



Project Report

A Fiscal Impact Analysis of the Saco River & Camp Ellis Beach Shore Damage Mitigation Project

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1. Background & Purpose of the Report

The Camp Ellis beach area of the City of Saco has suffered significant property damage and even loss of entire lots and buildings to the sea as a result of storm and erosion damage at the base of the jetty on the northern side of the mouth of the Saco River. The City's Department of Public Works (DPW) regularly makes major expenditures rebuilding seawalls, streets and other infrastructure following major storms that damage the area. When these storms are declared natural disasters, money from the Federal Emergency Management Agency (FEMA) can cover some or even most city costs, but annual maintenance of stone walls lining the beach and geotubes and "Jersey barriers" reinforcing sand dunes and protecting roads remain an ongoing annual cost to the City of approximately \$50,000 and a periodic cost to county, state and federal governments depending on the frequency and severity of storm damage. According to City of Saco Department of Public Works calculations, the cost of such periodic repairs over the past twenty years totals \$2.8 million, about 60% of which has been paid by the Federal Emergency Management Agency (FEMA).

Figure 1: Examples of Camp Ellis Repair & Maintenance Costs



Source: City of Saco website.

The Army Corps of Engineers has studied a variety of ways to mitigate future damage to this area and presented a potential agreement to the City (and possibly the State) whereby the Corps would pay the one-time capital cost of constructing a spur jetty and providing an initial sand replenishment if the City (and State?) agrees to pay the future costs of subsequent beach replenishment.¹

¹ See <http://www.sacomaine.org/archives/studies.shtml>.

In order to help inform local citizens, elected representatives and city, county and state officials as they make the decision to accept or reject the Army Corps’ offer, Planning Decisions, Inc. (PDI) has conducted a fiscal analysis of the proposed agreement. It consists of estimating the revenues gained or lost and the costs incurred or avoided that are likely to flow from each of the policy choices available to the participating government entities.

The analysis presumes that the fiscal impacts on the City are two-fold—actual costs incurred, the outlays for sand, equipment and labor time to repair a seawall, for example, and potential revenues lost, property tax receipts not received because parcels are valued less than they would otherwise be because of actual or threatened damage. Figure 2 summarizes this framework.

Figure 2 Fiscal Analysis Matrix

Potential Fiscal Gain	
1. From Increased Revenues <i>eg. higher property value & taxes</i>	2. From Decreased Costs <i>eg. lower repair costs</i>
Potential Fiscal Loss	
3. From Decreased Revenues <i>eg. lower property value & taxes</i>	4. From Increased Costs <i>eg. higher repair costs</i>

The report estimates each element of the Fiscal Matrix for each of the three policy alternatives now before the City and the State:

1. reject the Army Corps’ offer and continue the current city and state policy of regularly shoring up existing rock walls and geotubes, plowing sand back onto beaches and periodically repairing storm damage to streets and infrastructure;
2. reject the Army Corps’ offer *and* discontinue the current city and state policy of shoring up and repairing areas north of the jetty damaged by natural beach erosion and periodic storms; this alternative is, in effect, simply letting Mother Nature take her course; or
3. accept the Army Corps’ beach nourishment proposal.

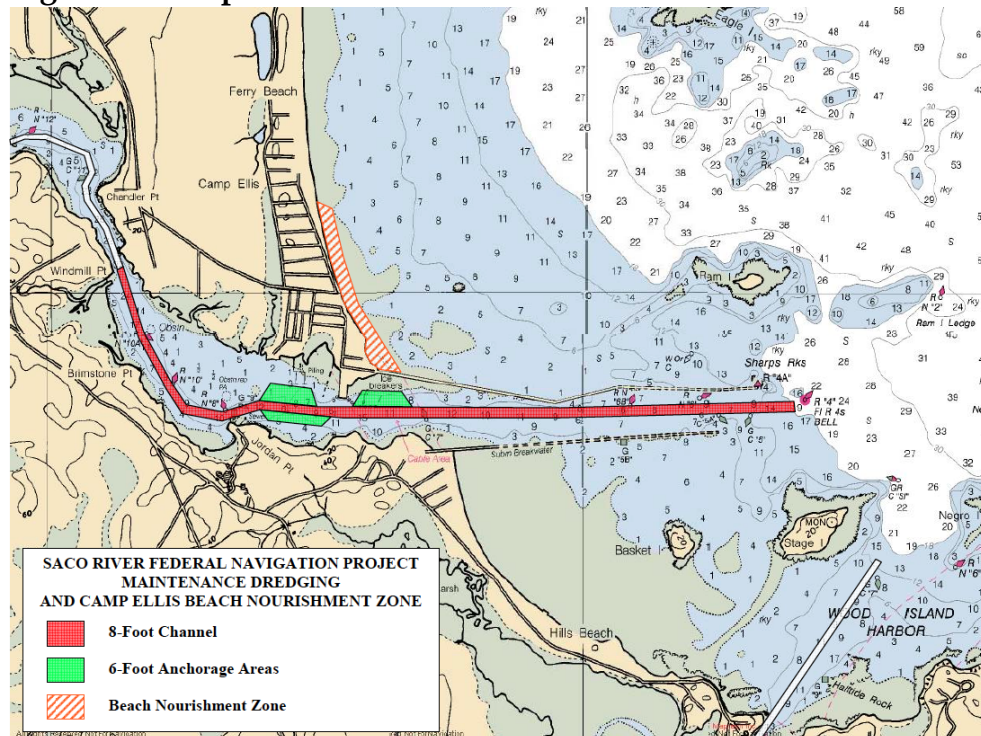
In shorthand terms, the policy choices might be called: 1. *periodic repair*; 2. *no repair*; and 3. *major beach nourishment*.

The fiscal impacts of these policy alternatives on the State are much less direct.

Continued sand erosion and storm damage clearly has effects on beaches, dunes, harbors and coastal wetlands, all of which fall under the state’s regulatory responsibility under the Natural Resources Protection Act (NRPA). In addition, as a property owner (Ferry Beach State Park), the state has a direct interest in the outcome of erosion mitigation choices. In short, while the City of Saco has the most direct fiscal interest in the deal proposed by the Army Corps, the state has regulatory and ownership reasons to participate in the decision. Indeed, the City of Saco should, at a minimum, insist that the state sign off on any agreement it signs with the Army Corps to ensure that it has the regulatory approvals to undertake any obligations it might incur.

Figure 3 depicts the geographic area where these policy choices have and will continue to be played out, highlights the areas where erosion mitigation activities will or will not occur and locates properties most immediately at risk.

Figure 3: Camp Ellis River Channel and Beach Nourishment Areas



Source: US Army Corps of Engineers, New England District Saco River & Camp Ellis Beach, Saco, Maine, Shore Damage Mitigation Project, p. 13, <http://www.sacomaine.org/archives/studies.shtml>.

