

Community Economic Values for the Capitol Lake Basin



Washington Department of General Administration
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Nathaniel Jones Senior Facilities Manager

With assistance from:

Thurston Regional Planning Council Staff

Steven W. Morrison	Senior Planner
Sarah Morley	Administrative Assistant
Erin Cahill	Office Specialist I

Cover: Capitol Lake, 2006 (Washington State Department of Transportation)

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Executive Summary

Since 2003, the Capitol Lake Adaptive Management Plan (CLAMP) Steering Committee has been working to implement a ten-year plan for the adaptive management of Capitol Lake. Fourteen plan objectives have driven the activities of the committee. Several of the objectives are heavily influenced by a pending decision regarding the long-range management strategy for the lake basin. Objectives related to comprehensive sediment management, flood hazard management, improved water quality, or the management of noxious weed infestations are influenced by a decision on whether to manage the basin as an impounded river or as an estuary.

The ten-year plan also called for the preparation of an estuary feasibility report. This work has been completed and it has been determined that restoring an estuary within the Capitol Lake basin is technically feasibility.

General Administration and the CLAMP Steering Committee are engaged in a comparison of multiple management alternatives for the Capitol Lake basin. The CLAMP Alternative Analysis report will compare four alternatives based upon fifteen analysis categories.

Information related to the cost of implementation and maintenance for alternative management scenarios has been provided within various technical reports. The reports have sought to identify the total cost of alternative strategies, without attempting to assign or distribute costs among groups or entities.

The identification of regional economic affects projected to follow implementation of alternative management scenarios has been identified as a highly desirable component of the current analysis. However budget constraints have kept the analysis from exploring this issue area.



This report is a collection of economic information drawn from earlier studies. Much of this input was developed as part of the Deschutes Estuary Feasibility Study (DEFS), completed in 2007. This report also assesses whether desired information on economic costs and benefits are reasonably attainable. It concludes that further data collection and analysis to respond to some questions is beyond the means of this study.

It should also be noted that the CLAMP Steering Committee evaluated which additional data was necessary and essential to make a recommendation on the future of the basin. It was a conscious choice to not conduct a full economic impact analysis of the lake management alternatives. The table below and on the following pages summarizes the economic costs which have been provided in recent CLAMP technical reports.

A single action recommendation was provided by the CLAMP Technical Working Group, which was to establish a process to explore possible cost distribution methods and possible cost sharing opportunities between effected parties for each management alternative.

Economic Data and Costs Identified in Recent CLAMP Technical Reports

Summary of Costs		
	Low Cost	High Cost
Managed Lake Scenario		
Dam Major Maintenance	\$2.0	\$4.0
Flood Mitigation	\$2.0	\$4.0
Initial Dredge (875,000 Cubic Yards)	\$74.3	\$145.9
50 years of dredging (1.75 million Cubic Yards)	\$113.3	\$167.5
TOTAL	\$191.6	\$321.4
Estuary Scenario		
Flood Mitigation	\$2.0	\$4.0
Construction - fully loaded	\$57.0	\$63.0
Initial Dredge (394,000 Cubic Yards)	\$15.7	\$22.8
50 years of dredging (1.2 million Cubic Yards)	\$39.8	\$134.7
TOTAL	\$114.5	\$224.5
Dual Basin Scenario		
Flood Mitigation	\$2.0	\$4.0
Construction - fully loaded	\$84.9	\$92.4
Initial Dredge (394,000 Cubic Yards)	\$15.7	\$22.8
50 years of dredging (1.2 million Cubic Yards)	\$39.8	\$134.7
TOTAL	\$142.4	\$253.9

Costs are in Millions of dollars

This summary contains a number of assumptions which are identified in the following report.

I. BACKGROUND

Capitol Lake is part of the Washington State Capitol Campus and is located in Olympia and Tumwater, Washington. Lake managers are conducting a study to inform decisions regarding the future management of the lake. This study is being directed by the Washington Department of General Administration (GA). Research into the appropriate management strategy for the Capitol Lake basin has been ongoing since 2003.

Reports have been prepared on how the lake would respond to different management strategies. All of this information will be used by the Capitol Lake Adaptive Management Plan (CLAMP) Steering Committee. The committee is to provide a recommendation to the Director of General Administration regarding the long-term management of aquatic environment for the Capitol Lake basin. (WDGA, 2002)

To make such a recommendation, all the technical information is being collected and will be compared in a single document - *CLAMP Alternatives Analysis Report*. The goal of this report is to provide a valid comparison between the four alternatives, which are: the Managed Lake, the Status Quo Lake, the Estuary, and the Dual Basin Estuary.

