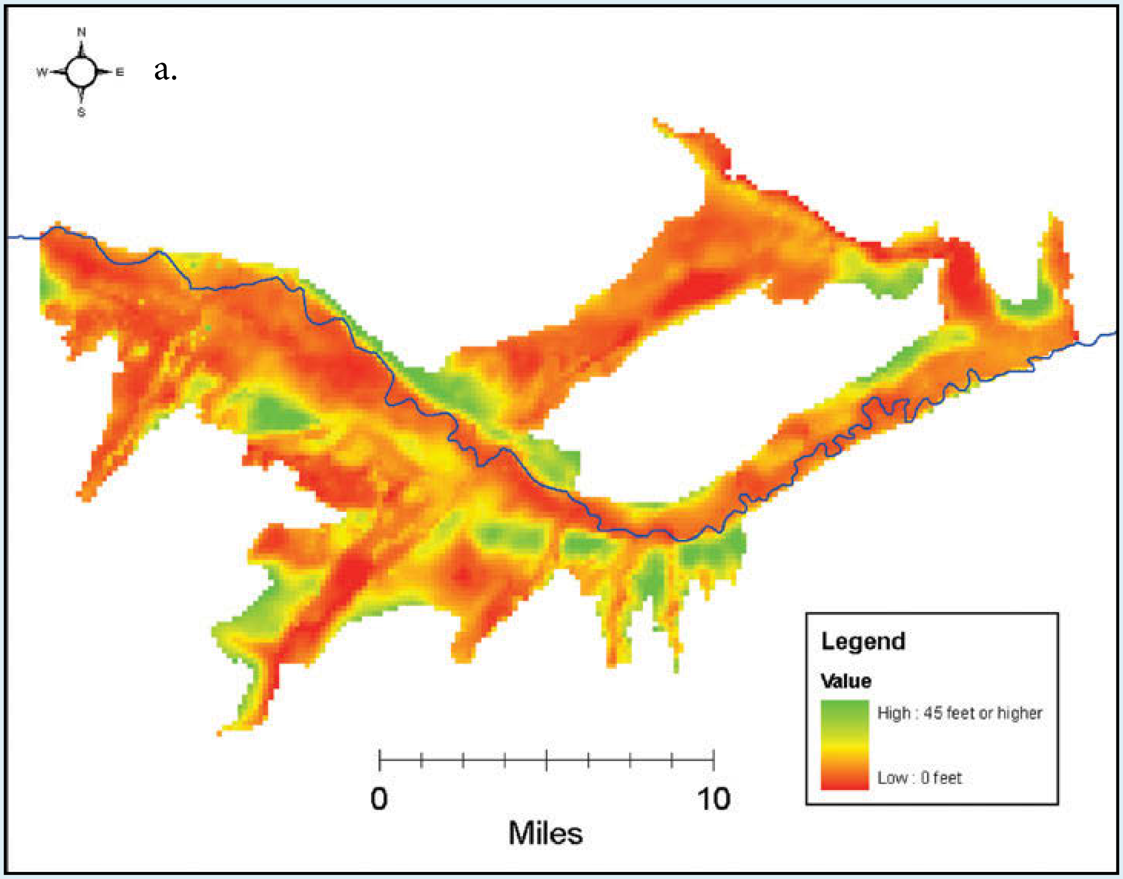
The regional scale models estimate that upflux from the groundwater table to non-beneficial ET_a under naturally-vegetated and fallow fields is substantial in relation to total crop ET_a, as seen in the plot in Figure 76. Cumulative predicted upflux to non-beneficial ET_a under naturally-vegetated and fallow fields is plotted in Figure 77 for the Upstream and Downstream Study Regions. Also, shown is the estimated cumulative upflux to non-beneficial ET_a under naturally-vegetated and fallow fields over the entire LARV. This was estimated using land survey data from 2003, assuming that the ratio of naturally-vegetated and fallow land to total land in the Upstream and Downstream Study Regions applies to the entire LARV, and also assuming that conditions determining upflux over the entire LARV are similar to those within the study regions.

Return Flows and Salt Loads to Streams

Figure 78 shows groundwater return flow predicted by the regional models to the Arkansas River along the Upstream and Downstream study regions. The average predicted return flow rate over the period April 1999-October 2007 is 30.9 ac-ft/week per mile along the modeled 48.6 miles of river Upstream. Downstream, the average predicted return flow rate over the period April 2002-October 2007 is 12.0 ac-ft/week per mile along the modeled 43.8 miles of river. Average predicted return flow rate over the years 2004, 2005, 2006, and 2007 is 19.4, 22.8, 22.8, and 35.3 ac-ft/week per mile, respectively, along the Upstream Study Region, and is 9.3, 8.9, 6.3, and 16.2 ac-f/week per mile, respectively, along the Downstream Study Region.

Salt load in groundwater return flow to the river within the Upstream and Downstream Study Regions was estimated using the regional models and is plotted in Figure 79. The loads are substantial, ranging from less than 1,000 tons/week (20.6 tons/week per mile) to more than 17,500 tons/week (359.8 tons/week per mile) Upstream, and from about 1,400 tons/week (32.0 tons/week per mile) to about 11,000 tons/week (251.2 tons/week per mile) Downstream.





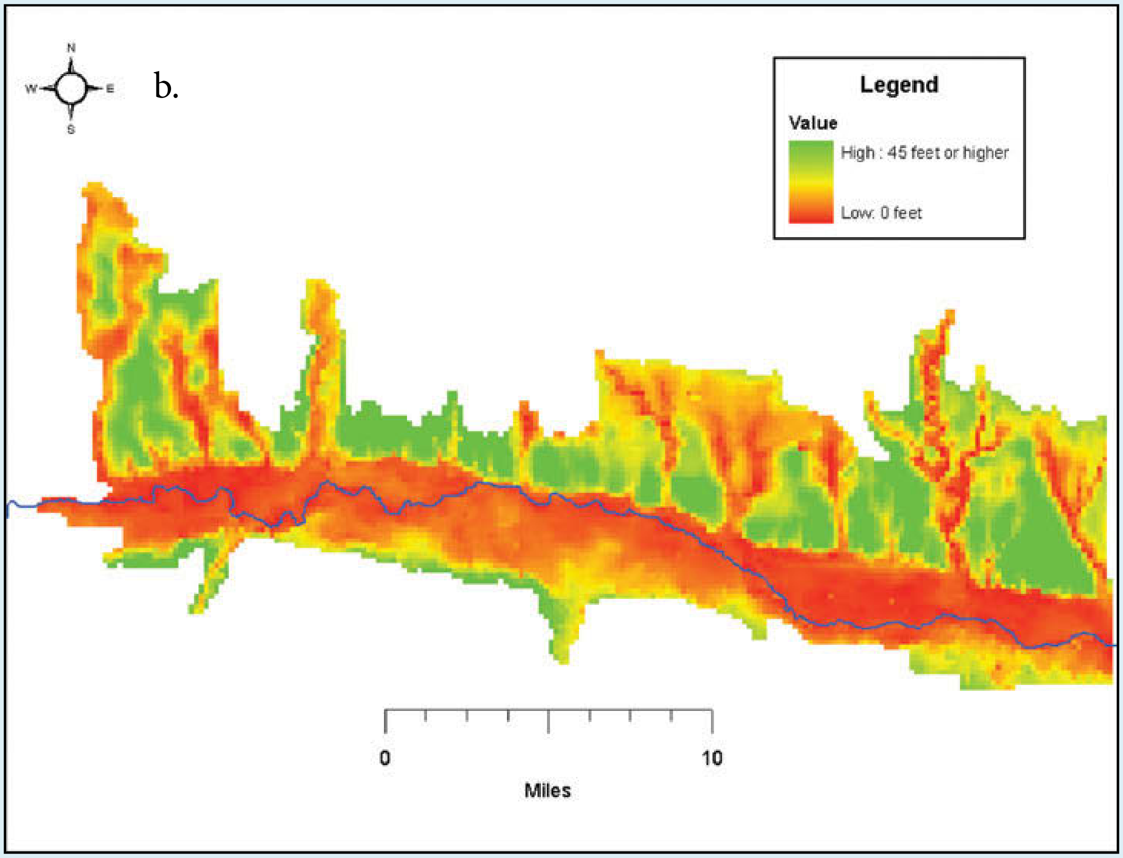


Figure 72. *Average D_{wt} computed over irrigation seasons (a) 1999-2007 in the Upstream Study Region, and (b) 2002-2007 in the Downstream Study Region*

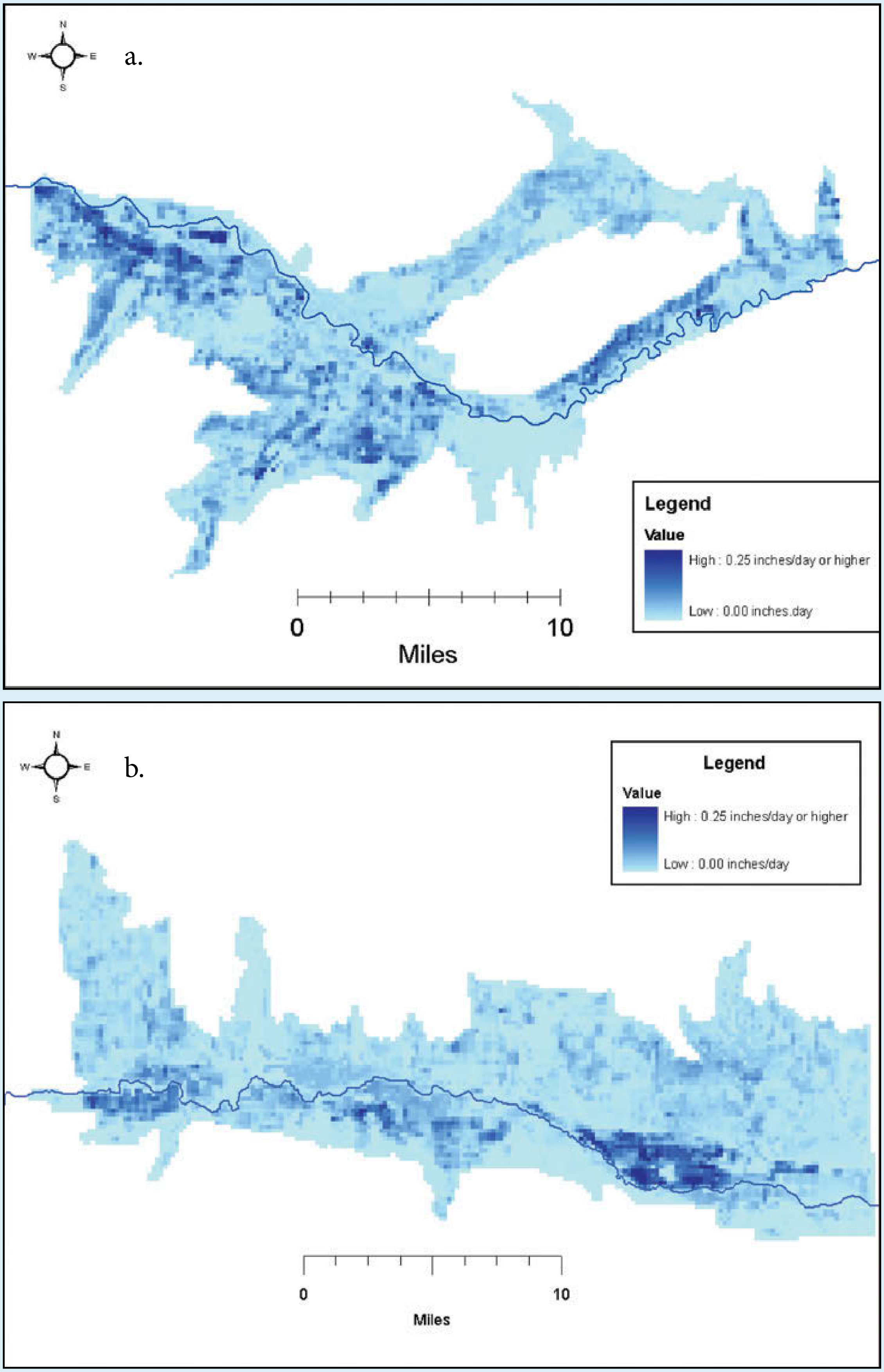
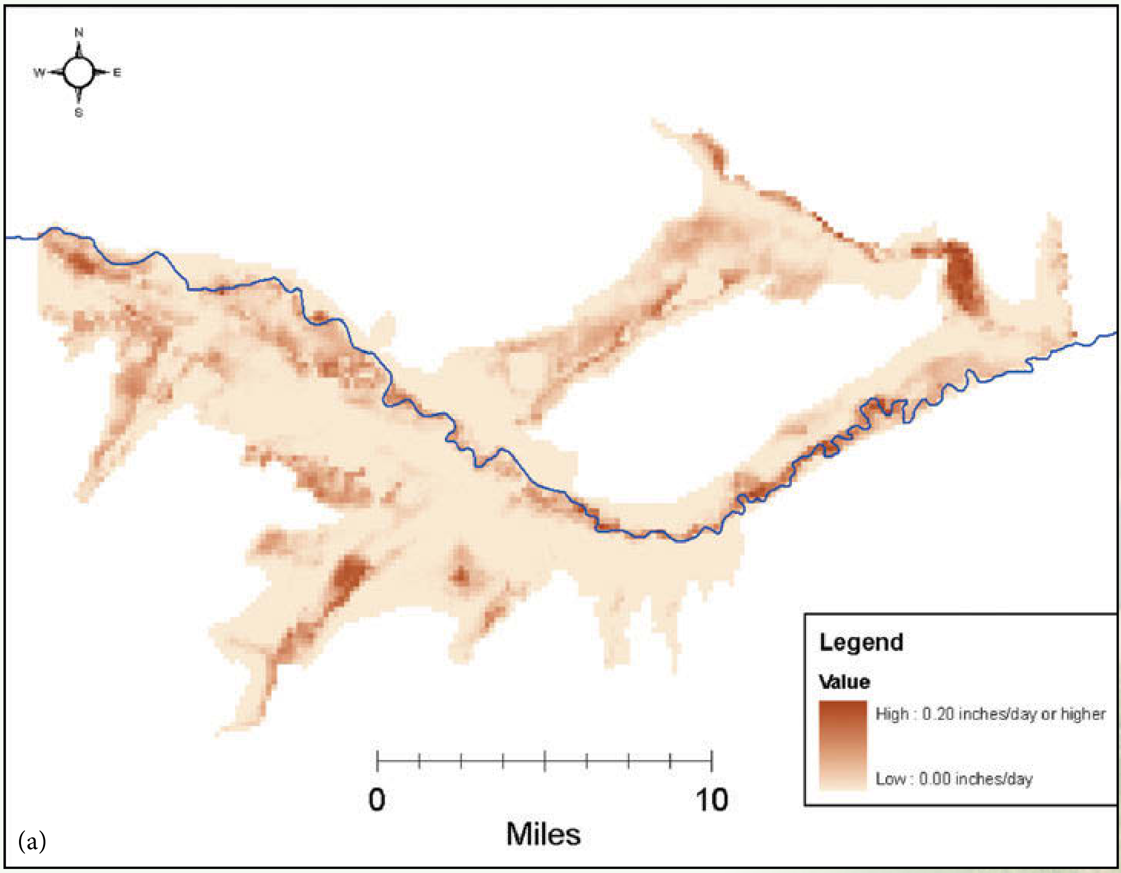