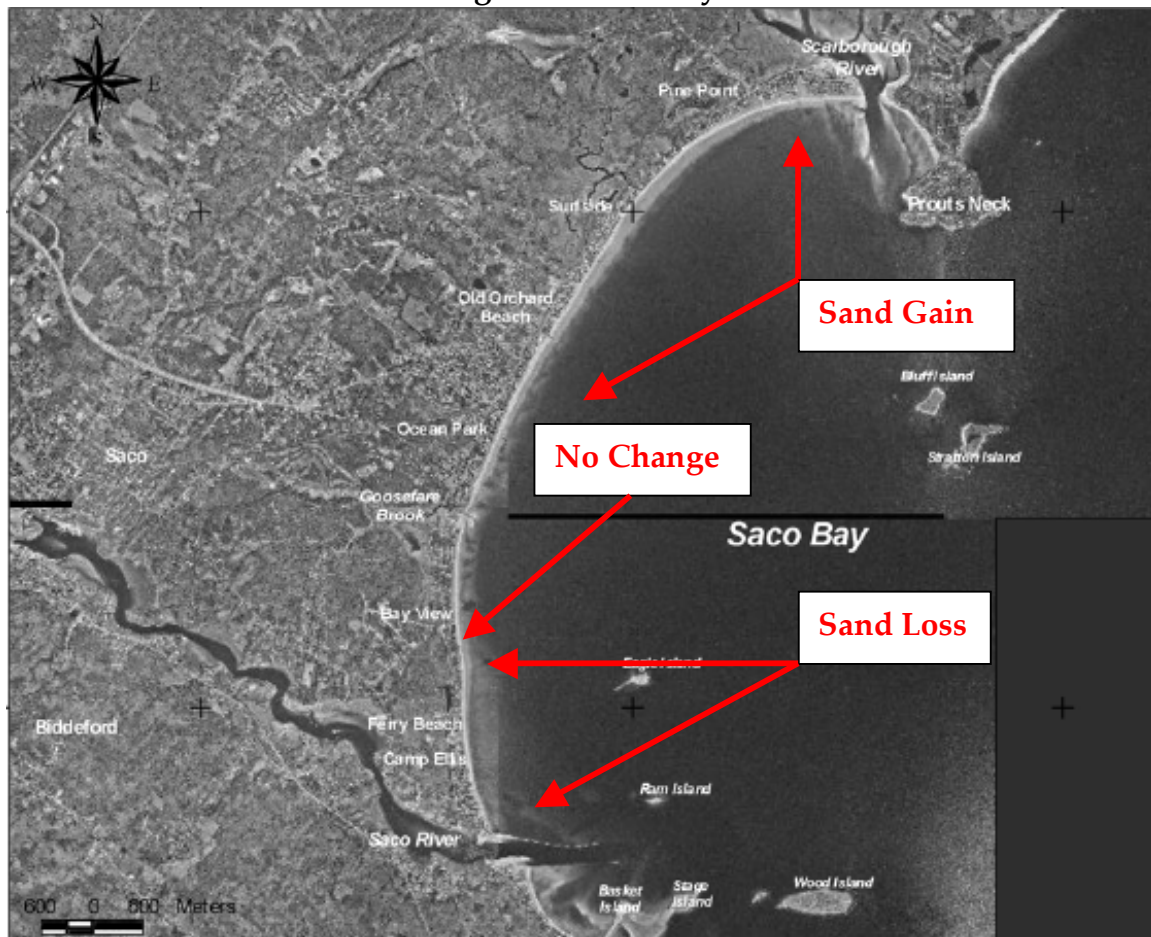
Section 2 below explains the three policy alternatives noted above and presents their likely fiscal consequences. Section 3 compares the long-term fiscal consequences of the alternatives in the common framework of discounted present values.

2. Policy Alternatives for the City & State

A. Introduction: A Brief Description of the Beach Erosion Dilemma

The policy dilemma facing the City of Saco and the State of Maine is the result of the complex interplay of river and ocean currents, wave energy and the jetties built by the Army Corps of Engineers to maintain navigation on the rivers at either end of Saco Bay. Figure 4 shows the overall picture.

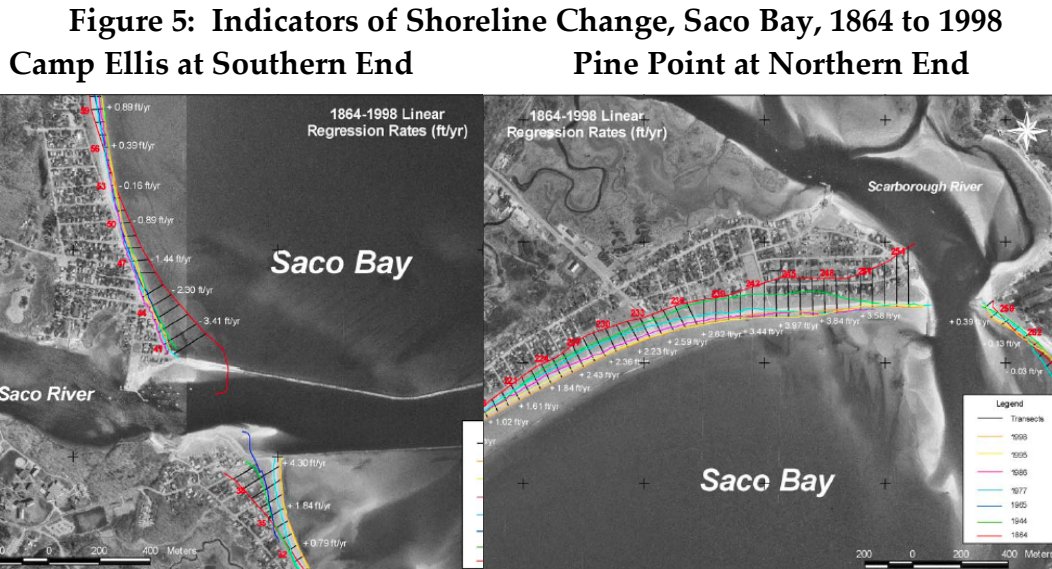
Figure 4: Saco Bay



Source: Final Draft Report Saco River and Camp Ellis Beach Section 111 Project, prepared for U.S. Army Corps of Engineers by Woods Hole Group Environmental Laboratories and Aubrey Consulting, Inc. January 2006; henceforth referred to as Woods Hole/Aubrey Report, p. 18.

River currents, ocean currents and wave energy create a natural movement of sand from the southern end of the bay to the northern end. Analysis of shoreline change over the century and a half since the jetties were built show sand loss (erosion) of approximately 3.4 feet per year in the Camp Ellis area at the southern end of the bay and sand gain (accretion) of similar amounts in the Pine Point area

in Scarborough at the northern end of the bay. The point of no change in sand cover is in the Bay View area just north of Ferry Beach. Figure 5 shows this comparison.



Source: Woods Hole/Aubrey Report, p. 28 and 31.

The practical effect of these natural processes has been the loss of several rows of houses in the Camp Ellis area (and the threatened loss of more with each major storm) and the gain of at least one row of homes in the Pine Point area. The question facing the citizens of Saco and the state is what, if anything, to do about these natural processes.