The Steering Committee has selected fifteen “analysis categories” which will be used in the Alternative Analysis report. The categories were drawn from a variety of sources, including: the *CLAMP 10-Year Management Plan (2002)*; the *Capitol Campus Master Plan (2007)*; estuary feasibility technical reports; and comments from the public. The analysis categories which are most relevant to this report are:

- ❖ *What effect would this alternative have on the regional economy?*
- ❖ *What effect would this alternative have on Long Term Operating and Maintenance Costs?*

II. PURPOSE

The purpose of this report is to provide a summary of the economic values collected through the technical reports completed as a part of the analysis process.



Capitol Lake and Budd Inlet (courtesy of *The Olympian*)

III. GATHERING ECONOMIC VALUES

In 2006, a study to collect opinions from a cross section of community stakeholders was undertaken as part of the *CLAMP Deschutes Estuary Feasibility Study (DEFS)*. The study was authored by the Washington State Department of Fish and Wildlife, along with the National Oceanic and Atmospheric Administration (NOAA) Coastal Services Center. They recognized the need to:

- 1) Identify ways to gather input from non-governmental groups, the business community, and citizens about the types of benefits they derive from the Deschutes Basin, and
- 2) Develop a formal social and economic assessment that would integrate both quantitative and qualitative estimates of the value of these benefits.

Representatives for the “DEFS Focus Group” were selected from a diverse cross section of interested parties, as well as advisory groups from the cities of Olympia and Tumwater. They met only twice before reporting to the community. Their third meeting was open to the public and was televised on local access television.

The information collected by the Focus Group and the public meeting was included in the report, *Deschutes Estuary Feasibility Study: Net Benefit Analysis – Stakeholder Involvement* (WDFW, 2006). NOAA also prepared a companion report on the Focus Group process, *A Case Study of Stakeholder Involvement in the Net Benefits Analysis of the Deschutes Estuary Feasibility Study* (NOAA, 2007).

The community economic values from this process were also incorporated into another major technical report, called the *CLAMP Deschutes Estuary Feasibility Study: Net Social and Economic Benefit Analysis* (or NBA report). It provided a preliminary comparison of “goods and services” between alternative lake and estuarine management options (Cascade Economics, 2007). Some of those goods and services were described in predominantly economic terms and are summarized in detail in a later section of this report.



Dragon Boat Races on Capitol Lake in 2008 (Washington Department of General Administration)

IV. FOCUS GROUP ECONOMIC VALUES

The DEFS Focus Group process did not consider the full range of alternatives which are a part of the CLAMP Alternatives Analysis. The Focus Group limited its work to the consideration of an estuary. Information drawn from this work may be helpful to the Alternatives Analysis process if used carefully.



Focus Group Meeting – Olympia Yacht Club, March 2006

The Focus Group identified more than 50 attributes related to the Deschutes Basin. These were organized into eight categories and identified with descriptive titles that illustrate the value of those attributes to the group. The chapter titled “Healthy Economy” captured a broad variety of attributes that contribute to the local economy, particularly a thriving downtown area and marine-related economic sector. The attributes contained in the Healthy Economy category are listed in Table 1. The Focus Group’s “Sustainable Future” category also included some economic values, in an approach which sought to achieve social, environmental, and economic balance.

Focus Group Participants	
<p>Allen Miller, <i>Heritage Park Development Association</i> Angela Ruiz, <i>Citizen</i> David Bills, <i>Tumwater Area Chamber of Commerce</i> Donna Nickerson, <i>Black Hills Audubon Society</i> Donna Smith, <i>Citizen</i> Doug DeForest, <i>Thurston County Chamber of Commerce</i> Emily Piper Sanford, <i>Citizen</i> Emily Ray, <i>Citizen</i> Eve Fagergren, <i>Citizen</i> Frank Anderson, <i>Citizen</i> Gary Franklin, <i>South Capitol Neighborhood Association</i> John DeMeyer, <i>Olympia Yacht Club</i> John Lynch, <i>Chambers Lake Homeowners Association</i></p>	<p>Keith Johnson, <i>Chambers Lake Homeowners Association</i> Loris Fenske, <i>Olympia Heritage Commission</i> Naki Stevens, <i>People for Puget Sound</i> Nancy Stevenson, <i>Tumwater Historic Preservation Commission</i> Oscar Soule, <i>Citizen</i> Paul Allen, <i>Friends of the Deschutes Estuary</i> Paul Seabert, <i>Olympia Downtown Association</i> Paul Spivak, <i>Citizen</i> Randy Weeks, <i>Citizen</i> Renee Sunde, <i>Thurston County Economic Development Council</i> Sara Carter, <i>South Sound Green - Thurston Conservation District</i> Tamara Garcia, <i>Thurston County Visitors Convention Bureau</i> Tom Hanson, <i>Capital Lakefair</i></p>