Figure 73. *Average recharge rate to the water table computed over irrigation seasons (a) 1999-2007 in the Upstream Study Region, and (b) 2002-2007 in the Downstream Study Region*



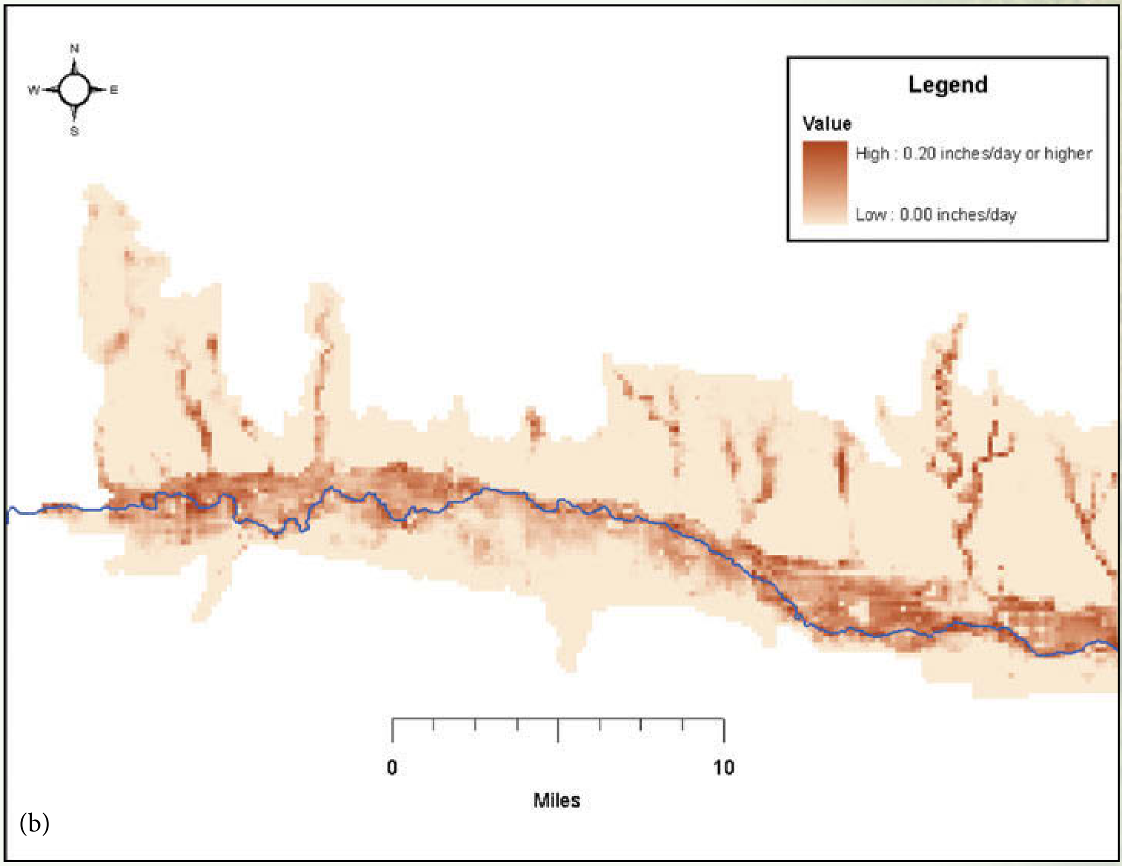


Figure 74. *Average ground water upflux rate to ET_a computed over irrigation seasons (a) 1999-2007 in the Upstream Study Region, and (b) 2002-2007 in the Downstream Study Region*

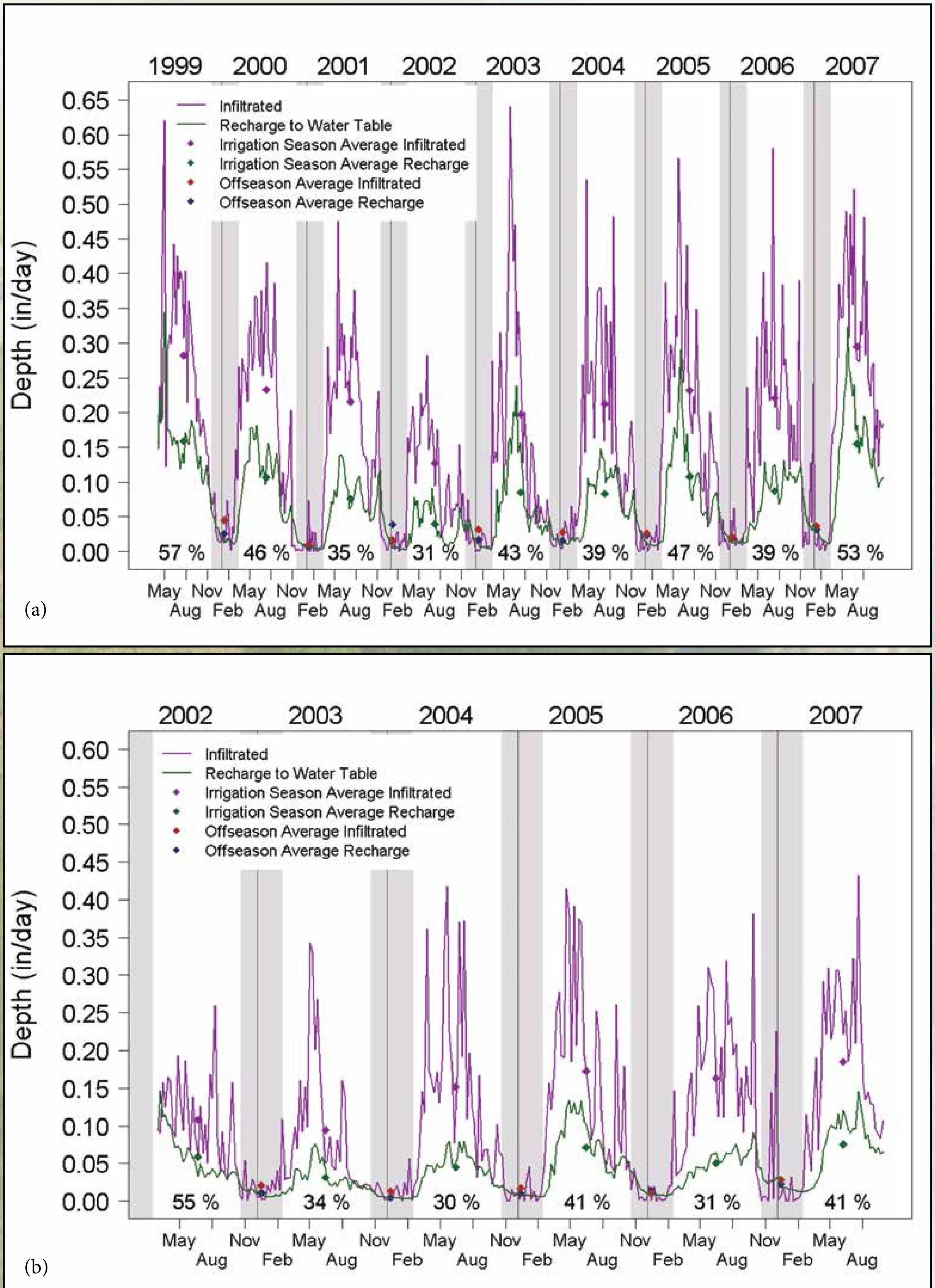


Figure 75. *Infiltrated water ($Q_I + Q_P$) and recharge to the groundwater table, showing average values during the off seasons and during the irrigation seasons as plotted points and ratios of recharge to infiltrated water over the irrigation seasons as written percentages for (a) Upstream Study Region and (b) Downstream Study Region*

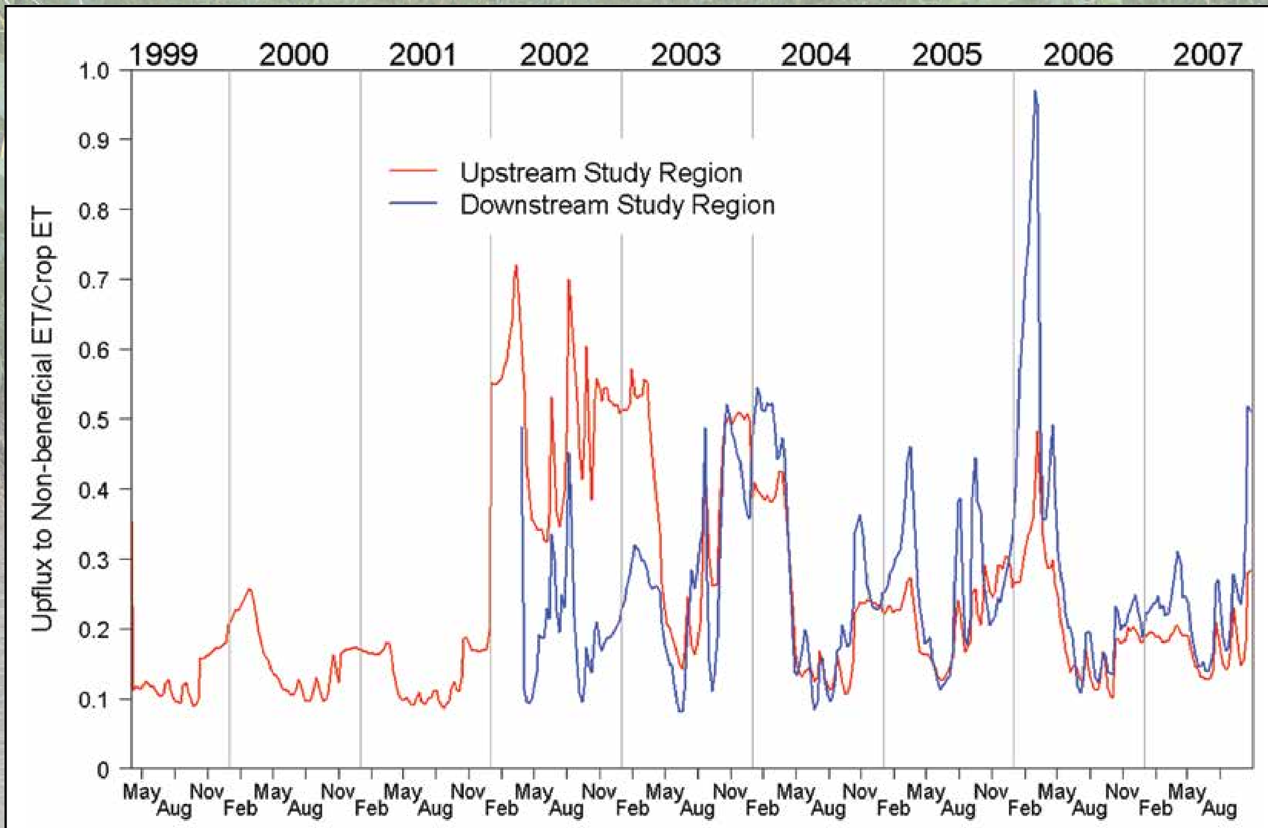


Figure 76. *Ratio of groundwater upflux to non-beneficial ET_a to crop ET_a computed by the regional models for the Upstream and Downstream Study Regions*