B. The Evidence for Potential Lost Property Value

On most days, Camp Ellis is a beautiful, traditional Maine seaside village—modest cottages and larger, newer vacation homes on small lots along narrow streets running to a long sandy beach. The area also contains a “village center” with a restaurant, several retail shops, a parking lot/pier/boat landing facility and a scattering of support services for the fishing, lobstering and recreational boating industries.

In this respect, Camp Ellis is not unlike other small, coastal villages along the southern Maine seashore. The difference, of course, is the ongoing erosion of the beach and the periodic damage from storms, both exacerbated by the gradual increase in sea level. A central starting point for any fiscal analysis of the area, therefore, is whether these geographic/geological differences are reflected in property values—both between different areas within Camp Ellis and between Camp Ellis and similar areas.

To establish this fiscal point of departure, PDI identified impact zones within Camp Ellis itself and several near-by coastal communities with reasonably comparable parcels of land and building.

B 1. Variations of Property Value Within Camp Ellis

Figure 6 illustrates impact zones within Camp Ellis.

Figure 6: Camp Ellis Impact Zones



Source: City of Saco, Department of Public Works.

Tiers 1, 2, 3 identify parcels in first, second and third levels of threat from erosion and storm damage. The balance of the impact area (marked by cross hatching) indicates those parcels where damage could occur over the very long term if erosion continues unabated. Without some beach nourishment, coastal areas north of Tier 3 parcels will experience some beach erosion as Tiers 1, 2 and 3 are washed away or severely damaged before sand migration reaches some natural equilibrium. In addition, areas west of Tier 3 parcels, while not threatened by actual erosion, would, because of the erosion of parcels in front of them, be subject to greater storm and flooding damage in the long term.

The first question for fiscal analysis of the policy alternatives noted above is, therefore, “Are these differing levels of threat reflected in differing levels of property value when standardized on a per acre basis?” This question is important because if the answer is “Yes,” then any policy that can successfully reduce that threat will presumably increase property values and thus property tax revenue. If, on the other hand, the answer is “No,” then storm and erosion mitigation is not likely to produce tax revenue gains beyond the properties they save directly. Table 1 shows that the answer to this question in Camp Ellis itself is “No.”

Table 1: Characteristics of Camp Ellis Properties by Tier

Characteristic	Tier 1	Tier 2	Tier 3	Tier 4
# of Lots	23	22	147	154
Avg. Lot Size (acres)	0.18	0.15	0.21	0.34
Lots with House	23	21	143	150
Avg. Value Land				
per lot	\$327,187	\$217,855	\$227,865	\$334,261
per acre	\$2,459,372	\$1,889,415	\$1,731,563	\$1,536,210
Avg. Value Building				
per lot	\$143,091	\$113,733	\$139,508	\$334,261
per acre	\$973,735	\$923,929	\$1,038,882	\$698,648
# of sales 1999-06	8	1	27	23
Avg. price	\$468,250	\$550,000	\$271,520	\$292,521
Avg. price per acre	\$3,641,420	\$2,115,497	\$2,312,485	\$1,570,807
# of sales 2007-11	3	2	10	17
Avg. price	\$544,000	\$235,500	\$235,840	\$656,972
Avg. price per acre	\$3,447,583	\$3,960,287	\$4,273,653	\$2,039,752
sales as % of parcels	48%	14%	26%	27%

Source: City of Saco, Assessor’s Office.

All of the lots in Camp Ellis are small, barely 1/5th of an acre, though lots in Tier 4 are slightly larger, averaging 0.34 acres per lot. Standardized to a per acre basis, the average value per acre declines from Tier 1 to Tier 4, indicating that proximity to the ocean seems to exceed threat of erosion and storm damage in determining value.

When considering sales rather than assessed value, the same generally declining value by Tier is true for sales in the 1999 to 2006 period, but less so for the 2007 to

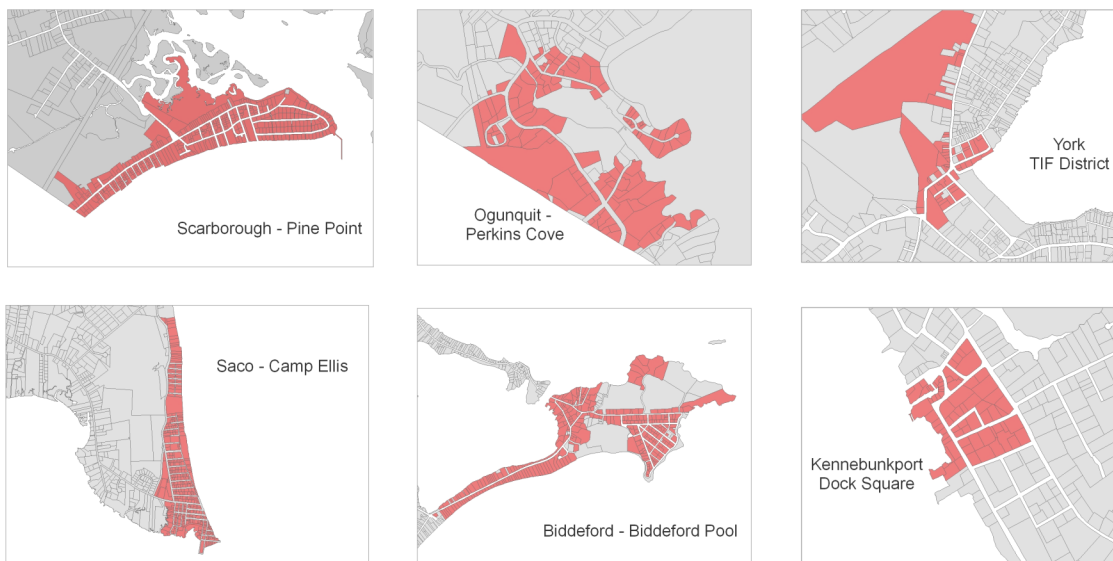
2011 period. If there is any pattern evident in Table 1, it is that the number of sales in Tier 2 as a percentage of total parcels is substantially less than in the other tiers, perhaps indicating a reluctance to buy in a potentially threatened area. In addition, on a per acre basis, the average price of parcels sold in the 2007 to 2011 period in Tier 1 dropped somewhat from the 1999 to 2006 period, perhaps acknowledging a fear of erosion and storm damage loss.

However parcels sold in Tiers 2, 3 and 4 all rose in value on a per acre basis between the 1999-2006 period and the 2007-2011 period. That this increase occurred during the greatest housing crisis since the Great Depression is both remarkable and underlines the fact that proximity to threatened erosion and storm damage did not seem to diminish the value of these properties.

B 2. Variations of Property Value Between Camp Ellis & Similar Villages

A second possible fiscal impact of the geologic nature of Camp Ellis is that it has not achieved the development it would have had it not been forced to deal with the ongoing loss of beach area and periodic threats from storm damage. In order to examine this hypothesis, PDI gathered assessing data from communities broadly similar to Camp Ellis. Figure 6 shows maps of these areas.