TABLE 1
Focus Group Attributes: ‘Healthy Economy’
Olympia Yacht Club – March 7 & 14, 2006

Ecotourism and wildlife viewing
<ul style="list-style-type: none"> • Ecotourism and wildlife viewing will be enhanced by a properly restored estuary with boardwalks, viewing stations, and interpretive centers/signage that will enhance the local economy.
Economic Driver (including transportation, tourism, port, marine businesses, yacht club)
<ul style="list-style-type: none"> • How much would the downtown economy be affected if the lake were an estuary? • How much business would “Mud Fair” attract?
Not a large tax burden
<ul style="list-style-type: none"> • No – lost opportunity • What is the annualized cost of dredging versus the loss of income? • How much would it cost each citizen to make up for the losses?
Destination for visitors
<ul style="list-style-type: none"> • Number of visitors: Where from? Frequency? • Restaurant revenues • Existing survey data from Olympia Downtown Association (ODA), Chamber, Capitol Visitors Center ~ new survey? • Marine-oriented visits: Tugboat races, Wooden Boat Festival, Lakefair, Harbor Days, etc.
Lake/Estuary attracts downtown business
<ul style="list-style-type: none"> • Future condos • Anchoring at new Anthony’s, Budd Bay
Safe haven for mooring boats
<ul style="list-style-type: none"> • Re: sediment changes, impact on Port operations • Look and feel ~ aesthetic values • Model the loss of slips associated with sediment deposition • Number of boats currently moored, revenues from moorage and boat repair • Tax revenues • Department of Natural Resources (DNR) lease revenues – impact on recreational and other programs (state matching grants) • Boat cleaning, repair, Canvas Works

V. COMMUNITY ECONOMIC VALUES

The Focus Group sessions were followed with a report to the community which highlighted the findings. Comments from that community meeting were collected and are included in the final report “*Deschutes Estuary Feasibility Study: Net Benefit Analysis – Stakeholder Involvement*” (WDFW, 2006). A list of public comments related to the “Healthy Economy” category is presented on the following page. They are provided verbatim and without interpretation.

TABLE 2
Public Meeting Comments on ‘Healthy Economy’
Knox Center – March 21, 2006

<p>Healthy port, marinas, marine businesses</p> <ul style="list-style-type: none"> ● Port of Olympia turning basin ● Cost of dredging for local marinas ● DNR lease payments from local marinas ● Businesses with marine connections: grocery stores, restaurants, repair shops, etc. ● Water-oriented tourist trade ● Festivals: Olympia Wooden Boat Festival, Harbor Days, etc.
<p>Entry way to downtown – lake, spiritual pathways, reflective pond. People enjoined in unity of a whole town - as <i>‘It’s the water guides’</i>. A capitol with magnificent aura. A learning for nature [sic] while keeping clean deep water. Healthy businesses and recreation bring future love for real values and love of life.</p>
<p>Avoid spending 1 million to 1.5 million taxpayer dollars every year to keep the lake.</p>
<p>Financial reimbursement for any impacts to large public and private investments.</p>
<p>Consider investments: road, park, bridge, downtown, etc.</p>
<p>What has the investment in the lake/Heritage Park already been?</p>
<p>Beneficiaries of dam (port, yachts, downtown) should pay for a piece of the dredging costs.</p>
<p>The lake provides a beautiful edge to our downtown and Capitol. I can’t imagine how mud flats would be visually compatible.</p>
<p>Studies should include the use of a bulkhead to protect OYC from sediment build-up under the marina. Direct the build-up to an easier dredge and less costly project.</p>
<p>To the extent that the lake increases tourism it is actually a detriment to the local economy.</p>
<p>Let’s just look at the value to cities of the two options.</p>
<p>Source of public attraction to support downtown commerce – business and restaurant.</p>
<p>Study car plates @ Nisqually – compare with Capitol Lake. Could local rest[aurants] bring more \$\$ downtown?</p>
<p>Beauty attracts visitors \$. Human as well as critters.</p>
<p>Maintaining the investment of millions of dollars of our money that created Capitol Lake and its improvements. Protect the investment.</p>
<p>Who will “Foot” the bill for sediment in Budd Inlet?</p>
<p>Study what would happen/costs to sediment in harbor if estuary.</p>
<p>Clean up Budd Inlet so we can eat and farm shellfish.</p>
<p>Sailing classes on Capitol Lake. Small boat rentals.</p>
<p>Lakefair.</p>
<p>Shellfish farms.</p>
<p>From an economic and engineering perspective, would an estuary do a better job of <u>flushing</u> sediment than the present lake?</p>