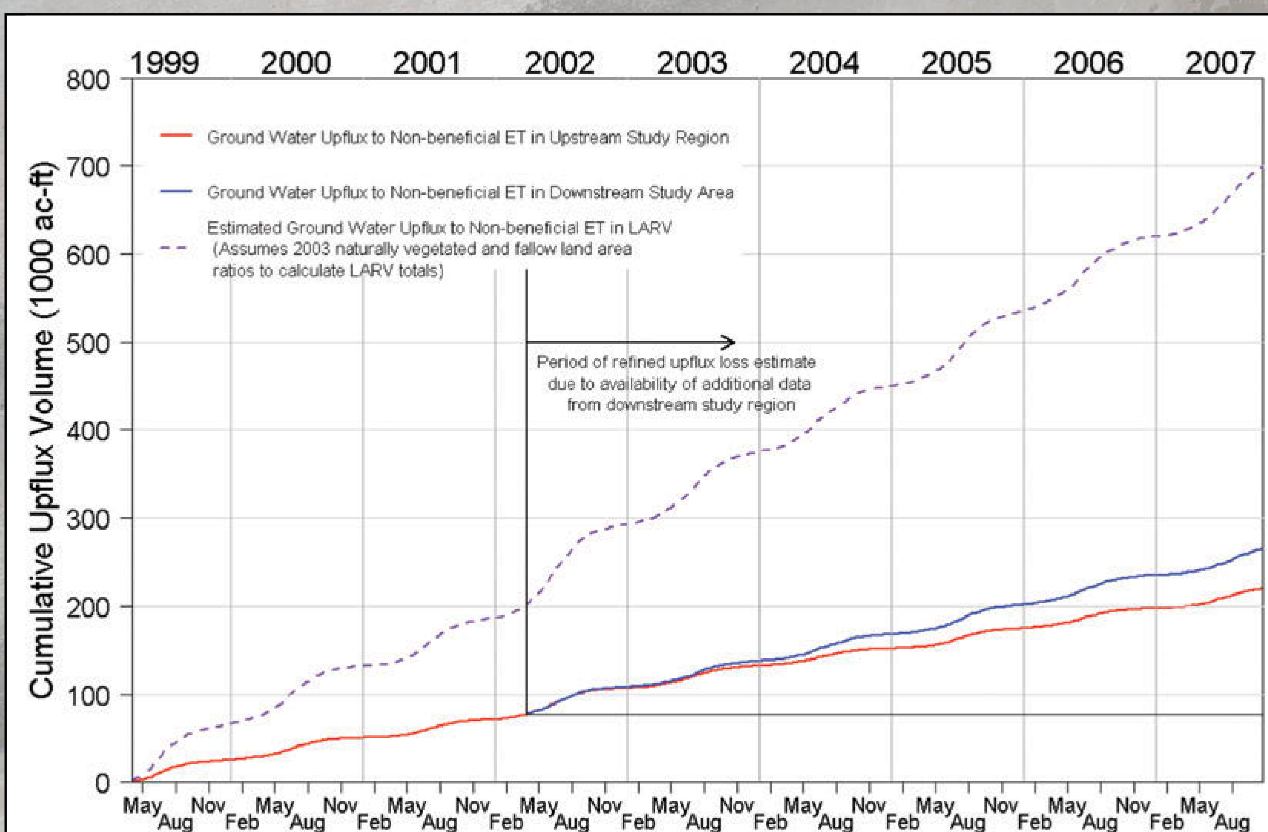


Figure 77. *Cumulative groundwater upflux to non-beneficial ET_a computed by the regional models for the Upstream and Downstream Study Regions and estimated for the entire LARV*

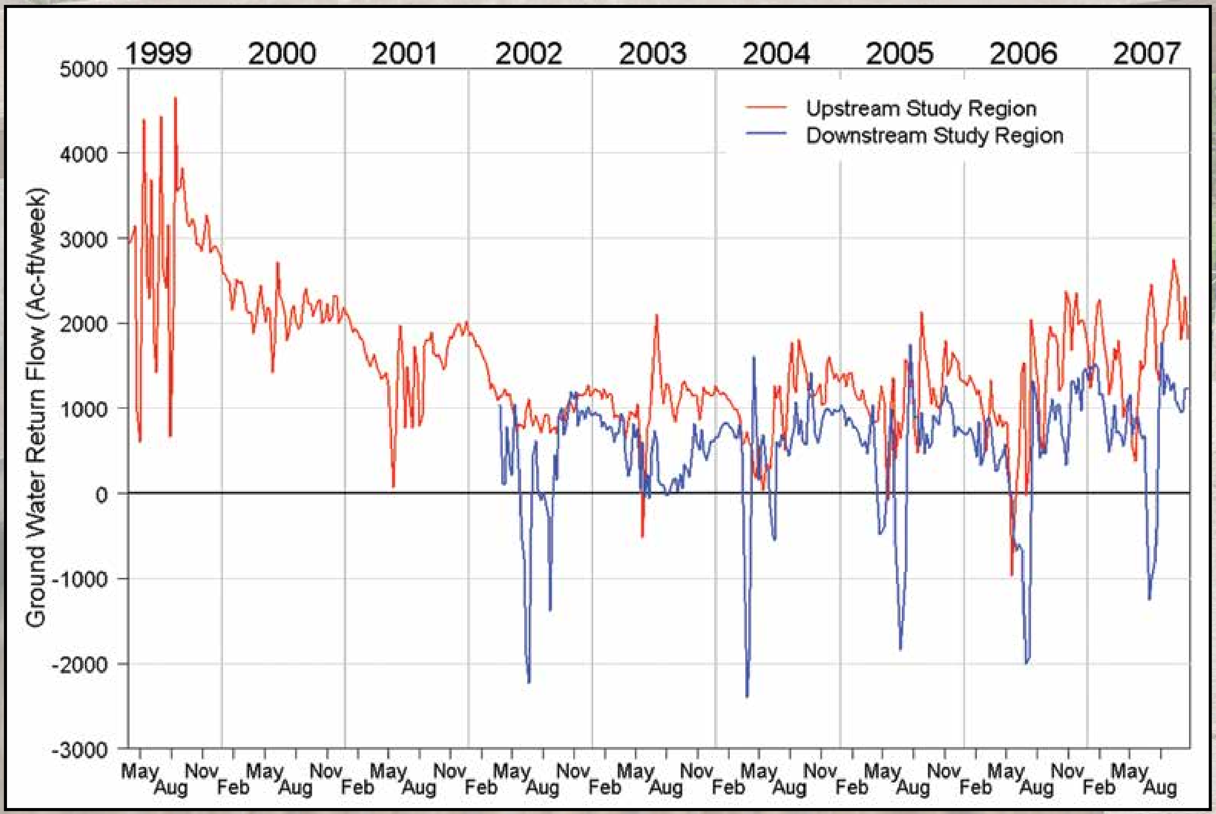


Figure 78. *Groundwater return flow to the Arkansas River within the Upstream and Downstream Study Regions estimated with the regional models (negative values indicate net loss of water from the river to the groundwater aquifer)*

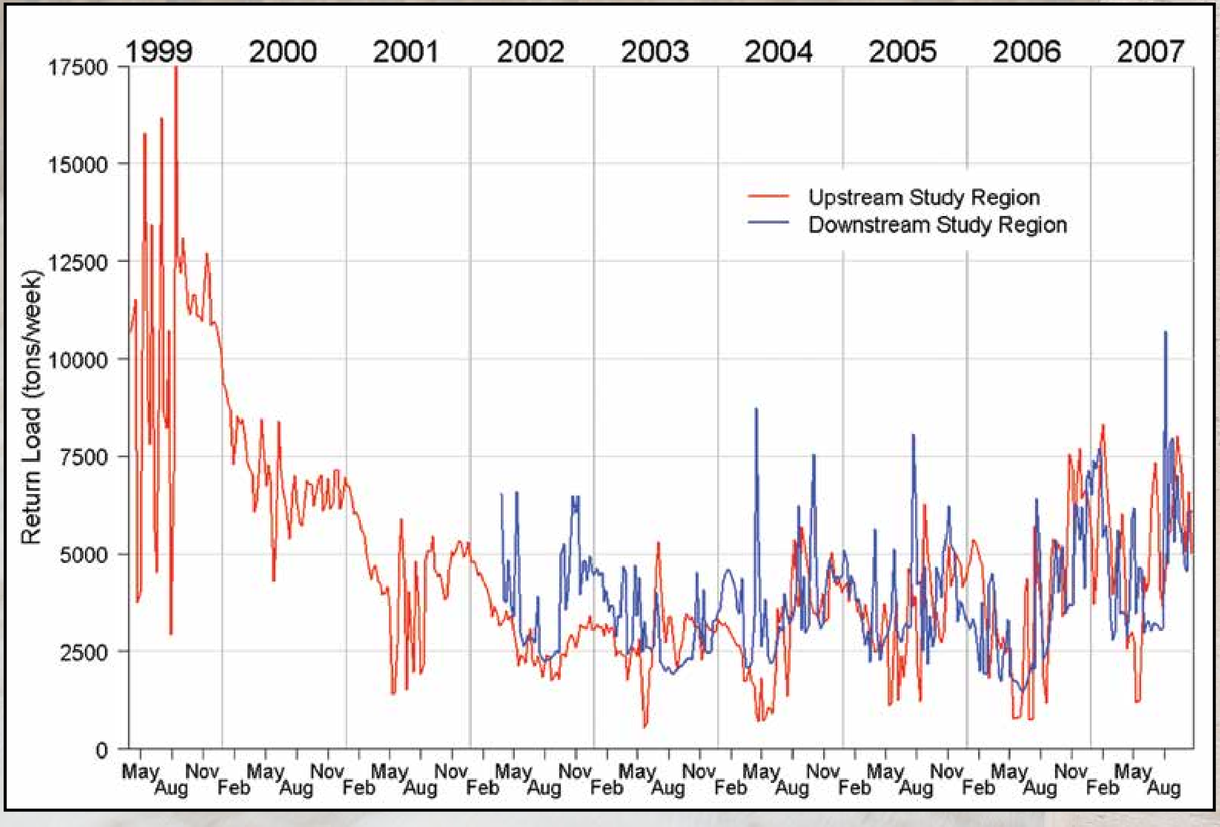


Figure 79. *Salt load in groundwater return flow to the Arkansas River within the Upstream and Downstream Study Regions estimated with the regional models*

Summary, Conclusions, and Implications

Irrigation practices in Colorado's Lower Arkansas River Valley, and their impacts on the stream-aquifer system, have been characterized using extensive field data and calibrated regional modeling. A total of 61 irrigated fields (33 surface-irrigated, 28 sprinkler-irrigated) were monitored in two study regions of the LARV from 2004-2008. Both flow and water quality characteristics were measured or estimated. Analysis and results are presented for a total of 242 irrigation events and 279 sprinkler irrigation events. These results, as well as discoveries from companion projects, allowed groundwater flow models to be calibrated and applied in describing conditions over regional scales within both study areas.

General Findings

The average applied irrigation depth for the monitored surface irrigation events was 8.2 in. Water losses in the form of tailwater runoff were found to be quite low on surface-irrigated fields, with an average tailwater fraction (TRF) of about eight percent. Most of the losses in surface irrigation events occurred in the form of deep percolation below the crop root zone, with an estimated deep percolation fraction (DPF) of 24 percent. Estimated values of irrigation application efficiency (E_a) for the surface-irrigation events ranged from 10 percent to a maximum of 100 percent and averaged about 68 percent, a value that is comparable or higher than average values reported in the literature (Howell 2003, Wolters 1992).