Figure 6: Maine Seaside Villages Similar to Camp Ellis



Source: Assessor's Offices for the towns of Scarborough, Ogunquit, York, Saco, Biddeford and Kennebunkport.

Table 2 shows the similarities and differences among these areas with respect to lot size, assessed property value and sales value.

Table 2: Comparison of Residential Properties in Coastal Villages

Characteristic	Camp Ellis	Pine Point	Biddeford Pool	Perkins Cove*	Dock Square**	York Beach***
# of Lots	346	447	233	86	37	12
Avg. Lot Size (acres)	0.24	0.29	0.45	n.a.	0.25	0.13
Lots w/ House	337	429	228	86	37	12
Median year built	1952	1948	n.a.	n.a.	1823	n.a.
% since 1990	11%	12%	n.a.	n.a.	0%	n.a.
Average Land Value						
per lot	\$274,058	\$408,645	\$710,228.07	\$692,122	\$190,662	\$182,575
per acre	\$1,050,854	\$1,939,180	\$2,551,147	n.a.	\$1,527,901	\$1,514,526
Average Building Value						
per lot	\$230,793	\$126,400	\$241,118	\$275,314	\$532,232	\$147,950
per acre	\$861,938	\$623,901	\$759,398	n.a.	\$2,332,623	\$1,258,175
Sales 1999-06	59	101	41	21	6	2
Avg. price	\$311,102	\$343,666	\$641,851	\$796,439	\$690,083	\$1,063,314
Avg. price per acre	\$2,200,212	\$2,000,196	\$2,648,237	n.a.	\$2,649,850	\$4,703,484
Sales 2007-11	32	53	25	7	7	0
Avg. price	\$488,435	\$465,790	\$1,090,840	\$1,012,357	\$635,357	n.a.
Avg. price per acre	\$2,989,863	\$2,186,372	\$3,518,290	n.a.	\$5,142,353	n.a.

Source: Assessor's Offices for the towns of Scarborough, Ogunquit, York, Saco, Biddeford and Kennebunkport; *Ogunquit data excludes condos; **\$5 million price per acre influenced by one \$16 million sale; ***\$4.7 million sale price per acre reflects \$2 million sale on small lot.

Analyzing Table 2 with the question, "Does the threat of erosion and storm damage reduce the value of properties in Camp Ellis?," in mind, the answer that emerges is, "Perhaps."

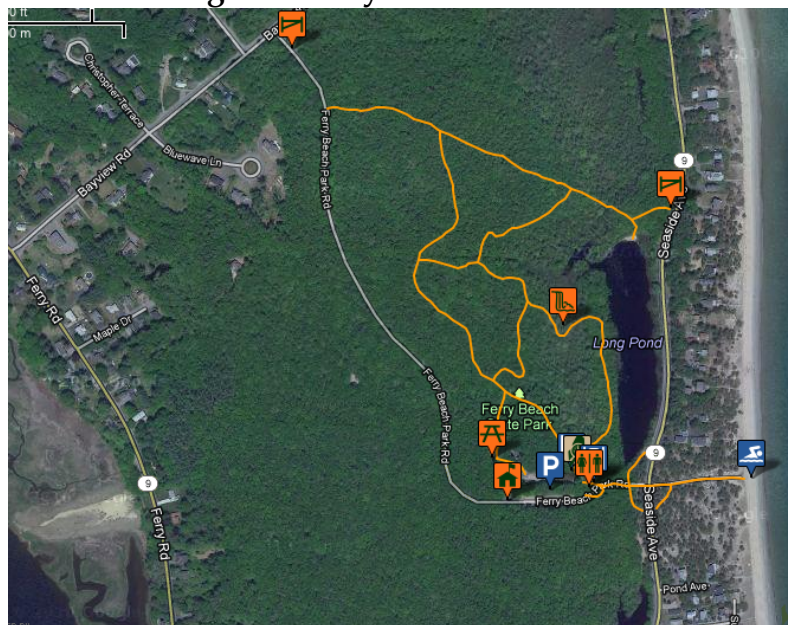
On a per-lot basis, land value in Camp Ellis is lower than in Pine Point, Biddeford Pool and Perkins Cove but higher than in Dock Square and York Beach. On a per-acre basis, land value in Camp Ellis is the lowest of all areas. With respect to building value, Camp Ellis falls in the middle on both a per-lot and per-acre basis.

Avoiding the problem of possible differences in assessing, by focusing on sales, leads to a similarly mixed picture. In the pre-2007 period, sales value per acre in Camp Ellis ranked fourth among the five communities for which data are available. In the 2007-11 period, sales value per acre in Camp Ellis rose (as they did in all four of the areas for which data are available), and Camp Ellis, as was true in the earlier period, Camp Ellis ranked behind Dock Square and Biddeford Pool and ahead of Pine Point in sales value per acre.

C. State Property: Ferry Beach State Park²

The largest property owner in the Camp Ellis area is the State of Maine, owner and operator of Ferry Beach State park, a 100-acre parcel containing parking, picnic areas, changing and restroom facilities, beach access and an extensive trail system. The park, assisted by a major private fundraising effort, has recently completed a display building and is currently assembling educational and display materials in hopes of opening for visitors in the 2012 or 2013 season. Figure 7 shows the layout and location of the park just north of the privately owned parcels displayed in Figure 6.

Figure 7 Ferry Beach State Park

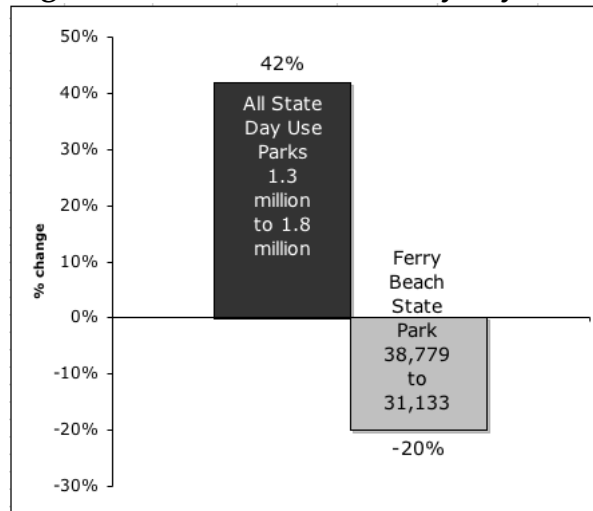


Comparing Figure 7 to Figure 4 above, it is clear that the beach section of the State Park is in the “sand loss” section of Saco Bay. If erosion and the effects of

² Information obtained from Maine Bureau of Parks and Lands website <http://www.maine.gov/doc/parks/about.html>, from visitor data provided by the Bureau, and from an interview with Bureau Director Will Harris on May 2, 2012.

storm damage continue their gradual northward movement, the recreational attractiveness of the beach area of the park will be diminished. Indeed, just as examination of property sales records indicate that the fact and threat of erosion and storm damage have diminished property values, visitor records indicate that a similar effect may be occurring at Ferry Beach State Park. Figure 8 compares growth in number of visitor days at day-visit state parks over the recent past.