VI. INTEGRATION OF ECONOMIC VALUES

One can identify some themes by drawing from the Focus Group process, the related community input, and from the *Net Social and Economic Benefit Analysis* (NBA) report. The NBA sought to integrate identified values and technical information. Estimating quantified economic impacts was beyond the scope of the NBA report. The following themes have been identified:

- Impact on Tourism
- Impact on Operating and Engineering Costs
- Impact on Downtown Businesses
- Impact on Port of Olympia and Percival Landing Marinas
- Infrastructure Costs

Impact on Tourism

The NBA report provided three observations about the potential impact on local tourism:

1. Most local tourism revolves around the annual legislative session, which is during the winter and spring.
2. Wildlife viewing in the basin is likely an under-developed tourist activity. However, the report did not predict the affect that changing from a lake to an estuary would have on wildlife viewing as a component of local tourism.
3. The report also indicated that there would be no change to upland areas which support some community celebrations; therefore, such events could proceed under either a lake or estuary option. However, this observation does not take into account that some associated water-based activities may be altered or eliminated under an estuary option. The report noted that visitation may suffer “if people choose not to attend because they do not enjoy the aesthetic experience of an estuary”.

Impact on Operating and Engineering Costs

A comparison of maintenance and restoration costs between a lake and estuary is possible. Such a comparison would need to take into account costs which are unique to either a lake or estuary, such as: any engineered revisions to the basin, normal maintenance and operations, dredging, noxious and aquatic weed management, and projected recreation or shoreline habitat enhancements.

Impact on Downtown Businesses

The NBA report did not predict how downtown businesses might be affected because no data on tourism impacts was available.

Impact on Port of Olympia and Percival Landing Marinas

The NBA report noted that under an estuary alternative, the Port of Olympia berths, the navigation channel, and marinas along Percival Landing would require dredging more frequently than in the past. It noted that additional information was needed to determine the predicted cost of new dredging. It also suggested that a cost-sharing plan be considered.



Port of Olympia (courtesy of *The Olympian*)

Since the completion of the NBA report, information has been developed which identifies the costs of dredging for impacted areas under alternative scenarios of lake management.

Infrastructure Costs

The Focus Group process noted the “value of the existing infrastructure that has been constructed to support the current uses of the Deschutes Basin”. The existing infrastructure includes dams, bridges, parkways, walkways, and the parks and roads associated with Capitol Lake and Budd Inlet. Participants noted that the creation of Capitol Lake required considerable public investment and that the value of this existing infrastructure, along with the value of new infrastructure requirements, should be assessed for basin management decisions.” (WDFW, 2006)

VII. SUGGESTED ECONOMIC DATA GAPS

The NBA and Focus Group reports identified a number of information gaps related to the economy and regional economic health. These are listed below. Many of these gaps have now been filled. Gaps which have been addressed are identified with a check mark (✓).

1. **Port and Percival Landing Marinas** – The data did not exist to:
 - ✓ Estimate the amount of yearly sediment accumulation at the Port berths and navigation channel; and at the Percival Landing Marinas,
 - ✓ Determine the yearly cost of dredging for the Port and the Marinas, and

2. **Maintenance and Operation** - The data did not exist to:
 - ✓ Compare the operational and maintenance costs between a lake and an estuary, and
 - ✓ Compare the dredging costs between a lake and an estuary.

3. **Infrastructure Investment** - The data did not exist to:
 - ✓ Compare the infrastructure and restoration costs of a lake and an estuary.

4. **Secondary Economic Impacts** - The data did not exist to:
 - Determine the relative effect on local tourism between a lake and an estuary,
 - Determine the relative effect on attendance at community events between a lake and an estuary, and
 - Determine the relative effect on downtown Olympia businesses between a lake and an estuary.

VIII. RECOMMENDATIONS FOR ECONOMIC DATA GAPS

After the NBA Report was complete, the CLAMP Steering Committee concluded that additional economic data was necessary to complete the Alternative Analysis report. Dredging costs, which represent the largest percent of long-term costs, were reevaluated when the conditions regarding the beneficial use of dredged materials changed. See Moffatt & Nichol, *Dredging and Disposal Addendum* (2009).