Average applied depth for sprinkler irrigation events was 2.2 in. In this study, no significant tailwater losses were observed for any of the sprinkler irrigation events. Average DPF on monitored sprinkler-irrigated fields was about 13 percent, indicating that deep percolation on sprinkler-irrigated fields was only about 37 percent of that estimated for surface-irrigated fields. The average E_a for sprinkler irrigation events was about 82 percent. Losses from sprinkler spray to direct evaporation and wind drift were estimated to be about 5 percent for the types of sprinkler systems used in the LARV.

A limited sensitivity analysis provided insight into the range of errors in estimated average DPF and E_a values independently derived from likely errors in actual evapotranspiration (ET_a), infiltrated irrigation volume (Q_I,) initial soil water storage volume (S_{SW}), and total available water (TAW). The maximum likely range of error was roughly plus or minus 10 percentage points. Sensitivity of E_a values due to errors in assumed infiltration distribution had a range of error of roughly plus or minus three percentage points.

Salt concentration in applied irrigation water on surface irrigated fields averaged about 532 mg/L in the Upstream Study Region, and about 1,154 mg/L in the Downstream Study Region. Associated applied salt loads to fields were about 997 lb/ac Upstream and about 2,480 lb/ac Downstream. On sprinkler-irrigated fields Upstream, supplied by groundwater wells, salt concentration in applied water averaged about 1,498 mg/L. In the Downstream region, where sprinklers were supplied with water from canals through stabilization ponds, measured salt concentration in applied water averaged about 849 mg/L. Loading rates of salt in applied sprinkler irrigation waters were about 1,217 lb/ac and 446 lb/ac Upstream and Downstream, respectively.

Average soil salinity as saturated paste extract electrical conductivity (EC_e) in monitored fields Upstream ranged from 2.1 dS/m to 7.0 dS/m over all surveys conducted during the study period. Averages in Downstream fields were considerably higher, ranging from 3.7 dS/m to 12.5 dS/m. About 60 percent of the fields showed an average EC_e that exceeded the approximate salinity threshold of four dS/m.

Water table depth (D_{wt}) varied considerably within fields over the irrigation season and from field to field. Values of D_{wt} averaged over monitored irrigated fields varied from 7.8 to 12.1 ft in the Upstream region, with an overall average value of 9.9 ft. In the Downstream region, D_{wt} averaged over monitored irrigated fields ranged from 12.6 to 15.0 ft, with an overall average of 13.8 ft. About four fields in the Upstream Study Region and 21 fields in the Downstream Study Region had values of D_{wt} exceeding the 20 to 25 ft depth to the bottom of available monitoring wells. Average electrical conductivity (EC) of groundwater varied from 1.8 to 2.3 dS/m Upstream and from 2.3-3.1 dS/m Downstream. The finding of deeper and more saline water tables in fields within the Downstream region compared to those within the Upstream region was corroborated by regional modeling results.

Data gathered on numerous fields were explored to evaluate the impact of soil water salinity on crop water use and crop yield. Crop ET_a and crop yield (biomass) were found to diminish when values of EC_e in the soil exceeded about three to five dS/m. These results closely correspond to the threshold value of about 3.7-4 dS/m, reported by Maas (1990), beyond which yields of corn and alfalfa will decline in gypsiferous soils. Since numerous fields throughout the Upstream and Downstream Study Regions show EC_e values exceeding this threshold, actual evapotranspiration (ET_a) values over the LARV are expected to be lower than potential evapotranspiration (ET_p) values calculated using the ASCE Standardized Equation with published crop coefficients.

Much of the deep percolation that occurs on irrigated fields in the LARV, in addition to seepage from earthen canals (Susfalk et al 2008) and effective precipitation, flows downward to recharge the underlying groundwater table. Calibrated regional groundwater models predicted an average recharge rate to shallow groundwater of 0.10 in/day and 0.06 in/day over modeled irrigation seasons within the period 1999-2007 Upstream and within the period 2002-2007 Downstream, respectively. Over these same respective periods the regional model predicted that recharge to the groundwater table during the irrigation season was equivalent to 31 percent to 57 percent of $Q_I + Q_P$ Upstream and to 30 percent to 55 percent of $Q_I + Q_P$ Downstream, where Q_P = effective precipitation volume.

A portion of the alluvial groundwater in the LARV returns to the unsaturated zone and contributes to ET_a via capillary rise from shallow water tables. The current study revealed that between zero and 40 percent (with an average of 5 percent) of beneficial crop ET_a on monitored irrigated fields was provided by groundwater upflux. This upflux also brings salt into the root zone, contributing to the deleterious effects of EC_e. In addition, the calibrated regional groundwater models predict that about 26,000 ac-ft/year in the Upstream region and 35,000 ac-ft/year in the Downstream region flows upward to non-beneficial ET_a demand on naturally-vegetated and fallow fields. This water loss is equivalent to about 20 to 25 percent of annual crop ET_a on the average.

Much of the remaining saline groundwater in the LARV eventually returns to tributaries and to the main stem of the Arkansas River by flow through the alluvial aquifer, dissolving additional salts and minerals along its path. Average return flow rates to the Arkansas River within the Upstream and Downstream regions were estimated by the regional models to be 30.9 ac-ft/day per mile and 12 ac-ft/day per mile along the river, respectively. Salt load in this return flow to the river over the modeled years was estimated as about 93 tons/week per mile Upstream and about 62 tons/week per mile Downstream. This is considerably more than the estimated salt loading to irrigated fields, indicating substantial dissolution of additional salts from shale and shale-derived soils, which occurs as groundwater makes its way to the streams.

Answers to Specific Questions of Concern to Water Managers and Regulatory Agencies

When possible, answers are provided to a number of specific questions that were raised during different stages of this study:

1. *How do the characteristic irrigation water balance component (WBC) and E_a values for sampled conventional surface irrigation systems compare to those for improved technology (especially sprinkler) systems?*

   There is a significant difference in the WBC and E_a values for sampled conventional surface irrigation systems compared to those for sprinkler systems.

   The estimated mean value of Q_I for all monitored surface irrigation events was almost four times larger than that for sprinkler irrigation events. The mean value of DPF for all surface irrigation events was about 1.9 times greater than for sprinkler irrigation events. Water balance calculations indicated that little to no deep percolation occurred on several monitored sprinkler-irrigated fields. Average E_a for monitored surface irrigation events was 20 percentage points lower than for sprinkler irrigation events. No tailwater runoff was observed on sprinkler-irrigated fields. On surface-irrigated fields TRF averaged about eight percent.

2. *Do the characteristic WBC and E_a values for irrigation events seem to vary significantly from canal to canal; which is to say, do the values appear to be affected by total water supply available from one canal to another, within a single year?*

While this study monitored a substantial total number of irrigation events, there were not enough observed events under the command of different canal systems to answer this question with statistical significance.

3. *Do the characteristic WBC and E_a values vary significantly from year to year within the same canal system; i.e., do WBC and E_a appear to be affected by total water supply available within a canal?*

   While this study monitored a substantial total number of irrigation events, there were not enough observed events within different irrigation seasons under the command of different canal systems to answer this question with statistical significance.

4. *Do the characteristic WBC and E_a values differ between surface-water supplied sprinklers as compared to groundwater-supplied systems?*

   The project focused on sprinkler-irrigated fields mainly in 2008. For that year, in the Upstream region seven monitored sprinkler-irrigated fields were supplied from groundwater pumping wells while one was supplied from surface water. On the other hand, the 19 sprinkler-irrigated fields in the Downstream region were all supplied by canal water through stabilization ponds. The average Q_A, Q_I, TRF, DPF and E_a values for the Upstream fields were 2.0 in, 1.8 in, 0.0 percent, 12.2 percent, and 82.8 percent while for the Downstream fields the respective values were 2.3 in, 2.1 in, 0.0 percent, 7.1 percent, 87.8 percent. There was no statistically significant difference between the WBC and E_a values estimated for surface-water supplied and groundwater-supplied sprinkler systems.

5. *Is there any indication of intentional bias introduced into the study by irrigators hoping to demonstrate that the achievable WBC and E_a values using surface-supplied sprinklers is no different than that associated with flood and furrow methods?*

   No intentional bias was detected. The irrigated fields that were monitored in this study were selected based on their suitability to the study objectives and their convenience (location, ability to monitor, source of water, etc) rather than by a broad request for volunteers from among irrigators.

6. *Do the data indicate any effect of soil salinity on crop yield? If so, what conclusions can be reached with these data, and what additional information is necessary to adequately quantify the impact of soil salinity on crop yield in the LARV?*

   Yes, based on the crop biomass samples collected on corn and alfalfa fields there appears to be a clear trend of decreasing crop yield as EC_e increases above a threshold value of three to five dS/m. There are many factors that affect crop yield (so such as irrigation amount, fertilizer application, pest management, crop variety, etc.). Additional data on these factors should be collected in order to remove that variability from the data. Measurements on a larger number of fields also would strengthen understanding of the crop yield – EC_e relationship for various crops.

7. *Do the data indicate any effect of irrigation timing or amount on crop yield? If so, what conclusions can be reached with these data, and what additional information is necessary to adequately quantify the impact of irrigation management practices on crop yield in the LARV?*

   A statistically significant weak correlation was detected between average crop yield and average total Q_A on monitored fields. However, not enough data were collected on irrigation timing (given that all irrigation events on fields typically were not monitored) and spatial uniformity of irrigation applications to definitively answer these questions. To do so would require monitoring of a much larger number of fields and irrigation events, under more carefully controlled conditions.

8. *What are the known or assumed possibilities and limitations for correlating crop yield and soil salinity to ET for the fields included in this study?*

   As stated above, clear trends of decreasing crop biomass with increasing EC_e were detected on a number of fields investigated in this study. Also, using the ReSET model with satellite imagery, estimates of the impact of EC_e on crop ET_a were developed for a number of corn fields. There appears to be a clear trend of decreasing ET_a as EC_e increases above threshold values of roughly three to five dS/m, corresponding to the thresholds detected for impact on crop yield.

9. *Does crop type appear to affect WBC and E_a under sprinkler systems?*

An examination of differences in DPF and E_a for sprinkler-irrigated events on corn and alfalfa fields revealed no statistically significant difference.

10. *Do sprinkler operators typically apply sufficient volumes of water necessary to meet the ET requirement of crops?*

This has not yet been thoroughly examined. However, the fact that no deep percolation occurred for about 72 percent of sprinkler irrigation events indicates that fields are likely being under-irrigated.

11. *Do sprinkler irrigators apply sufficient water to meet the salt leaching requirement for the soil root zone?*

Water balance calculations indicated that no deep percolation occurred on about 72 percent of monitored sprinkler irrigation events, indicating no salt leaching occurred during these events. If this practice continues, problems associated with increased soil salinity are to be expected.

12. *What is the difference in the WBC and E_a of sprinkler systems that practice leaching to those that do not?*

Given that very little leaching (very little deep percolation) was observed on the sprinkler-irrigated fields that were monitored, this question cannot be answered with the data that were collected.

13. *Are there significant differences in deep percolation and leaching fraction for various types of sprinkler systems?*

Given that very little leaching was observed (very little deep percolation) on the sprinkler-irrigated fields that were monitored, this question cannot be answered with the data that were collected.

14. *How do alfalfa crop yields from sprinkler irrigated fields compare with those irrigated by flood and furrow irrigation methods?*

There were an inadequate number of monitored fields to provide a statistically significant evaluation of this question.

15. *How do water table depth and salinity, soil salinity, and crop yields relate to WBC and E_a?*

No statistically significant relationships could be detected using the data from this study.

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EXHIBIT S

To: 1041 Application Committee : Reviewing Arkansas River Farms' application for change of land use.
From: Melvin DePra: Area Wildlife Manager, Retired, Colorado Division of Wildlife. *See attached resume.*

I have been contracted by Arkansas River Farms for the purpose of identifying the impact on wildlife habitat involved with the conversion of Ft. Lyon irrigation water to LAWMA shares, on 2,207 acres in Bent, Otero and Prowers counties and the subsequent planting of those acres to a permanent cover of a cool season, dry land pasture mix. The dry up acres are currently planted to milo, which mainly serves as a winter food source for resident wildlife and shelter for small rodents.

The proposed dryland pasture mix consists of bunch grasses (*Tetraploid Perennial Rye, Paiute Orchardgrass, Hycrest Crested Wheatgrass, and Dahurian Wildrye*) and sod grasses *(Lincoln Smooth Brome & Pubescent Wheatgrass)*. The bunch grasses would provide increased opportunity for wildlife nesting for native songbirds, small rodents and upland game along with brood rearing cover. These grasses consist of scattered clumps of herbaceous plants interspersed with bare soil or soil with only a light layer of litter. Any first cutting haying operations should be delayed until after July 1. Burning and rotational grazing can also be used to remove additional litter and prevent the sod grasses from becoming a solid mat. The open under story provides easy wildlife movement while providing protective overhead cover for broods foraging on insects and fallen seeds. Winter and escape cover are provided until the bunch grasses are not usable due to snow depth. The rye grasses would be utilized by the grazing and browsing wildlife and the seeds, feed for birds.