Figure 8 Change in Number of Visitor Days by Park, 2004 to 2011



Source: Maine Bureau of Parks and Lands

Over the seven-year period from 2004 to 2011, the number of visitors to those of Maine’s day-use state parks open in both years rose 42%, from approximately 1.3 million to approximately 1.8 million. Over the same period, the number of visitors to Ferry Beach State Park fell 20% from 38,779 to 31,133. Ferry Beach was one of only six day-use state parks that saw their number of visitor days decline over the period. Ferry Beach ranked 27th among the 31 parks in terms of visitor growth. It is impossible to know why Ferry Beach experienced this negative trend in visitors without conducting an extensive user opinion survey. Nonetheless, the trend is striking and warrants further investigation, particularly given the state’s significant and growing investment in facilities at the park.

Visits to Ferry Beach State Park are important to the City and the State not merely for the use of public recreational investments but also for the commercial activity they provide for area businesses. According to an impact analysis conducted by the University of Maine, the average visitor to a day-use state park

spends approximately \$31 per visit.³ The indirect and induced impacts of this spending adds another \$11 per visit bringing the total commercial impact of day park visitors on area businesses to approximately \$42. Applying this average to the 31,133 visitors who came to Ferry Beach State Park in 2011 means that they generated sales for area businesses of just over \$1.3 million supporting 18 jobs. If Ferry Beach had experienced the state average growth over the 2004 to 2011 period, it would have had over 68,000 visitors and area businesses would have had made \$2.9 million in sales, enough to support 40 jobs. Thus the “loss” from below average visitor growth amounted to about \$1.6 million in sales and 22 jobs for area businesses.

It would, of course, be unwarranted to attribute this “loss” to the effects or fear of erosion and storm damage on the part of potential park visitors. But this comparison does indicate the clear financial interest the State of Maine has in any decision affecting the ecological stability the beaches along Saco Bay.

D. Tentative Conclusions and Decision Making

Having examined all these data, what is a reasonable expectation for the effects of erosion mitigation on the value of property in Camp Ellis? Two conclusions emerge—one regarding expectations and the second regarding non-residential development.

For any storm-damage mitigation/beach erosion-control program to have a significant impact on future property values in Camp Ellis it must be widely accepted by buyers, lenders and insurers as effective and long-lasting. If there is any lost potential in Camp Ellis it lies in the hesitation with respect to Tier 2 properties and in the relative absence of non-residential properties. The greatest difference between Camp Ellis and the other seaside communities examined above lies not in residential property but in non-residential property, particularly in comparison to Perkins Cove, Dock Square and York Beach. This conclusion is reinforced by the below average attendance growth at Ferry Beach state Park and its consequent constraints on related commercial growth. If a major investment is made in a erosion/storm mitigation program, AND it is widely accepted as being effective and permanent, then values of Tier 2 residential properties and Tier 3 commercial properties are likely to rise. This conclusion is spelled out somewhat more explicitly in the examination of each policy alternative.

³ The Economic Contributions of Maine State Parks Margaret Chase Smith Policy Center, University of Maine, June 2006. Figures cited here are inflated to 2011 values using the CPI.

Alternative #1: Business as Usual—Maintain walls; rebuild periodically

The first alternative available to the City is to continue its current policy of regularly shoring up existing rock walls and geotubes, plowing sand back onto beaches and periodically repairing storm damage to streets and infrastructure. The fiscal implications of this choice are summarized in Figure 9.

Figure 9: Fiscal Analysis Matrix, Alternative #1

Fiscal Gain	
From Increased Revenues	From Decreased Costs
No increased revenues are expected to flow as a result of undertaking Alternative #1; this is the baseline to which alternatives #2 and #3 will be compared.	No decreased costs are expected to flow as a result of undertaking Alternative #1. This alternative is the baseline to which alternatives #2 and #3 will be compared.
Fiscal Loss	
From Decreased Revenues	From Increased Costs
Loss of property tax revenue from properties damaged or destroyed and not replaced. Even with regular maintenance, the sand erosion will continue as in the past, and some Tier 1 properties will be lost over the next 30 years.	Annual costs for this alternative are maintenance of stonewalls, “jersey barriers,” road clearing and maintenance; These amount to approximately \$50,000 per year; a cost that will increase with the overall rate of DPW expenses.
Loss of property tax revenue from properties at risk of damage. As Tier 1 properties are lost, threats to Tier 2 properties will increase. Eventually, values will fall and property tax revenues will fall.	Periodic costs for stone and geotube replacement and any storm damage costs not covered by FEMA. \$160,000 every 10 years for stone; \$400,000 every 7 years for geotubes; \$220,000 every 4 years for storm damage.

The City of Saco Department of Public Works calculated that storm damage repair for the Camp Ellis area not covered by FEMA has, over the past twenty years, totaled approximately \$1.1 million, or about \$220,000 every four years. Given the threat of rising sea levels and the slow but inevitable erosion loss, this cost is likely to increase over the next thirty years both because of the general inflationary increase in DPW expenses and because of the likely increase in storm-related damage.

Alternative #2: Discontinue Periodic Repair/Let Nature Proceed

The second alternative available to the City is to discontinue the current repair policy, i.e. reject the Army Corps’ offer *and* discontinue the City’s current periodic efforts to shore up and repair areas north of the jetty damaged by natural beach erosion and periodic storm damage; this alternative is, in effect, simply letting Mother Nature take her course. The fiscal implications of this choice are summarized in Figure 10 by comparison to Alternative #1.

Figure 10: Fiscal Analysis Matrix, Alternative #2

Fiscal Gain	
From Increased Revenues	From Decreased Costs
No increased revenues are expected to flow as a result of undertaking Alternative #2.	Alternative #2 will avoid the costs associated with both Alternative #1 and Alternative #3.
Fiscal Loss	
From Decreased Revenues	From Increased Costs
Loss of property tax revenue from properties damaged or destroyed and not replaced; greater than Alternatives #1 and #2.	No increased costs are expected to occur as a result of undertaking Alternative #2.
Loss of property tax revenue from properties at risk of damage; greater than Alternatives #1 and #3.	

The central unknown for Alternative #2 is the rate of loss of property as erosion continues unabated until sand movement reaches equilibrium. This alternative assumes the gradual loss of Tier 1 and Tier 2 properties over a 30-year period and hence the loss of property tax revenues from them.

Alternative #3: Accept Army Corps Proposal of Major Beach Nourishment

The third alternative available to the City is to accept the Army Corps proposal, i.e., to have the Army Corps build the spur jetty and make the first sand nourishment deposit. The fiscal implications of this choice are summarized in Figure 11.