Table 3 (on the following page) identifies how the suggested data gaps line up with the CLAMP Priority Reports. Table 3 also includes the recommendations from the preceding chapter, and identifies those questions where additional economic data collection will not be pursued.

Table 4A, 4B, and 4C (on pages 13, 14, & 15 in the Summary section) provides the new economic data or cost from the various CLAMP technical reports.

**TABLE 3
Recommendations for Economic Data Gaps**

Suggested Economic Data	Data to be provided	CLAMP Priority Report
1. Maintenance and Operation		
Determine the annualized cost of dredging associated with the lake basin, the Port, and the affected Marinas for the four identified alternatives – <i>Status Quo Lake, Managed Lake, Estuary, and Dual Basin Estuary</i>	√	M&N, <i>Dredging and Disposal & Addendum Reports</i>
Compare the operational and maintenance costs for the identified alternatives, including the cost of dredging.	√	Herrera, <i>Alternative Analysis Report</i> , and M&N, <i>Dredging and Disposal & Addendum Reports</i>
2. Infrastructure Investment		
Compare the infrastructure investment costs of the four alternatives	√	M&N, <i>Engineering and Cost Estimate Report</i> M&N, <i>Low Lying Infrastructure Report</i> , and M&N, <i>Dam Structural Report</i>
3. Secondary Economic Impacts		
Determine the relative economic effect on downtown Olympia business, local tourism, and community events for the four identified alternatives	Suggested	This analysis not being pursued because of the high cost and low reliability of such studies.
4. Comprehensive Cost Analysis		
Identify direct costs and savings for affected public entities under each alternative and identify opportunities for improved cost distribution. Similarly, identify financial impacts for private entities and recommend opportunities for improved cost distribution.	Suggested	Consider CLAMP Steering Committee process to identify possible cost sharing opportunities between affected parties for cost items directly associated with the recommended long-term management strategy.

1. Maintenance and Operations

Refer to Table 4 in the Summary section. There are limitations to the maintenance and operations information. The report has sought to capture all costs associated with dredging and on-going maintenance under alternative scenarios. However, secondary impacts, such as business disruption during maintenance dredging or the cost of existing deferred maintenance have not been captured in this report.

2. Infrastructure Investment

Refer to Table 4 in the Summary section. There are some limitations to this information. It is reasonable to expect that if significant infrastructure investments were to be implemented decision makers would consider upgrades to such improvements which serve objectives beyond the consideration of this report. The best example of this may be the transportation improvements of the estuary alternatives associated with replacing the

5th Avenue dam. The proposed bridge is priced to achieve transportation functions. However, additional costs may result from aesthetic upgrades or enhanced traffic flow investments.

Please note that the summary section includes infrastructure costs associated with sea-level rise. Sea-level rise impacts can be associated with all lake and estuary alternatives, albeit to varying degree or schedule. These infrastructure expenditures have been held out separately from the basic costs of the alternatives. There is some question if the identified investments would be undertaken due to the limited duration and limited extent of flooding which prompts the need for expenditure.

3. Secondary Economic Impacts

The NBA report was not able to determine the possible affect on downtown Olympia business if the lake were restored to an estuary. The Focus Group and public meeting comments did not provide any specific suggestions for responding to this question.

Staff representing General Administration, the Thurston Regional Planning Council, and the National Oceanic and Atmospheric Administration - Coastal Services Center explored various local data sets which might be used to populate a regional economic model. It was determined that available economic models required a large amount of localized data that was not available within the US census profile, provided in the county property tax records, or reasonably attainable through other methods.

As noted previously, the NBA report was not able to determine if changing Capitol Lake to an estuary would have a measurable effect on local tourism via wildlife watching. However, there is one local example where local tourism from wildlife watching has significantly increased over recent decades.

Bowerman Basin Case Study - Hoquiam, WA.

The placement of dredged spoils in Hoquiam, Washington near the Bowerman Basin resulted in the creation of inter-tidal mud flats. In a short time, there was a high use of these tide flats by migratory waterfowl and shorebirds. In 1988 the significance of this site was recognized by Congress when it established the *Grays Harbor National Wildlife Refuge*. The refuge is managed by the US Fish and Wildlife Service and encompasses about 1,500 acres of inter-tidal mudflats, salt marsh, and uplands. (USFWS – internet site)

Although the refuge occupies only 2% of the inter-tidal habitat of the Grays Harbor estuary, it hosts up to 50% of the shorebird use. (Chehalis River Council – internet site)

A new community event was created in 1995, the *Grays Harbor Shorebird Festival*, which celebrates the annual migration of shorebirds. (Grays Harbor Shorebird Festival – internet site)

Bowerman Basin is not a direct ‘one to one’ comparison with Capitol Lake. In Hoquiam, dredge spoils created inter-tidal flats where none had existed before. With an estuary in the Capitol Lake basin the water surface elevation would fluctuate twice daily with the tides, as compared to the stable water elevation of a lake. This makes it more difficult to predict change in tourism due to a change in Capitol Lake.