The wheat and brome grasses would allow for increased rodent and insect production, which increases hunting opportunity for eagles, hawks, falcons, owls, furbearers, turkeys, small game and reptiles. Additional forage will attract deer and antelope. Seeds for birds and numerous small mammals are also known benefits of the wheatgrass. Turkeys and pheasants would also use the areas for breeding displays. Thick, solid stands of wheatgrass would provide good winter cover, but marginal use as nesting cover. The thinner, taller stands are preferred nesting sites for upland game birds, waterfowl and various mammals.

In conclusion, any permanent grass stands that are established would be of more benefit to wildlife than barren ground with minimal weed cover. Native, warm season grasses provide optimum habitat conditions to more native wildlife species, than do cool season grasses. However, with sound management practices that interrupt cool season grass growth to full maturity, significant wildlife habitat enhancement will result from planting the cool season grasses to be used by Arkansas River Farms in this application. If reseeding is required in limited areas, a mixture of switch grass and bluestem might be used to further enhance the winter cover and increase the wildlife values. Due to their durable structure, the above mentioned grasses will stand upright under two feet of snow. Management practices to be considered are burning, haying and rotational grazing and the planting of the taller grasses would increase snow collection, resulting in increased production of vegetation, seed production and overall general plant health.

In regards to the dryland farming of an additional 3,746 acre, this will also benefit wildlife habitat by creating more edge effect on common borders of the permanent grass stands and the small grains that will be planted every other year. In farm communities, most edges are created by humans growing fields of varying crops.

Edges are unique because they combine some of the characteristics of two or more habitats. Edges are inhabited by some of the animals and plants that are found in each of the original habitats, along with species that are specially adapted to live in transition habitats. Therefore, edges usually have more diverse wildlife communities than unbroken blocks of habitat. This increased diversity is known as *the edge effect.* Grass fields/small grain fields intersections provide nesting, brooding, feeding, roosting and escape cover for a wide variety of wildlife. Edges can also provide travel corridors for predators like raccoons, foxes, coyotes, skunks and opossums that severely impact plains associated songbirds, along with upland and small game species of wildlife.

Successful edge management techniques involve periodic mowing, disking, burning and leaving adequate stubble height after harvest. These practices can be very beneficial in enhancing habitat and wildlife species diversity. Summer fallowing can also increase annual weed production that can be beneficial to multiple species.

There will also be ground water recharge pits constructed at five different locations. They will range in size from five to ten surface acres and when operating, create additional beneficial wetlands. Existing vegetation will eventually be replaced by other plant species associated with moist soils, thus providing more diversity in available habitat and increase wildlife diversity. This will also increase the insect activity, thus attracting more prairie and shore birds, and small amphibians to the recharge locations. Depending on the length of time and availability of exposed surface water, the use of the area by hoofed wildlife and waterfowl will increase. The recharge pits will mimic tail water impoundments with taller vegetation, available water and annual weed production. All of which are beneficial to resident wildlife.

In summary, all wildlife species need food, water and shelter to exist. This proposal should enhance, under normal climatic conditions, the basic wildlife habitat of the area and create additional biodiversity opportunities.

Respectfully submitted,

Melvin DePra

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CAREER OBJECTIVE

To continue to utilize the skills and experiences I have gained in 32 years of dedicated service to wildlife management and public service.

EDUCATION

Colorado State University, Ft. Collins, CO
Bachelor of Science Degree: Wildlife Management
Graduated: December 1971

Joliet Junior College, Joliet, IL
Associate Degree: Biological Science
Graduated: May 1969

WORK EXPERIENCE

Midwestern Farm..........Hartman, CO
2008 to present - Property Manager
- Managed gravel removal and farming
- Coordinated reclamation activities

Retired from Colorado Division of Wildlife-May 2004

Colorado Division of Wildlife..........Lamar, CO
March 1983 to May 2004 - Area Wildlife Manager/Wildlife Manager V
Responsibilities:
- First line field supervisor of twelve area personnel
- Cost center supervisor of $300,000 annual operating budget
- Budget development and justification
- Develop and monitor employee work plans
- Conduct annual performance evaluations
- Habitat development & maintenance in 20 wildlife areas
- Wildlife management & regulation development
- Law enforcement
- Game damage evaluation
- Public relations & Conservation education

September 1976 to March 1983 - District Wildlife Manager/Wildlife Manager III ...Evergreen, CO
Responsibilities:
- Natural resource protection and conservation
- Law enforcement
- Wildlife management
- Game damage evaluation
- Public relations and education

February 1973 to September 1976 - District Wildlife Manager..........S. E. Denver, CO
Responsibilities: Same as above

July 1972 to February 1973 - Wildlife Officer Trainee..........Denver, CO
Responsibilities: Schooling in state directives, policies, procedures and regulatory law concerning wildlife management and conservation.

February 1972 to June 1972 - Utility Worker I..........Ft. Collins, CO
Responsibilities: Assistant to Wildlife Biologist

Field research
Data compilation

July 1971 to December 1971 - Junior Trainee................Field Assignments throughout Colorado
Responsibilities: same as Wildlife Officer trainee

HONORS & LEADERSHIP ACTIVITIES

Colorado Division of Wildlife
In appreciation of efforts in behalf of SE Colorado wildlife-----------------------March 1991

Outstanding contributions in improving landowner and sportsman relation --January 1990

Outstanding contribution in implementing conservation reserve programs--February 1987

Recognition of Excellence and Dedication in the SE Region-----------------------1985-1986

Colorado Trappers Association
Colorado Wildlife Professional of the year--1981

Colorado Wildlife Commission
Recognition of continuing and ongoing contributions to the State of Colorado
and the management of its wildlife resources------------------------September 1988

Lamar Chamber of Commerce
Spirit of Lamar Award--1992

Southeast Colorado Game & Fish Club
In appreciation of your service to the organization--1993

United States Department of Agriculture
Certificate of appreciation for valuable and continued assistance, coordination &
cooperation in facilitating effective management of the fish and wildlife
resources on Comanche National Grasslands----------------------------August 1989

Pheasants Forever Organization
Secretary/Treasurer for local chapter--1988 to present

ADDITIONAL QUALIFICATIONS

P.O.S.T. Certified Peace Officer of Colorado

Special Commission with U. S. Fish & Wildlife Service

CPR & First Aid Card

20 years experience implementing conservation practices with the local NRCS office

18 years experience with shrub planting design & installation with local Pheasants Forever chapter

10 years planning and implementing area landowner appreciation dinners

10 years working with the U. S. Fish & Wildlife Service and Partners for Wildlife program

10 years working with the C. S. Forest Service on forest stewardship & living snow fence program

5 years working with the Water for Wildlife Foundation

REFERENCES

Mrs. Kelly Spitzer
Midwestern Farm owner
P.O. Box 246
Wiley, CO 81092
(719) 829-4408

Mr. Mark Stark
Army Corp of Engineers, Retired
504 Lavista Road
Pueblo, CO 81005
(719) 688-1515

Mr. Gordon East
CDOW - Land Use Coordinator - Retired
10395 Xavier Ct.
Westminster, CO 80030
(303) 465-3104

(6) Environmental Impact Analysis

(d) Significantly Environmentally Sensitive Factors
(v) Critical wildlife habitat or other wildlife protection areas

Introduction

This exhibit provides an analysis of estimated impacts of the proposed dry-up actions associated with the Arkansas Valley Farms project (ARF Project) to local wildlife and wildlife habitat.

Existing conditions for wildlife habitat, as well as general wildlife resources and Special Status Species, are discussed by group below. If scientific binomials are not listed Tables 1 through 3, they are presented in the text. This descriptions are followed by an estimated impact analysis for each group.

1.1 Existing Conditions

Because most wildlife species move through contiguous habitat, this analysis addressed a Project Area that comprises all of the farms involved in the ARF Project as well as all intervening lands and irrigation laterals, the Arkansas River corridor and tributaries. The Project Area is generally bounded by the Arkansas River to the south; La Junta to the west; Lamar to the east; and the northernmost farms to the north, as illustrated in Figure 1. Some portions of this area extend beyond Bent County.

A desktop review of publically available literature, geospatial data, and web-based queries to U.S. Fish and Wildlife Service (USFWS); Colorado Parks and Wildlife (CPW), Natural Diversity Information Source (NDIS) database; and U.S. Geological Service's (USGS) Landscape Fire and Resource Management Planning Tools Project (LANDFIRE) was performed (USFWS 2017, CPW 2017, USGS 2010). In addition, a brief site visit was conducted on November 13, 2017. The desktop analysis and site visit provide baseline information to determine existing conditions, as well as to determine if habitat for Special Status wildlife species exists within the Project area.

Wildlife Habitat

Wildlife habitat throughout the Project Area as defined by dominant vegetation cover, as illustrated in Figure 1. Open water habitat includes the Arkansas River corridor and tributaries, irrigation laterals, and the northern portions of John Martin Reservoir. In addition to open water habitat, these areas support floodplain herbaceous wetlands, in a mosaic with an extensive overstory of riparian trees and shrubs, including sand bar willow (*Salix exigua*), crack willow (*S. fragilis*), peachleaf willow (*S. amygdaloides*), plains cottonwood (*Populus deltoides*), narrowleaf cottonwood (P. angustifolia), and silver cottonwood (*P. alba*). Extensive stands of tamarisk (*Tamarix chinensis*) and Russian-olive (*Elaeagnus angustifolia*) also occur within these areas.

The largest portions of the Project Area include farmland and hay fields. A number of types of irrigated farmlands support various row crops or are seasonally fallow. Irrigated hayfields and pastures support harvested alfalfa and hay crops. A large area of non-irrigated rangeland along the northern edge of the Project Areas is characterized as shortgrass prairie, dominated by native grasses, including buffalo grass (*Buchlöe dactyloides*), blue grama (Chondrosum gracile), sideoats grama (Bouteloua curtipendula), western wheatgrass (*Pascopyrum smithii*), little bluestem (*Schizachyrium scoparium*), and sand dropseed *(Sporobolus cryptandrus*)

Common weeds occur throughout the Project Area, often along road verges and edges of irrigated agricultural fields that are treated to control weeds. Common broadleaf species include common blue mustard (*Chorispora tenella*), tall tumble mustard (*Sisymbrium altissimum*), field bindweed (*Convolvulus arvensis),* prickly lettuce (*Lactuca serriola*), redstem filaree (*Erodium cicutarium*), hoary cress *(Cardaria draba),* and field pennycress (*Thlaspi arvense*). Johnsongrass (*Sorghum halepense*) is found in large stands in wet areas at the edges of fields. Kochia (*Bassia scoparia*) and Russian-thistle (*Salsola australis*) dominate in stands along the banks of irrigation laterals.

General Wildlife Species

Mammals

Black bear and mountain lions likely wander along the Arkansas River corridor and occasionally into Project farm areas, as the Natural Diversity Information Source indicates that summer concentration, fall concentration area as well as overall range, overlap the general region of the Project on a large scale. Overall range for mountain lion overlap the Project area, but they're unlikely to remain onsite for any length of time. Although not captured in the NDIS database search, coyotes (*Canis latrans*) are likely residents throughout the Project area; as are common gray foxes (*Urocyon cinereoargenteus*). Common prey species likely to occur within the Project Area include mice, squirrels, voles, rabbits, and black-tailed prairie dogs (*Cynomys ludovicianus*).

Big Game

As summarized in Table 1, CPW documents the Project Area as habitat for American elk, mule deer, white-tailed deer, and pronghorn (NDIS 2017). None were detected within the Project area during the site reconnaissance. All these species most likely forage and bed in the riparian cover along the Arkansas River and tributary creeks, with occasional forays into croplands to eat young crop shoots and grain crops.

Table 1. Mammal Species - CPW Natural Diversity Information Source Results, Arkansas Valley Farm Project Area, Bent County, Colorado

Species	Habitat Designations
American elk *Cervus canadensis*	Limited Use Area Resident Population Area Overall range
mule deer *Odocoileus hemionus*	Highway Crossing Concentration Area Severe Winter Range Winter Range Overall Range
pronghorn *Antilocapra americana*	Overall Range

Table 1. Mammal Species - CPW Natural Diversity Information Source Results, Arkansas Valley Farm Project Area, Bent County, Colorado

Species	Habitat Designations
white-tailed deer *Odocoileus virginianus*	Highway Crossing Concentration Area Overall Range
mountain lion *Felis concolor*	Peripheral Range Overall range
black bear *Ursus americanus*	Overall Range

Birds

Willow (*Salix* spp.), cottonwood trees (*Populus* spp.), with fair amounts of tamarix and Russian-olive in riparian habitat along the Arkansas River, as well as major tributaries and irrigation ditches, provide bald eagle (*Haliaeetus leucocephalus)* roost sites. Open water, such as the John Martin Reservoir, provides winter range forage areas for eagle. Hay fields provides foraging habitat for red-tailed hawk *(Buteo jamaicensis)* and American kestrel *(Falco sparverius*), both of which were observed ruing the site visit. Swainson's hawks (*Buteo swainsoni*) and northern harriers (*Circus hudsonius*) were observed throughout the project area.