Figure 11: Fiscal Analysis Matrix, Alternative #3

Fiscal Gain	
From Increased Revenues	From Decreased Costs
Increased revenues are expected to flow from long-term increases in the value of Tier 2 properties and development of Tier 3 properties	No decreased costs are expected to flow as a result of undertaking Alternative #3.
Fiscal Loss	
From Decreased Revenues	From Increased Costs
No loss of revenue.	This alternative assumes that sand nourishment program eliminates the annual maintenance costs, the periodic costs for stone replacement, geotube replacement and any storm damage costs not covered by FEMA and adds the costs of a second and third sand replacement plus repair of roads damaged by sand replenishment.

Alternative #3 is the most uncertain of the three choices before the City. The basic assumption underlying this proposal is that the spur jetty will reduce wave energy hitting the beach and accelerating sand erosion. This investment together with an initial sand replenishment of 300,000 yards is designed to stabilize the beach for twelve to fifteen years. At that time, the City will undertake another replenishment of approximately 100,000 yards. Twelve to fifteen years later, another similar replenishment will be undertaken and, hopefully, the Camp Ellis beach will reach a level of equilibrium whereby future replenishments will be unnecessary, or at least less frequent and smaller.

There are a great many unknowns associated with this alternative. How long will the initial 300,000 yards of sand delivered by the Army Corps last? Twelve years? Eight? Fifteen? Perhaps twenty? The answer will depend on storm frequency, sea level and the effectiveness of the spur jetty.

Where will sand for beach nourishment be obtained? From dredging? From land-based commercial suppliers? How will it be delivered? By truck? By barge? By pumping? By some combination of all sources? What will be the delivered cost of the sand? What will be the impact on city roads if the sand must be trucked in? Delivering 300,000 yards of sand at 18 yards per truckload means approximately 17,000 trips across the city to dump sand. In addition, the delivery must take place at low tide when equipment to spread the sand can be brought onto the beach. In short, initial sand nourishment even if paid by the Army Corps, will involve a substantial cost to the city in terms of traffic congestion and road wear and tear. Similarly, future sand replenishments paid for by the City will require post-delivery road repair at whatever the DPW costs are at that time.

The City's Department of Public Works estimates that the wear and tear from sand nourishment traffic across the 11.3 miles from the Saco town line on Route 112 to Fairhaven will reduce the road's life expectancy by one-third. At a cost of \$710,000 per mile, that produces a road repair cost of approximately \$2.65 million for the 300,000-yard sand nourishment program and, presumably, a cost of 1/3 that amount (plus inflationary cost increases) following delivery of 100,000 yards every 10 to 20 years.

The gains on the revenue side are equally hazy. Will citizens, visitors and potential investors see the mitigation program as successful? Will they invest and increase property values? If so, over what time period?

To help evaluate these choices, PDI estimated repair cost and property value changes over a thirty-year period for each of the alternatives. Using this framework, citizens, city and state officials and other interested parties can explore the implications of differing cost and property value assumptions on each of the investment outcomes. Coming to some consensus about these parameters can lead to a clearer decision.

3. Fiscal Comparison of the Policy Alternatives

Table 3 lists the amounts and timing of the City’s costs associated with the various elements of the beach nourishment program. Columns 2 to 4 refer to Alternative #1 (periodic repair), and columns 5 and 6 refer to Alternative #3.

Table 3: Camp Ellis Storm Repair & Beach Nourishment Costs

Year	(2) annual maintenance	(3) storm damage	(4) rock & geotube repair	(5) sand nourishment	(6) road repair
2013	\$50,000			\$0	
2014	\$51,000				
2015	\$52,020		\$416,160		
2016	\$53,060	\$220,000			\$882,530
2017	\$54,122				\$882,530
2018	\$55,204		\$176,653		\$882,530
2019	\$56,308				
2020	\$57,434	\$231,000			
2021	\$58,583				
2022	\$59,755		\$478,037		
2023	\$60,950				
2024	\$62,169	\$242,550			
2025	\$63,412			\$1,612,500.00	
2026	\$64,680				
2027	\$65,974				
2028	\$67,293	\$254,678	\$215,339		\$395,923
2029	\$68,639		\$549,114		\$403,842
2030	\$70,012				\$411,918
2031	\$71,412				
2032	\$72,841	\$267,411			
2033	\$74,297				
2034	\$75,783				
2035	\$77,299				
2036	\$78,845	\$280,782	\$630,760		
2037	\$80,422			\$2,150,000.00	
2038	\$82,030		\$262,497		
2039	\$83,671				
2040	\$85,344	\$294,821			\$502,126
2041	\$87,051				\$512,169
2042	\$88,792				\$522,412

Source: City of Saco, DPW; storm damage repair is assumed to occur every four years and to increase by 5% each storm; sand nourishment is presumed to occur 12 and 24 years after the original Army Corps 300,000 yard replenishment and to be 100,000 yards for the second and third replenishments; road repair is assumed to occur two years after the start of sand nourishment. Both are assumed to have an annual cost increase of 2.0%.

Table 4 lists the costs and estimated fiscal effects of Alternative #1. It includes annual maintenance, storm damage repair and rock and geotube repair.

Table 4: Costs & Fiscal Impacts of Alternative #1

Year	City Cost	% loss Tier 1	% loss Tier 2	Change in Property Value	Change in Tax Revenue	Net Gain or Loss	Discounted Net Gain or Loss
2013	\$50,000	0%	0%	\$0	\$0	-\$50,000	-\$50,000
2014	\$51,000	0%	0%	\$0	\$0	-\$51,000	-\$49,133
2015	\$468,180	0%	0%	\$0	\$0	-\$468,180	-\$434,528
2016	\$273,060	5%	0%	-\$540,820	-\$7,799	-\$280,859	-\$251,129
2017	\$54,122	5%	0%	-\$540,820	-\$7,799	-\$61,920	-\$53,339
2018	\$231,857	5%	0%	-\$540,820	-\$7,799	-\$239,656	-\$198,884
2019	\$56,308	5%	0%	-\$540,820	-\$7,799	-\$64,107	-\$51,253
2020	\$288,434	10%	0%	-\$1,081,640	-\$15,597	-\$304,032	-\$234,173
2021	\$58,583	10%	0%	-\$1,081,640	-\$15,597	-\$74,180	-\$55,044
2022	\$537,792	10%	0%	-\$1,081,640	-\$15,597	-\$553,389	-\$395,598
2023	\$60,950	10%	0%	-\$1,081,640	-\$15,597	-\$76,547	-\$52,717
2024	\$304,719	15%	5%	-\$1,985,740	-\$28,634	-\$333,353	-\$221,174
2025	\$63,412	15%	5%	-\$1,985,740	-\$28,634	-\$92,046	-\$58,835
2026	\$64,680	15%	5%	-\$1,985,740	-\$28,634	-\$93,315	-\$57,462
2027	\$65,974	15%	5%	-\$1,985,740	-\$28,634	-\$94,608	-\$56,126
2028	\$537,310	20%	10%	-\$2,889,840	-\$41,671	-\$578,981	-\$330,906
2029	\$617,754	20%	10%	-\$2,889,840	-\$41,671	-\$659,425	-\$363,085
2030	\$70,012	20%	10%	-\$2,889,840	-\$41,671	-\$111,684	-\$59,243
2031	\$71,412	20%	10%	-\$2,889,840	-\$41,671	-\$113,084	-\$57,789
2032	\$340,252	25%	15%	-\$3,793,940	-\$54,709	-\$394,961	-\$194,448
2033	\$74,297	25%	15%	-\$3,793,940	-\$54,709	-\$129,006	-\$61,188
2034	\$75,783	25%	15%	-\$3,793,940	-\$54,709	-\$130,492	-\$59,626
2035	\$77,299	25%	15%	-\$3,793,940	-\$54,709	-\$132,008	-\$58,111
2036	\$990,387	30%	20%	-\$4,698,040	-\$67,746	-\$1,058,132	-\$448,746
2037	\$80,422	30%	20%	-\$4,698,040	-\$67,746	-\$148,168	-\$60,536
2038	\$344,527	30%	20%	-\$4,698,040	-\$67,746	-\$412,273	-\$162,275
2039	\$83,671	30%	20%	-\$4,698,040	-\$67,746	-\$151,417	-\$57,417
2040	\$380,165	40%	25%	-\$6,142,960	-\$88,581	-\$468,747	-\$171,242
2041	\$87,051	40%	25%	-\$6,142,960	-\$88,581	-\$175,633	-\$61,813
2042	\$88,792	40%	25%	-\$6,142,960	-\$88,581	-\$177,374	-\$60,140
Discounted Present Value (DPV) =							-\$4,425,962