Since the release of the NBA report two related studies were completed: *Implications of Capitol Lake Management for Fish and Wildlife* (September 2008), and *Heritage Park Program Development – Partner Agency Focus Group Report and Recommendations* (April 2008). These reports offer greater insight into the potential for the development of wildlife watching in the Capitol Lake basin under alternative scenarios. In sum, these studies found significant potential for local wildlife tourism and a greater quantity and diversity of wildlife under estuary alternatives.

The NBA report was not able to determine the possible affect on attendance at community events if the lake were restored to an estuary. It is likely that the affect would vary for different events. For example, the affect on *Lakefair*, which predominately uses Heritage Park, would be different than the *Wooden Boat Festival* and *Harbor Days*, which are oriented along Percival Landing and the Budd Inlet shoreline. These events are a source of civic pride and revenue for local non-profit organizations. They are generally week-long or weekend events. There are no known localized studies which link tourist trips to local community events.

A study could be undertaken to predict these behaviors. However, it is believed that the study’s cost is greater than the benefit it would provide to the CLAMP decision making process.



Heritage Park - Arc of Statehood (Washington Department of General Administration)

4. Comprehensive Cost Analysis

Recommended Action: It was suggested that the CLAMP Steering Committee address possible distribution of costs and possible cost sharing opportunities between effected parties. The scope and reach of the committee's recommendations regarding the future management of the lake will be determined as a part of the analysis process.

IX. **POTENTIAL ECONOMIC CONDITIONS**

There are two potential economic conditions which this reports has been unable to address. The first is the forthcoming Total Maximum Daily Loading (TMDL) report from the Washington Department of Ecology.

The TMDL report is a 'state of the art' water quality report which will describe conditions which do not comply with state water quality standards throughout the full length of the Deschutes Watershed (including Budd Inlet). Because of its complexity and multiple water quality parameters, this report has been delayed. The report did become available in October 2008, however, the fiscal and policy implications of the report findings will become known through the water cleanup plan which is in the early stages of development.

The second unanswered potential economic condition is the willingness for outside parties to cost-share for restoration or maintenance components of the various alternatives. The Washington Department of Fish and Wildlife and the US Army Corps of Engineers are engaged in a Puget Sound region-wide evaluation of estuary restoration opportunities. Called the Puget Sound Nearshore Ecosystem Restoration Project, this General Investigation began in 2001 and is now collecting possible candidates to be included in its final feasibility report.

The goal of the General Investigation is to provide the Army Corps and the US Congress with a priority list of Nearshore Restoration and Protection projects for each of the seven sub-basins of Puget Sound by February 2010. It is likely that there are few other opportunities for estuary restoration of the scale and magnitude of Capitol Lake in Southern Puget Sound. A draft list of candidate sites, the type of potential projects, and the amount of funding are not available at this time.

X. **SUMMARY**

Over the past few years, community based economic values have been collected regarding the future of Capitol Lake and the Deschutes basin. These economic values were provided by a Focus Group consisting of community stakeholders and from a public meeting which was hosted by the Focus Group. A number of economic questions have been raised, many of which were addressed by other CLAMP technical reports.

There are limited financial resources available to address detailed questions of regional economic impact. Recent CLAMP technical reports have provided answers to some of the economic questions about the future of the Capitol Lake basin. Questions which will likely not be fully resolved relate to the secondary economic impact of a lake versus an estuary upon the local region.