Other birds with defined habitat within the Project Area are listed in Table 2. Most species listed make primary use of the open water, shores, and riparian habitat associated with the Arkansas River and tributary creeks. Wild turkeys, ring-necked pheasants,

Very few songbirds were detected within the Project area during the site reconnaissance. Western meadowlark *(Sturnella neglecta),* American robin *(Turdus migratorius),* and red-winged blackbird *(Agelaius phoeniceus*), were observed in the vicinity of irrigated and dryland farm fields.

Table 2. Bird Species - CPW Natural Diversity Information Source Results, Arkansas Valley Farm Project Area, Bent County, Colorado

Species	Habitat Designation
bald eagle *Haliaeetus leucocephalus*	Roost Site Communal Roosts Winter Concentration Winter Forage Winter Range
bobwhite quail *Colinus virginianus*	Concentration Area Overall Range
Canada geese *Branta canadensis*	Foraging Areas Winter Concentration Areas Winter Range

Table 2. Bird Species - CPW Natural Diversity Information Source Results, Arkansas Valley Farm Project Area, Bent County, Colorado

Species	Habitat Designation
snow geese *Chen caerulescens*	Winter Range
great blue heron *Ardea herodias*	Nesting Area Foraging Area
greater prairie chicken *Tympanuchus cupido*	Historic Range
lesser prairie chicken *Tympanuchus pallidicinctus*	Historic Range
ring-necked pheasant *Phasianus colchicus*	Concentration Area Overall Range
scaled quail *Callipepla squamata*	Overall range
white pelican *Pelecanus erythrorhynchos*	Foraging Area Overall Range
wild turkey *Meleagris gallopavo*	Roost Sites Production Areas Winter Concentration Areas Winter Range Overall Range

Reptiles and Amphibians

Limited habitat exists in farmlands and hayfields for reptiles and amphibians. Possible common species include bullsnake and garter snake(s). More native habitats such as the river corridor and grasslands provide overall range for a number of snakes and lizards, listed in Table 3. Many of these amphibians would be associated with the open water and shorelines of the Arkansas River and tributary creeks. Most of the snake species inhabit the more natural grasslands in the Project Area. Few are likely to use currently irrigated croplands and hay meadows.

Table 3. Reptile and Amphibian Species* - CPW Natural Diversity Information Source Results, Arkansas Valley Farm Project Area, Bent County, Colorado

Species	
black-necked garter snake *(Thamnophis cyrtopsis)*	ornate box turtle (*Terrapene ornata ornata)*

Table 3. Reptile and Amphibian Species* - CPW Natural Diversity Information Source Results, Arkansas Valley Farm Project Area, Bent County, Colorado

Species	
bullsnake (*Pituophis catenifer sayi*)	painted turtle (*Chrysemys picta)*
coachwhip (*Masticophis flagellum)*	plains black-headed snake (*Tantilla nigriceps*)
common kingsnake (*Lampropeltis getula)*	plains garter snake (*Thamnophis radix)*
common lesser earless lizard (*Holbrookia maculata)*	plains hog-nosed snake (*Heterodon nasicus nasicus)*
desert nightsnake (*Hypsiglena torquata)*	prairie lizard (*Sceloporus consobrinus)*
eastern collared lizard (*Crotaphytus collaris*)	prairie rattlesnake (*Crotalus viridis)*
glossy snake (*Arizona elegans)*	round-tailed horned lizard (*Phrynosoma modestum)*
Great Plains rat snake (*Pantherophis emoryi)*	six-lined racerunner (*Aspidoscelis sexlineata)*
Great Plains skink (*Plestiodon obsoletus)*	snapping turtle (*Chelydra serpentine)*
lined snake (*Tropidoclonion lineatum)*	spiny softshell turtle (*Apalone spinifera*)
long-nosed snake (*Rhinocheilus lecontei*)	terrestrial garter snake (*Thamnophis elegans)*
massasauga[1] (*Sistrurus catenatus)*	Texas-horned lizard[1] (*Phrynosoma cornutum)*
milk snake (*Lampropeltis triangulum***)**	triploid checkered whiptail (*Cnemidophorus neotesselatus)*
North American racer (*Coluber constrictor)*	western ground snake (*Sonora semiannulata)*
northern water snake (*Nerodia sipedon)*	yellow mud turtle (*Kinosternon flavescens)*

* Overall Range
[1] also Potential Habitat

Fisheries

Although significant fisheries are supported in the Arkansas River, CPW documents no fisheries within the vicinity of the Project Area.

Special Status Wildlife Species

For the purposes of this summary, Special Status wildlife species include those with Federal status (Threatened, Endangered, or Candidate species) listed by the USFWS pursuant to the Endangered Species Act (ESA) (USFWS 2017); and those with State of Colorado status (threatened or endangered or species of special concern) designated by the Colorado Nongame Wildlife Regulations (CPW 2017). USFWS and CPW websites were consulted to identify known locations of these species. Wildlife data were compiled during a desktop level analysis in April 2017, while a site visit for special status wildlife species was conducted on April 21, 2017.

Two ESA-listed bird species were identified as potentially present within the Project area (USFWS 2017). The least tern is listed as Endangered; and the piping plover is listed as Threatened. These species are described below. There is no designated Critical Habitat for these, or any other ESA-listed species, within the Project Area (USFWS 2017).

§ The **least tern** (*Sterna antillarum*) is listed as Endangered by the ESA. Least terns are small, ground nesting birds. They forage in streams, reservoirs, marshes, gravel pits, and other impounded wetlands. In Colorado, least terns breed only in the Lower Arkansas River Basin; nesting in open, sandy soils, including sandy shores, such as John Martin Reservoir. However, the regulation of water probably precludes least terns from much successfully nesting. Least tern Production Area and Foraging Area habitats are noted to occur within the Project area (NDIS 2017).

§ The **piping plover** (*Charadrius melodus*) is listed as Threatened by the ESA. Piping plover are small, ground nesting shorebirds that forage for invertebrates along sandy shorelines. They occur in eastern Colorado as rare migrants. In the Project Area, they have been known to use the sparsely-vegetated sandy shorelines of the John Martin Reservoir for nesting. Piping plover Production Area and Foraging Area habitats are noted to occur within the Project area (NDIS 2017).

Potential habitat for a number of Birds of Conservation Concern (BCC), as listed by the USFWS, may occur within the Project Area. These are listed below in Table 4. While some of the BCC species may forage or otherwise move-through agricultural fields, none of these bird species breed or nest in this habitat.

Table 4. Birds of Conservation Concern,
Arkansas Valley Farm Project Area, Bent County, Colorado

Status	Common Name	Scientific Name	Likelihood of Occurrence	Rationale
Birds				
State Threatened	burrowing owl	*Athene cunicularia*	Possible	Within limited prairie dogs colonies
BCC	Cassin's Sparrow	*Aimophila cassinii*	Possible	Potential habitat
BCC	chestnut-collared longspur	*Calcarius ornatus*	Possible	Potential habitat
BCC	golden eagle	*Aquila chrysaetos*	Possible	Potential habitat
BCC	Hudsonian godwit	*Limosa haemastica*	Possible	Potential habitat; non-breeding

Table 4. Birds of Conservation Concern,
Arkansas Valley Farm Project Area, Bent County, Colorado

Status	Common Name	Scientific Name	Likelihood of Occurrence	Rationale
BCC	lark bunting	*Calamospiza melanocorys*	Possible	Potential habitat
BCC	lesser yellowlegs	*Tringa flavipes*	Possible	Potential habitat
BCC	Lewis's woodpecker	*Melanerpes lewis*	Possible	Potential habitat
BCC	long-billed curlew	*Numenius americanus*	Possible	Potential habitat
BCC	Mccown's longspur	*Calcarius mccownii*	Possible	Potential habitat
BCC	semipalmated sandpiper	*Calidris pusilla*	Possible	Potential habitat
BCC	snowy plover	*Charadrius alexandrinus*	Possible	Potential habitat
BCC	whimbrel	*Numenius phaeopus*	Possible	Potential habitat; non-breeding
BCC	willet	*Tringa semipalmata*	Possible	Potential habitat
BCC	willow flycatcher	*Empidonax traillii*	Possible	Potential habitat

1.2 Impact Analysis

This impact analysis integrates all of the ARF Project details as described in Exhibit C and quantified in Exhibit K. It assumes all Best Management Practices (BMPs), monitoring, reporting, and certifications described in Exhibit A would be conducted as described.

The dry-up involved in the ARF Project would comprise five particular activities that have the potential to impact wildlife and/or wildlife habitat. Each are described comprehensively in the 1041 permit application and are briefly characterized below. Areas noted are for the entire Project, some of which actions would not occur in Bent County.

§ Conversion of lands by revegetation (1,985.58 acres). This would entail establishment of native grasses or such other self-sustaining suitable dry-land ground cover. This process would generally include the following steps: removal of perennial cover (except for desirable, established grass species), such as alfalfa; weed treatments; installation of temporary cover crop (in some cases) for first growing season; drill seeding with permanent cover seed mixes; and on-going weed management. Scattered, small prairie dogs populations may require control, over time. This would be done in compliance with county-specific regulations.

§ Conversion of lands to dry-land farming (3,746.5 acres) – establishment and maintenance of no-till, or minimum-tillage dry-land farming. Periodic fallowing and crop rotation may be used to stabilize crop yields and allow for soil rest. Scattered, small prairie dogs populations may require control, over time. This would be done in compliance with county-specific regulations.

§ Modifying length and location of irrigation laterals to accommodate required water movements, including confluence with natural creeks that would conduct required return of surface flow to the Arkansas River. The areas of modified irrigation lateral length are summarized in Table 5.

§ Increased summer water flow in natural creek tributaries conduct required return of surface flow to the Arkansas River.

§ Construction and maintenance of infiltration ponds to allow for required return of water shares to the Arkansas River groundwater flow. These ponds would be filled in the summer months, then allowed to recharge into the water table, drying into the winter. This would include revegetation of augmentation pond margins by seeding with mix of desired herbaceous species. Weed control would be conducted, as required. Removal of woody vegetation would also be conducted. The areas of created infiltration ponds are summarized in Table 5.

The following sections describe estimated impacts of implementing these actions to wildlife habitat, general wildlife species, and special status wildlife species.

Table 5. Total Length of Irrigation Lateral Changes and Associated Areas of Augmentation Pond Creation, Arkansas Valley Farm Project Area, Bent County, Colorado

Lateral	Gain (miles)	Loss (miles)	Net (miles)	Pond Area (acres)
27	0.2	0	0.2	3
Horse Creek	0	0	0	0
145		1.35	-1.35	4
McClave	0	0	0	3
201E/205	0.5	0.5	0	5
230/230G	0	0	0	4
125	1	0	1	0
126	1.5	0	1.5	0
151E (Verhoff)	0	0	0	0
160	0	0	0	0
166	1	0	1	4
181	0.5	0	0.5	0
Total	**4.7**	**1.85**	**2.85**	**23**

Wildlife Habitat

The most extensive impacts to wildlife habitat would result from implementation of dry-up activities that convert 1,986 acres of irrigated farmland to native grasses or other self-sustaining cover and 3,746.5 acres to dry-land farming crops. While these are relatively large areas, the impact to wildlife habitat is estimated to be relatively small, and beneficial. Irrigated croplands generally do not provide much wildlife habitat, due to the annual disturbances of soil disking, seeding, weed control, and harvesting. Irrigated agricultural areas also result in vegetation monocultures that provides cover and food sources to only a limited number of wildlife species. Therefore, conversion of almost 2,000 acres of irrigated cropland to native grasses or other self-sustaining cover would result in reduced annual disturbances from agricultural activities, as well as eventually replace existing monoculture crops with a more variable vegetation community. Both of these consequences of the dry-up activities in these areas are expected to create somewhat better areas of wildlife habitat.

The same is estimated, although to a lesser degree, for the conversion of irrigated croplands to dry-land crops. These areas are expected to generally receive less frequent disturbances from agricultural activities, as well as experience regular fallow periods. This would provide more stable habitat cover for some wildlife species, even if the planted crops would still result in monoculture vegetation. Beneficial impacts to wildlife habitat are also expected from a reduction in non-native plant species and noxious weeds from revegetation and dry-land farming management activities.