Discount rate of 3.8% from Office of Management and Budget Circular A-94 Appendix E, Revised December 2011, http://www.whitehouse.gov/omb/circulars_a094/a94_appx-c.

This analysis assumes 40% of Tier 1 property and 25% of Tier 2 property will be lost over a 30-year period. The annual net loss discounted at the rate of 3.8% per year yields a discounted present value of approximately negative \$4.4 million.

Table 5 presents a similar analysis for Alternative #2, the cease repairs option.

Table 5: Costs & Fiscal Impacts of Alternative #2

Year	City Cost	% loss Tier 1	% loss Tier 2	Change in Property Value	Change in Property Tax Revenue	Net Gain or Loss	Discounted Net Gain or Loss
2013	\$0	2%	1%	-\$288,984	-\$4,167	-\$4,167	-\$4,167
2014	\$0	5%	2%	-\$686,132	-\$9,894	-\$9,894	-\$9,532
2015	\$0	10%	3%	-\$1,299,608	-\$18,740	-\$18,740	-\$17,393
2016	\$0	20%	4%	-\$2,453,904	-\$35,385	-\$35,385	-\$31,640
2017	\$0	25%	6%	-\$3,140,036	-\$45,279	-\$45,279	-\$39,004
2018	\$0	30%	8%	-\$3,826,168	-\$55,173	-\$55,173	-\$45,787
2019	\$0	35%	9%	-\$4,439,644	-\$64,020	-\$64,020	-\$51,183
2020	\$0	40%	10%	-\$5,053,120	-\$72,866	-\$72,866	-\$56,123
2021	\$0	45%	14%	-\$5,884,564	-\$84,855	-\$84,855	-\$62,965
2022	\$0	50%	16%	-\$6,570,696	-\$94,749	-\$94,749	-\$67,733
2023	\$0	55%	18%	-\$7,256,828	-\$104,643	-\$104,643	-\$72,067
2024	\$0	60%	20%	-\$7,942,960	-\$114,537	-\$114,537	-\$75,994
2025	\$0	65%	22%	-\$8,629,092	-\$124,432	-\$124,432	-\$79,536
2026	\$0	70%	25%	-\$9,387,880	-\$135,373	-\$135,373	-\$83,362
2027	\$0	75%	28%	-\$10,146,668	-\$146,315	-\$146,315	-\$86,801
2028	\$0	80%	30%	-\$10,832,800	-\$156,209	-\$156,209	-\$89,278
2029	\$0	85%	35%	-\$11,736,900	-\$169,246	-\$169,246	-\$93,188
2030	\$0	90%	40%	-\$12,641,000	-\$182,283	-\$182,283	-\$96,692
2031	\$0	95%	45%	-\$13,545,100	-\$195,320	-\$195,320	-\$99,815
2032	\$0	100%	50%	-\$14,449,200	-\$208,357	-\$208,357	-\$102,579
2033	\$0	100%	55%	-\$14,812,480	-\$213,596	-\$213,596	-\$101,309
2034	\$0	100%	60%	-\$15,175,760	-\$218,834	-\$218,834	-\$99,993
2035	\$0	100%	65%	-\$15,539,040	-\$224,073	-\$224,073	-\$98,639
2036	\$0	100%	75%	-\$16,265,600	-\$234,550	-\$234,550	-\$99,471
2037	\$0	100%	80%	-\$16,628,880	-\$239,788	-\$239,788	-\$97,970
2038	\$0	100%	85%	-\$16,992,160	-\$245,027	-\$245,027	-\$96,445
2039	\$0	100%	95%	-\$17,718,720	-\$255,504	-\$255,504	-\$96,887
2040	\$0	100%	100%	-\$18,082,000	-\$260,742	-\$260,742	-\$95,254
2041	\$0	100%	100%	-\$18,082,000	-\$260,742	-\$260,742	-\$91,767
2042	\$0	100%	100%	-\$18,082,000	-\$260,742	-\$260,742	-\$88,407
Discounted Present Value (DPV) =							-\$2,230,982

This analysis is based on no cost to the City and gradual loss over the 30-year period of all of Tier 1 and Tier 2 properties. It produces a discounted present value of approximately negative \$2.2 million.

Finally, Table 6 presents an analysis of Alternative #3. It includes the costs listed in columns 5 and 6 in Table 3 above and the rates of increase in property values in each of the four impact tiers necessary to produce a return at least equal to Alternative #2, i.e., a discounted present value of approximately -\$2.2 million.