TABLE 4 A
Economic Data and Costs Identified in Recent CLAMP Technical Reports

A. Infrastructure Investment		
<p>The <i>Engineering Design and Cost Estimates</i> report (M&N, 2007) provides detailed assumptions for the estimated costs to construct the Estuary scenario, and the Dual Basin scenario. A typical three-point construction estimate of low, medium, and high cost was used, but only the low and high costs are provided below. Initial and maintenance dredge costs were revised by the <i>Dredging and Disposal Addendum</i> report (M&N, 2009). Those costs associated with major maintenance of the Capitol Lake Dam were generated as a result of the <i>Capitol Lake Dam Condition Assessment and Life Expectancy</i> report (M&N, 2008).</p>		
Summary of Infrastructure Investments		
	Low Cost	High Cost
Managed Lake Scenario		
Dam Major Maintenance	\$2.0	\$4.0
Flood Mitigation	\$2.0	\$4.0
Initial Dredge (875,000 Cubic Yards)	\$74.3	\$145.9
TOTAL	\$78.3	\$153.9
Estuary Scenario		
Flood Mitigation	\$2.0	\$4.0
Construction - fully loaded	\$57.0	\$63.0
Initial Dredge (394,000 Cubic Yards) *	\$15.7	\$22.9
TOTAL	\$74.7	\$89.9
Dual Basin Scenario		
Flood Mitigation	\$2.0	\$4.0
Construction - fully loaded	\$84.9	\$92.4
Initial Dredge (394,000 Cubic Yards) **	\$15.7	\$22.9
TOTAL	\$102.6	\$119.3
<p>Costs are in Millions of dollars</p> <p>* This initial dredge figure includes relocation of sediment within the basin. It is built upon a balanced dredge and fill for the north and middle basins. It includes no dredging in Budd Inlet.</p> <p>** The Dual Basin initial dredge cost is projected to be equivalent to the Estuary scenario.</p>		

TABLE 4 B
Economic Data and Costs Identified in Recent CLAMP Technical Reports

B. Maintenance																																			
<p>The <i>Dredging and Disposal</i> report (M&N, 2008) and its update, <i>Dredging and Disposal Addendum</i> (M&N, 2009), provide detailed assumptions for the estimated dredge costs between the various alternatives. A typical three-point construction estimate of low, medium, and high cost was used, but also included a worst case cost if the dredged materials need to be sent to a landfill.</p>																																			
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<p>* The Managed Lake Scenario includes no dredging in Budd Inlet. Sediment volumes and frequencies for this scenario are expected to be equivalent to current Budd Inlet conditions.</p>																																			
<p>** Dual Basin maintenance dredging is projected to be equivalent to the Estuary Scenario.</p>																																			
<p>NOTE: The Estuary Scenario and the Dual Basin Scenario include the cost of additional dredging in Budd Inlet for the Port and the affected marinas. The Managed Lake scenario does not.</p>																																			

TABLE 4 C
Economic Data and Costs Identified in Recent CLAMP Technical Reports

C. Infrastructure Investment associated with Sea Level Rise			
<p>The <i>Low-Lying Infrastructure</i> report (M&N, 2008) provides an assessment of the effects of sea level rise on low-lying infrastructure in the vicinity of Capitol Lake. The report compares possible future management alternatives: continued management of the lake as a lake (the Lake Alternative), and restoration of the Deschutes Estuary with or without a separate reflecting pool (the Estuary Alternatives). The table below lists the effects and possible mitigation measures for Sea Level Rise, which includes a number of detailed assumptions.</p>			
Summary of Infrastructure Effect and Mitigation	Cost (Millions of dollars)	Triggering Sea Level Rise	
		Lake Alternative	Estuary Alternatives
Downtown Olympia			
Raise berm along Arc of Statehood	\$2 M	1.0 ft	0.5 ft
Install stormwater pump station*	\$4 M	Now*	Now*
Transportation Corridors			
Raise Deschutes Parkway near BNSF crossing	\$4 M	1.0 ft	At most 0.5 ft*
Replace BNSF Railroad Trestle	\$9 M	2.0 ft	0.5 to 1.0 ft
Raise rail track west of Capitol Lake	\$3 M	Varies†	Varies†
Parks and Buildings			
Construct perimeter dike for parking and restroom at Marathon Park	\$0.1	0.5 to 1.0 ft	At most 0.5 ft*
Construct perimeter dike for parking at GA Powerhouse	\$0.2 M	0.5 ft	Now*
Construct or raise perimeter dike to protect the Old Brewhouse	\$0.5 M	1.0 to 2.0 ft‡	1.0 to 2.0 ft‡
<p>* This activity could reasonably be excluded from the costs associated specifically with sea level rise.</p> <p>† This could be chosen to coincide with either the replacement of the BNSF Railroad Trestle or with raising Deschutes Parkway.</p> <p>‡ The need for protection of the Old Brewhouse depends on the nature of any building restoration efforts that may be implemented.</p> <p>NOTE: The identified improvements may be deferred due to the relatively low frequency and limited impact and the high cost of remediation.</p>			