A beneficial impact to linear open water habitat in irrigation laterals would result from the net gain of 2.85 miles of lateral ditches, for the annual periods of water flow (Table 5). A commensurate increase in the length of ditch-bank mesic vegetation is also expected. In addition, water flow in open water habitat in existing natural creeks would increase in the summer months, as required return of surface flow to the Arkansas River is conducted.

Additional beneficial impacts to wildlife habitat would be realized by the creation of approximately 23 acres of open water habitat from augmentation ponds, through the summer and fall months when water stands in these areas. Shoreline habitat would also be created around these ponds, although the nature of these new shoreline communities would be modified from natural diversity by management of woody vegetation.

General Wildlife Species

Potential direct adverse impacts to wildlife includes injury or death of individual animals. An increase in such impacts is not expected from implementation of dry-up activities, beyond those that incidentally occur during normal irrigated field cultivation or lateral ditch maintenance. Most wildlife species avoid impacts by moving away from the site while human activities occur. Creation of the proposed augmentation ponds should not cause direct impacts to wildlife, unless these activities are conducted during ground-nesting season, when such nests may be disturbed.

Indirect impacts caused by changes in habitat have been discussed above. Many of wildlife species identified above are currently associated with habitat provided by the Arkansas River corridor and tributary creeks, or native grasslands, not irrigated farmland and hayfields that would be converted by the dry-up project activities. Therefore, these areas would not be impacted by the proposed dry-up activities, except for the beneficial impact of increasing water flow in some of the tributary creeks during the summer months. Because irrigated croplands and hayfields do not currently provide particularly good wildlife habitat, the proposed dry-up activities and resulting vegetation conversion are not likely to cause adverse impacts to wildlife.

Some beneficial impacts to wildlife are expected due to the reduced activities and disturbances in the dry-up revegetation areas. Likewise, because the eventual vegetation cover in these areas would be more diverse, natural, and support fewer weeds than current conditions, many bird, rodent, and reptile species would eventually find better habitat in these areas. There would be the same beneficial impacts realized the revegetation areas that , Many wildlife species would avoid impacts by moving away from the site while the dry-up would be implemented. Negligible impacts to habitat for the commonly occurring reptiles and amphibians in this area are anticipated, as the species likely do not extensively use the irrigated hay field and would move on to adjacent habitats.

Special Status Wildlife Species

No impacts to least terns and piping plovers are expected to be incurred by implementation of the proposed dry-up activities. These birds are restricted in the Project Area to the shorelines on the Arkansas River, which would experience no impacts as a result of implementation of project dry-up activities.

No adverse impacts are expected to burrowing owls, if surveys are done prior to prairie dog control actions, or if control occurs outside the burrowing owl nesting season. Surveys should be conducted during times when burrowing owls may be present on prairie dog colonies; between March 15 and October 31. No burrowing owls are expected in these colonies between November 1 and March 14.

Few, if any adverse impacts to BCC birds are expected. Irrigated croplands and hay meadows have limited value to these species. Therefore, conversion by dry-up activities would be expected to have nominal impacts. Currently the areas are used by commonly occurring generalist species, and during dry-up activities these species would move to preferred habitats adjacent to the Project Area.

References

Colorado Parks and Wildlife (CPW). 2017. Threatened and Endangered List. Available: http://cpw.state.co.us/learn/Pages/SOC-ThreatenedEndangeredList.aspx. Accessed November 3, 2017.

Landscape Fire and Resource Management Planning Tools Project (LANDFIRE). 2010. Wildland Fire Science, Earth Resources Observation and Science Center, U.S. Department of Interior, Geological Survey. Sioux Falls, SD. Available: http://landfire.cr.usgs.gov/viewer/. Accessed November 3, 2017.

Natural Diversity Information Source (NDIS). 2017. Natural Diversity Information Source. Available: http://ndis.nrel.colostate.edu/wildlife.asp. Accessed November 3, 2017.

U.S. Fish and Wildlife Service (USFWS). 2017. Environmental Conservation Online System. Available: http://ecos.fws.gov/tess_public/countySearch!speciesByCountyReport.action?fips=08055. Accessed November 3, 2017.

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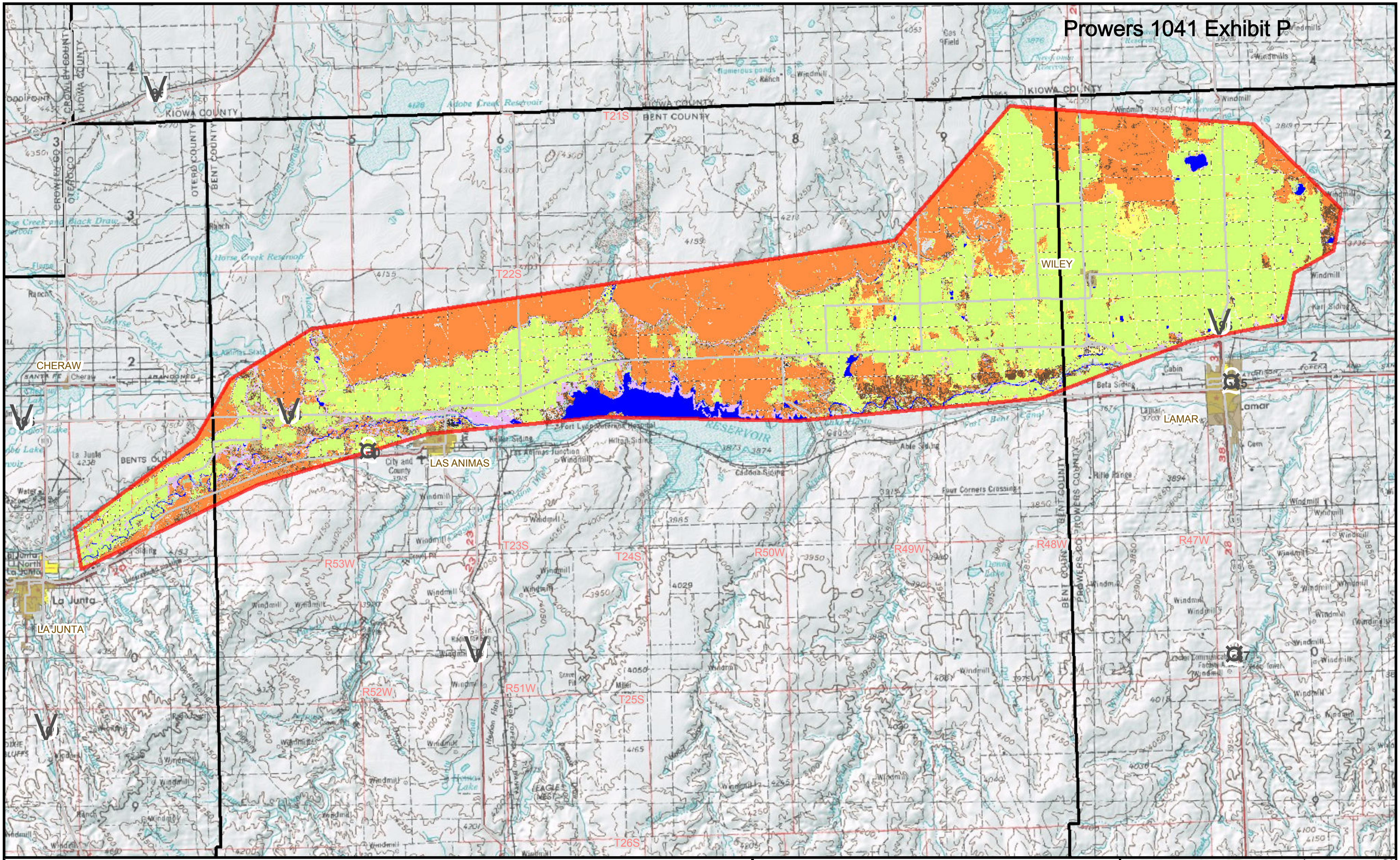

Landfire Existing Vegetation Type

- Open Water
- Developed-Upland Herbaceous
- Developed-Roads
- NASS-Row Crop
- NASS-Close Grown Crop
- NASS-Fallow/Idle Cropland
- Herbaceous Wetlands
- Agriculture-Cultivated Crops and Irrigated Agriculture
- Colorado Plateau Mixed Low Sagebrush Shrubland
- Western Great Plains Sandhill Steppe
- Western Great Plains Shortgrass Prairie
- Arkansas River Farms Project Area
- Interstate Highway
- Major Road
- County boundary

Data Source:

USGS 2010

Figure 1

Arkansas River Farms Project Vegetation Types

Bent County, Colorado

0 2.75 5.5 11

Miles

U:\Projects_2015\ArkansasValleyFarms\AVF_Landfire.mxd 11/9/2017

Exhibit Q
ARF PROPOSED
REVEGETATION AND DRY-LAND FARMING
CERTIFICATION PROCESS

This exhibit responds to the requirement that Applicant show how Design and Performance Standards for Chapter 3.304 (g) will be met.

The FLCC Board approved the following process for implementing a reasonable revegetation and dry-land farming plan ("Process"). ARF proposes that the County adopt the same Process to prevent overlap in regulatory requirements.

I. REVEGETATION AND DRY-LAND PROCESS

1. Upon the removal of irrigation water from each LAWMA Dry-Up parcel, such parcel shall be subject to these requirements to be revegetated or converted to dry-land farming. The revegetation or conversion to dry-land farming shall be done in the manner described in Sections A and B below.

2. ARF shall have ten (10) years from the date irrigation water is removed from a parcel of LAWMA Dry-Up to obtain a Certificate of Completion for that parcel of the LAWMA Dry-Up.

3. Prior to removal of a LAWMA Dry-Up parcel from irrigation, ARF will give notice to the County and Company that provides: i) the identity of the parcel(s) to be removed from irrigation; ii) a statement of whether the parcel(s) will be revegetated or dry-land farmed.

4. Upon the removal of lands from irrigation, ARF shall allow dry-land farming on no more than sixty five percent (65%) of the ARF owned LAWMA Dry-Up lands. As to the thirty five percent (35%) of the ARF owned LAWMA Dry-Up lands not dry-land farmed, ARF shall either revegetate, re-irrigate, or convert the dried up farms to non-agricultural uses including but not limited to gravel mines. ARF owned LAWMA Dry-Up lands do not include approximately 2,000 acres of non-ARF owned farms that are subject to dry-up covenants and that severed water from the land prior to adoption of the Bent County 1041 regualtions. Those farms may be dry-land farmed or revegetated as provided for in the recorded dry-up covenants.

5. ARF will obtain security in an amount equal to the number of acres historically irrigated by any LAWMA Dry-Up farm removed from irrigation multiplied by $250 (number of acres in farm removed from irrigation X $250 = required security amount) to secure its obligation to successfully revegetate or convert the farm to dry-land farming. The security shall be a Letter of Credit from Rabo Bank.

6. ARF shall reserve 500 of its 2,203.44 unchanged Fort Lyon shares to be used to aide in revegetation of the LAWMA Dry-Up. These 500 shares shall be released to ARF after it receives Certificates of Completion for eighty percent (80%) of the LAWMA Dry-Up.

7. Once ARF obtains a Certificate of Completion for any particular parcel of the LAWMA Dry-Up, the security for that parcel shall be released consistent with the terms of the security.
8. Once ARF obtains a Certificate of Completion for any parcel of the LAWMA Dry-Up, FLCC shall have no further oversight of the farming or land management practices on that parcel by Bent County.

9. If ARF has not completed revegetation or converted any LAWMA Dry-Up to dry-land farming within ten years of the parcel being removed from irrigation the County may withdraw and employ from the security such funds as may be necessary to carry out the revegetation work for such parcel, up to an amount equal to the number of acres not certified as complete times $250. In the event that the Company has utilized it's security to revegetate the same parcel, the County shall not withdraw funds from security for revegetation of the same parcel. The County shall provide ARF a reasonable time to cure of no less than one irrigation season for any deficiency identified by the County prior to requesting withdrawal from the security.

10. To the extent that successful establishment and maintenance of revegetation of the LAWMA Dry-Up may require water for an interim period, ARF shall provide such water at its cost. Potential sources of such water may include but are not limited to the following: (i) ground water that is treated as sole-source pumping and is fully-augmented under LAWMA's augmentation plan or other augmentation plan approved by the Water Court for Water Division 2, or any SWSP or Arkansas River replacement plan approved by the State Engineer; (ii) water available to other Fort Lyon Canal Company shares owned by Arkansas River Farms; and/or (iii) water available to certain of the Fort Lyon Shares, repaid to LAWMA in the form of an equivalent reduction in allocation to the LAWMA Trade Shares (e.g., if the water available to all 82 Fort Lyon Shares historically used on the Farm No. 3 Dry-Up is required to establish and maintain revegetation, LAWMA would not allocate water to 82 of the LAWMA Shares during that irrigation season). LAWMA will make the determination as to whether water is required for an interim period to establish and maintain revegetation based on the opinion of its consulting expert in agronomy.