Table 6: Costs & Fiscal Impacts of Alternative #3

Year	City Cost	Change in Property Value	Change in Property Tax Revenue	Net Gain or Loss	Discounted Net Gain or Loss
2013	\$0	\$9,871,818	\$142,352	\$142,352	\$142,352
2014	\$0	\$10,022,501	\$144,524	\$144,524	\$139,234
2015	\$0	\$10,176,472	\$146,745	\$146,745	\$136,197
2016	\$882,530	\$10,333,825	\$149,014	-\$733,516	-\$655,870
2017	\$882,530	\$10,494,658	\$151,333	-\$731,197	-\$629,861
2018	\$882,530	\$10,659,071	\$153,704	-\$728,826	-\$604,835
2019	\$0	\$10,827,169	\$156,128	\$156,128	\$124,823
2020	\$0	\$10,999,060	\$158,606	\$158,606	\$122,163
2021	\$0	\$11,174,853	\$161,141	\$161,141	\$119,572
2022	\$0	\$11,354,665	\$163,734	\$163,734	\$117,048
2023	\$0	\$11,538,613	\$166,387	\$166,387	\$114,590
2024	\$0	\$11,726,820	\$169,101	\$169,101	\$112,195
2025	\$1,612,500	\$11,919,412	\$171,878	-\$1,440,622	-\$920,835
2026	\$0	\$12,116,520	\$174,720	\$174,720	\$107,591
2027	\$0	\$12,318,280	\$177,630	\$177,630	\$105,379
2028	\$395,923	\$12,524,830	\$180,608	-\$215,315	-\$123,059
2029	\$403,842	\$12,736,314	\$183,658	-\$220,184	-\$121,235
2030	\$411,918	\$12,952,882	\$186,781	-\$225,138	-\$119,424
2031	\$0	\$13,174,688	\$189,979	\$189,979	\$97,085
2032	\$0	\$13,401,889	\$193,255	\$193,255	\$95,144
2033	\$0	\$13,634,652	\$196,612	\$196,612	\$93,253
2034	\$0	\$13,873,144	\$200,051	\$200,051	\$91,410
2035	\$0	\$14,117,543	\$203,575	\$203,575	\$89,615
2036	\$0	\$14,368,028	\$207,187	\$207,187	\$87,866
2037	\$2,150,000	\$14,624,788	\$210,889	-\$1,939,111	-\$792,257
2038	\$0	\$14,888,016	\$214,685	\$214,685	\$84,502
2039	\$0	\$15,157,913	\$218,577	\$218,577	\$82,885
2040	\$502,126	\$15,434,685	\$222,568	-\$279,558	-\$102,128
2041	\$512,169	\$15,718,546	\$226,661	-\$285,507	-\$100,483
2042	\$522,412	\$16,009,717	\$230,860	-\$291,552	-\$98,854
		Discounted Present Value (DPV) =			-\$2,205,937

The change in property value listed in column 3 of Table 6 is based on the assumptions that Tier 1 properties increase at an annual rate of 1.5% in real terms

over the thirty-year period, that Tier 2 properties increase at an annual rate of 2.0%, that Tier 3 properties increase at an annual rate of 3.5% per year and that Tier 4 properties at the rate of 1.0% per year.

In short, over the 30-year period:

- ✓ the “business-as-usual” policy produces a return on a discounted present value basis of *negative \$4.4 million*;
- ✓ the “cease repair” policy produces a return of *negative \$2.2 million*; and
- ✓ the “Army Corps” policy will produce a return of *negative \$2.2 million* (effectively the break-even point with the “cease repair” policy) *if* it produces a response from potential buyers and investors such that they increase the value of Tier 1 properties by 1.5% per year, of Tier 2 properties of 2.0% per year, of Tier 3 properties of 3.5% per year and of Tier 4 properties of 1.0% per year over the 30-year period.

Finally, the selection of one of these alternatives, particularly for those representing the interests of the State, will depend on the likely impact of each alternative on the number of visitors to Ferry Beach State Park and their associated spending. To illustrate this impact, PDI calculated three scenarios for future visitor growth/decline. We assumed a continued decline of 2% per year associated with Alternative #1, a decline of 4% per year for Alternative #2 and an increase of 2% per year with Alternative #3. Table 7 lists the number of visitors and the discounted present value of their associated spending.

The discounted present value of visitor spending associated with Alternative #1 under these assumptions amounts to approximately \$18.5 million. For Alternative #2 the figure is \$15.2 million and for Alternative #3 it is \$29.7 million. In short, in addition to evaluating the likely effects of each alternative on property values, decision makers need to consider the effects on visiting patterns at Ferry Beach State Park. In particular, the change from a 4% annual *decrease* in park visitors and a 2% annual *increase* doubles the park’s cumulative commercial impact over the 30-year time horizon considered here.

Table 7 Estimated Trends in Ferry Beach State Park Visitors & Spending

Year #	Year	Alternative #1		Alternative #2		Alternative #3	
		Ferry Beach Visitors	Discounted Value of Visitor Spending	Ferry Beach Visitors	Discounted Value of Visitor Spending	Ferry Beach Visitors	Discounted Value of Visitor Spending
1	2013	30,000	\$1,260,000	30,000	\$1,260,000	30,000	\$1,260,000
2	2014	29,400	\$1,189,595	28,800	\$1,165,318	30,600	\$1,238,150
3	2015	28,812	\$1,123,125	27,648	\$1,077,751	31,212	\$1,216,679
4	2016	28,236	\$1,060,368	26,542	\$996,764	31,836	\$1,195,581
5	2017	27,671	\$1,001,118	25,480	\$921,862	32,473	\$1,174,848
6	2018	27,118	\$945,179	24,461	\$852,589	33,122	\$1,154,475
7	2019	26,575	\$892,366	23,483	\$788,522	33,785	\$1,134,455
8	2020	26,044	\$842,503	22,543	\$729,269	34,461	\$1,114,783
9	2021	25,523	\$795,427	21,642	\$674,468	35,150	\$1,095,451
10	2022	25,012	\$750,981	20,776	\$623,786	35,853	\$1,076,455
11	2023	24,512	\$709,019	19,945	\$576,912	36,570	\$1,057,788
12	2024	24,022	\$669,401	19,147	\$533,560	37,301	\$1,039,445
13	2025	23,542	\$631,997	18,381	\$493,466	38,047	\$1,021,420
14	2026	23,071	\$596,683	17,646	\$456,385	38,808	\$1,003,708
15	2027	22,609	\$563,343	16,940	\$422,090	39,584	\$986,302
16	2028	22,157	\$531,865	16,263	\$390,372	40,376	\$969,199
17	2029	21,714	\$502,146	15,612	\$361,038	41,184	\$952,392
18	2030	21,280	\$474,088	14,988	\$333,908	42,007	\$935,876
19	2031	20,854	\$447,597	14,388	\$308,816	42,847	\$919,647
20	2032	20,437	\$422,587	13,813	\$285,611	43,704	\$903,700
21	2033	20,028	\$398,974	13,260	\$264,148	44,578	\$888,029
22	2034	19,628	\$376,681	12,730	\$244,299	45,470	\$872,629
23	2035	19,235	\$355,633	12,220	\$225,941	46,379	\$857,497
24	2036	18,850	\$335,762	11,732	\$208,963	47,307	\$842,627
25	2037	18,473	\$317,000	11,262	\$193,261	48,253	\$828,015
26	2038	18,104	\$299,288	10,812	\$178,738	49,218	\$813,656
27	2039	17,742	\$282,564	10,379	\$165,307	50,203	\$799,547
28	2040	17,387	\$266,776	9,964	\$152,885	51,207	\$785,682
29	2041	17,039	\$251,869	9,566	\$141,397	52,231	\$772,057
30	2042	16,698	\$237,795	9,183	\$130,771	53,275	\$758,669
		DPV	\$18,531,733	DPV	\$15,158,197	DPV	\$29,668,763