**TABLE 5
Infrastructure Cost Calculations**

Estuary Scenario

	Low Cost	High Cost
Base Construction*	\$37.6	\$41.2
Construction adjusted for inflation**	\$40.3	\$44.1
Contingency @ 5%	\$2.0	\$2.2
Sales tax @ 8.4	\$3.2	\$3.7
Construction Engineering @ 10%	\$4.0	\$4.4
Right of Way	\$0.2	\$0.6
Permitting, etc. @ 15%	\$6.0	\$6.6
State Oversight @ 3%	<u>\$1.2</u>	<u>\$1.3</u>
TOTAL	\$57.0	\$63.0

Dual Basin Scenario

	Low Cost	High Cost
Base Construction*	\$55.9	\$60.6
Construction adjusted for inflation**	\$59.9	\$64.9
Contingency @ 5%	\$3.0	\$3.2
Sales tax @ 8.4	\$5.0	\$5.5
Construction Engineering @ 10%	\$6.0	\$6.5
Right of Way	\$0.2	\$0.6
Permitting, etc. @ 15%	\$9.0	\$9.7
State Oversight @ 3%	<u>\$1.8</u>	<u>\$1.9</u>
TOTAL	\$84.9	\$92.4

Costs are in Millions of dollars

*Capitol cost from M&N *Engineering & Design Report, 2007*; minus initial dredge (initial dredge costs revised by M&N *Dredging and Disposal Report, 2008*)

** Inflation @ 3.5 per year - from 2006 to 2008

**TABLE 6
Dredging Cost Calculations**

Managed Lake

Initial Dredge

	Construction	Permitting & Design	Construction Contingency	Construction Engineering	State Oversight	TOTAL
Low	\$52	\$15.6	\$2.6	\$2.6	\$1.56	\$74.36
High	\$102	\$30.6	\$5.1	\$5.1	\$3.06	\$145.86

Maintenance Dredge

	Construction	Permitting & Design	Construction Contingency	Construction Engineering	State Oversight	TOTAL
Low	\$100	\$0.3	\$5.0	\$5.0	\$3.0	\$113.30
High	\$148	\$0.3	\$7.4	\$7.4	\$4.44	\$167.54

Estuaries

Initial Dredge

	Construction	Permitting & Design	Construction Contingency	Construction Engineering	State Oversight	TOTAL
Low	\$11	\$3.3	\$0.55	\$0.55	\$0.33	\$15.73
High	\$16	\$4.8	\$0.8	\$0.8	\$0.48	\$22.88

Maintenance Dredge

	Construction	Permitting & Design	Construction Contingency	Construction Engineering	State Oversight	TOTAL
Low	\$35	\$0.2	\$1.75	\$1.75	\$1.05	\$39.75
High	\$119	\$0.2	\$5.95	\$5.95	\$3.57	\$134.67

Costs are in Millions of dollars

TABLE 7
Economic Data and Costs Identified in Recent CLAMP Technical Reports
With Out-year Expenses expressed as Net Present Value

Summary of Costs		
	Low Cost	High Cost
Managed Lake Scenario		
Dam Major Maintenance	2.00	4.00
Flood Mitigation	2.00	4.00
Initial Dredge (875,000 Cubic Yards)	74.30	145.90
50 years of dredging (1.75 million Cubic Yards)	71.00	105.40
TOTAL	\$149.30	\$259.30
Estuary Scenario		
Flood Mitigation	2.00	4.00
Construction - fully loaded	57.00	63.00
Initial Dredge (394,000 Cubic Yards)	15.70	22.80
50 years of dredging (1.2 million Cubic Yards)	25.70	87.70
TOTAL	\$100.40	\$177.50
Dual Basin Scenario		
Flood Mitigation	2.00	4.00
Construction - fully loaded	84.90	92.40
Initial Dredge (394,000 Cubic Yards)	15.70	22.80
50 years of dredging (1.2 million Cubic Yards)	25.70	87.70
TOTAL	\$100.40	\$177.50
<p>Note: Cost comparisons include all identified infrastructure and dredging costs. Total cost approach for Estuary and Dual Basin Scenarios includes depth maintenance for Port, marinas, and navigation channel in lower Budd Inlet, and the cost of roadway modifications. Managed Lake Scenario does not capture the cost of dredging in Budd Inlet, but does include major maintenance for dam.</p> <p>All costs are millions. Construction, Mitigation and Initial Dredge costs expressed in 2008 dollars.</p> <p>Net Present Value applied 50 years of Maintenance Dredging using 2008 dollars with interest rate of 4.875%</p>		

XI. REFERENCES

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