11. In the event that the owner of any LAWMA Dry-Up desires to continue to irrigate portions of the LAWMA Dry-Up with ground water pumped by wells, the County acknowledges that nothing in this Process is intended to preclude the owner from continuing to irrigate the LAWMA Dry-Up with ground water, as long as any such irrigation with ground water is treated as sole-source pumping and is fully augmented under LAWMA's augmentation plan or other augmentation plan approved by the Water Court for Water Division No. 2, or any substitute water supply plan or replacement plan approved by the Colorado State Engineer. If any

dry-up covenant for the LAWMA Dry-Up is more restrictive on the owner of the LAWMA Dry-Up or more protective of LAWMA than this Process, then the terms and conditions of the dry-up covenant shall control.

12. In the event that the owner of any LAWMA Dry-Up desires to irrigate portions of the LAWMA Dry-Up with FLCC shares not part of this application and not previously used on the LAWMA Dry-Up Lands proposed to be irrigated ("New FLCC shares"), the County acknowledges that nothing in this Process is intended to preclude the owner from doing so, as long as any such irrigation with New FLCC shares has been approved by the Company if required by the FLCC By-laws. If any dry-up covenant for the LAWMA Dry-Up is more restrictive on the owner of the LAWMA Dry-Up or more protective of LAWMA than this Process, then the terms and conditions of the dry-up covenant shall control.

II. CERTIFICATION OF COMPLETION

A. Definitions

1. Acceptable for Farms where Revegetation will occur means:

    a. Any field that meets the criteria for Classes VI or VII using the Revegetation Classification Schedule in Section III.

    b. Certain fields may never reach Classes VI or VII, nonetheless, if the Annual Report determines a particular field has been revegetated as far as can be reasonably expected, such field will be Acceptable if noxious weeds and/or erosion of the soil caused by wind is adequately controlled in a manner consistent with state and local law.

    c. Any Field successfully converted to Dry-land Farming shall be Acceptable.

    d. Any Field upon which buildings, grain storage facilities, railways or railroad facilities, oil and gas facilities, wind power generation facilities, power transmission facilities, pump houses, recharge facilities, augmentation stations, feed yards, roads, reservoirs, drains, impervious surfaces or other facilities or structures on a Farm that will adequately control noxious weeds and/or erosion of the soil caused by wind, shall be classified as Acceptable.

    e. Any Field that is irrigated as allowed under the Process term and conditions 11 and 12 above shall be classified as Acceptable.

2. Acceptable Farms where Dry-land Farming will occur means:

a. The farm has been planted to a dry-land crop or is in a fallow period following a dry-land crop; the crop was planted and farmed without irrigation water, such that it is dependent solely upon precipitation to meet crop water requirements; if other dry-land farming in the region is producing crops, the farm also is producing a dry-land crop with weeds adequately controlled and that controls soil erosion from wind in a manner consistent with state and local law; and minimum crop residue after harvesting a dry-land crop is as described below, and the crop residue is left on the parcel until the parcel is prepared for the next rotation of planting; provided, however, that this requirement for crop residue does not prevent a farmer from controlling weeds by mechanical tillage of the parcel or using other acceptable methods of weed control that do not disturb the residue on the surface. For grain crops, such as winter wheat or milo, this shall include a minimum crop residue of at least thirty percent (30%) determined by the step-point method. For hay or forage crops, crop stubble shall measure at least five inches (5") with row spacing no more than thirty inches (30").

b. Recommended best management practices for Farms designated to be Dry-land Farmed shall include the following.

   i. The management of annual precipitation to produce commodities or forage for livestock warranting a reasonable expectation of ongoing profits.

   ii. Weed control methods on crop land may include conservation tillage, mowing or chemicals to manage harvested crop residue to reduce evapotranspiration of soil moisture and maintain ground cover to minimize soil erosion by wind or water.

   iii. Conservation tillage is achieved by the use of non-inversion tillage equipment such as chisels, field cultivators, sweeps, vertical tillage, no-till planters or strip till planters to maximize harvested crop residue ground cover over thirty percent (30%) or more of the entire field.

A Farm designated to be Dry-land Farmed will be deemed Acceptable even in the absence of the above-described recommended best management practices, as long as the requirements in Sub-Section 2.a above have been met for that Farms.

3. Dry-land Farming means the establishment and maintenance of dry-land farming practices with weeds adequately controlled and that controls soil erosion from wind in a manner consistent with state and local law. Dry-land farming practices include: No-Till Dry-land Farming and Minimum-tillage Dry-land Farming.

4. Farm means the parcels of land used for agricultural purposes which will be permanently removed from irrigation as described in the Process.

5. Field means a portion of the LAWMA Dry-Up within any Farm.

6. Minimum tillage Dry-land Farming means management of farming operations which seeks to minimize impacts from tilling through the use of a sweep plow, strip-till, or similar technology. Additionally, a farmer may rely on herbicides to control weeds. Both contact and residual herbicides may be used. Periodic fallowing and crop rotation may be used to stabilize the crop yields and allow the soil to rest.

7. No-till Dry-land Farming means a system of planting seeds into untilled soil by opening a narrow slot, trench or band, of sufficient width and depth to obtain proper seed coverage. As no soil tillage is utilized, a farmer must rely on herbicides to control the weeds. Both contact and residual herbicides may be used. Periodic fallowing and crop rotation may be used to stabilize the crop yields and allow the soil to rest.

8. Percentage of Completion is the total dry-up acres for a farm classified as Acceptable divided by the total number of dry-up acres for a Farm as shown in the Annual Report, multiplied by 100.

9. Revegetation means the establishment of native grasses or such other self-sustaining (under the conditions prevailing on the land) suitable dry-land ground cover with weeds adequately controlled. Dry-land ground cover does not include alfalfa or other similar deep rooted phreatophytes. Revegetation of the LAWMA Dry-Up may include, but is not limited to, the following activities:

    a. Class I Fields. Seeding, irrigation, herbicide application and mowing;

    b. Class II Fields. Herbicide application and mowing;

    c. Class III Fields. Spot seeding and irrigation, herbicide application, mowing and grazing;

    d. Class IV-A Fields. Spot seeding and irrigation, herbicide application and mowing;

    e. Class IV-B Fields. Herbicide application, mowing and grazing;

    f. Class V Fields. Spot herbicide application and grazing.

g. Spot seeding and irrigation of any Class I through V fields if determined to be necessary for revegetation as fields matriculate through the classifications.

h. Continuation of appropriate revegetation activities.

i. Controlling weeds in a manner consistent with state and local law on all fields.

B. Annual Report.

1. On or about December 1 of every year ARF shall submit a report to the Company, County and the Water Court that provides information about the LAWMA Dry-Up Farms <u>that have been removed from irrigation</u>. The Annual Report shall provide the following information:

   a. The number of the Farm and the year that irrigation water first was removed.

   b. Whether the Farm is being Revegetated or Dry-land Farmed.

   c. The total number of acres that were dried-up.

   d. The Percentage of Completion for the Farm.

   e. The approximate annual precipitation that fell on the Farm, which may be estimated based on the average of published local weather station data.

   f. If the Farm was not Dry-land Farmed, the efforts undertaken in the preceding year to Revegetate the dried-up acreage, including without limitation, the seeding rate, type and composition of blend by percentage and date planted, information about herbicides or pesticides applied and information about efforts to control erosion of the soil caused by wind.

   g. If the farm was Dry-land Farmed, the efforts undertaken in the preceding year to convert the Farm to Dry-land Farming, including information about tilling practices, the planting and fallowing rotation, the crops planted, and the acres fallowed; information about herbicides or pesticides applied; information about efforts to control erosion of the soil caused by wind; information about the amount of crops harvested or the number of animal units grazing the land;

and information about the amount of crops planted and harvested by other Dry-land farmers in the area during the preceding year;

h. If the farm was Dry-land farmed, whether the crop is a grain crop or a hay/forage crop. If the crop is a hay/forage crop, the expert also will determine and record the stubble height in inches and the distance, in inches, on which the hay/forage crop was planted.

i. Whether water was used to assist in Revegetation or conversion to Dry-land Farming and if so describe the water used in amount and method of application.

j. Whether any other factors occurred that had a negative impact on efforts to Revegetate or convert to Dry-land Farming.

k. Classification of the lands pursuant to the chart in Section III. ARF shall notify the County and Company prior performing an annual inspection of the Farms to determine the classification. The County and Company may, at its election and cost, send its own Expert along with the ARF Expert to review the classification and progress toward completion of the Farms included in the Annual Report.

l. Whether a Field has been revegetated as far as can reasonably be expected and thus whether such Field will be considered Acceptable.

m. If an Annual Report has been filed on the Farm in past years, how the conditions on the Farm compares to past years.

n. If a Farm is recommended for a Certificate of Completion, the Annual Report shall also contain representative photographs of the Farm depicting how the Farm has been Revegetated or converted to Dry-land Farming.

o. Whether the Farm is eligible for issuance of a Certificate of Completion.

C. Certificate of Completion. The criteria for issuing a Certificate of Completion for Revegetated land and lands converted to Dry-land Farming shall be:

1. Certificate of Completion may only be issued for an entire Farm.

2. Revegetation: Any Farm that has 90% Percentage of Completion shall be granted a Certificate of Completion.

3. Dry-land Farming: Any Farm where 90% of its Fields were used for one full crop rotation cycle (two years crop production, one year fallow with appropriate stubble and weed control) in accordance with the standards described in Section A.2.a above and with adequate control of weeds and wind-caused soil erosion in a manner consistent with state and local law shall be granted a Certificate of Completion.

D. Review of Annual Report and Dispute Resolution.

1. ARF shall pay the reasonable expenses of an expert jointly retained by the County and Company (Retained Expert) to review any Annual Report that recommends that a Farm is eligible for a Certificate of Completion.

2. The Retained Expert shall approve or reject the Annual Report that recommends that a Farm is eligible for a Certificate of Completion, no later than January 15.

    a. If the Retained Expert approves the Annual Report, FLCC shall not oppose Water Court approval of a Certificate of Completion for any Farm for which the Annual Report recommends issuance of a Certificate of Completion.

        i. Any FLCC stockholder on their own behalf and not on behalf of the FLCC, may separately oppose Water Court approval of a Certificate of Completion for any Farm in which the Annual Report recommends issuance of a Certificate of Completion.

    b. If the Retained Expert does not approve an Annual Report that recommends that a Farm is eligible for a Certificate of Completion, ARF's Expert and the Retained Expert, no later than February 1, shall consult and attempt to reach a consensus, which consensus may modify, or add terms to the recommendation contained in the Annual Report.

    c. If the experts do not reach consensus on whether a Farm is eligible for a Certificate of Completion, then the recommendation may be withdrawn by ARF or Water Court approval of the Certificate of Completion may be requested, which may be opposed by FLCC.

    d. The Water Court shall rule upon any contested request for approval of a Certificate of Completion, whether FLCC or a FLCC stockholder is the opposer.

        i. Any appeal of the Water Court's Process on a request for approval of a Certificate of Completion shall follow the normal rules and procedures for appeal of a water matter.

III. REVEGETATED LAND CLASSIFICATION METHODOLOGY

CLASS I Full seeding and irrigation needed, either first seeding or reapplication of seeding. Desired plants scarce or absent.

CLASS II Seeding and irrigation completed. Stand undetermined. Usually this will occur at the beginning of the second growing season following seeding.

CLASS III Stand is variable. Part of the field has an adequate stand and part does not. Plants may be juvenile plants to well developed mature plants. More than 10% of field with an inadequate stand on areas exceeding one acre in size. Plant frequency of desirable plant on deficient areas is less than 10%. Such deficient areas will require reseeding.

CLASS IV-A Stand is inadequate, frequency is less than 10% but plants are fairly well distributed over field. Field may need reseeding.

CLASS IV-B Stand is inadequate; frequency is between 10% to 15%. Plants are uniformly distributed over the field. No further seeding then recommended as the stand is expected to develop.

CLASS V Stand appears adequate but root system is undeveloped. There are 10% to 15% or more desired plants per count. Good potential for stand establishment. Generally found after the first growing season but possibly the second growing season.

CLASS VI Stand adequate. Plants well rooted. Desirable plant frequency range 15% to 20%, no deficient areas larger than one acre in size over 90% of the field. This may occur following second growing season but more likely after the third growing season and beyond.

CLASS VII Stand adequate. Plants well rooted with vigorous top growth. Desirable Plant frequencies are 20% to 30% or more over 90% of the field. No deficient areas larger than one acre in size. Generally occurring the third growing season and beyond.