

## Restoration Alternatives

*continued*

### Alternative B – Widened BNSF Trestle

Alternative B would widen the Burlington Northern Santa Fe (BNSF) railroad trestle between the North and Middle Basins of Capitol Lake. The existing 200 foot trestle would be widened to 500 feet. Alternative B assumes the installation of Alternative A.

This opening would match the connection with Budd Inlet. It would provide better water and sediment movement between the basins of the lake.

### Alternative C – Widened Parkway Bridge

Alternative C would widen the connection between Percival Cove and the Middle Basin. The existing 100 foot bridge in Deschutes Parkway would be widened to 200 feet. Alternative C assumes the installation of Alternative A.

In 1951 the construction of Deschutes Parkway separated Percival Cove from the Middle Basin of Capitol Lake. Sediment from Percival Creek has been accumulating in the cove so that the creek almost flows directly into the Middle Basin, by passing the cove. It is anticipated that these sediments would present a barrier to full tidal inundation.

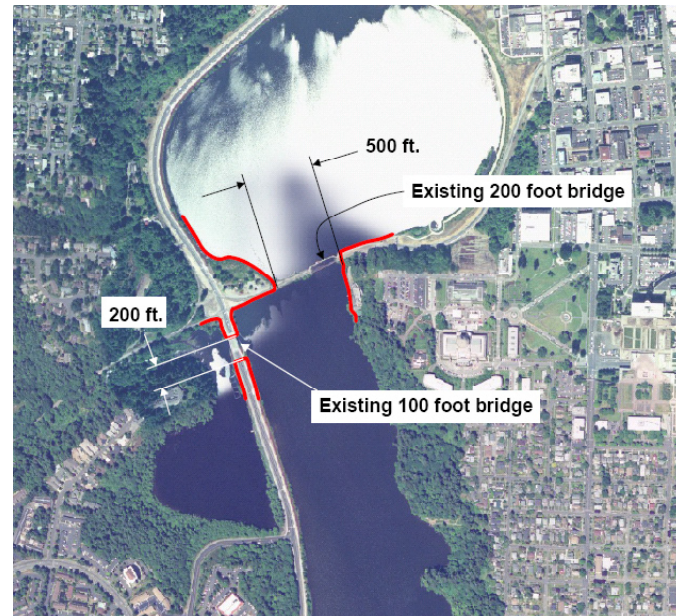
### Alternative D – Split North Basin

In Alternative D, a barrier would be constructed in the North Basin splitting the basin into an east and west half. The western half would be connected to the inlet from through the 500 foot opening provided in Alternative A.

This alternative would preserve a partial reflecting pond adjacent to Heritage Park. The alignment of the north-south barrier is similar to a design suggested in the 1912 Olmstead brothers plan for the Capitol Campus. It has been suggested that the eastern half would be a freshwater impoundment.

*All Alternatives use a 500 foot wide opening between Capitol Lake and Budd Inlet.*

Alternatives B & C



Alternative D



## CAPITOL LAKE Adaptive Management Plan

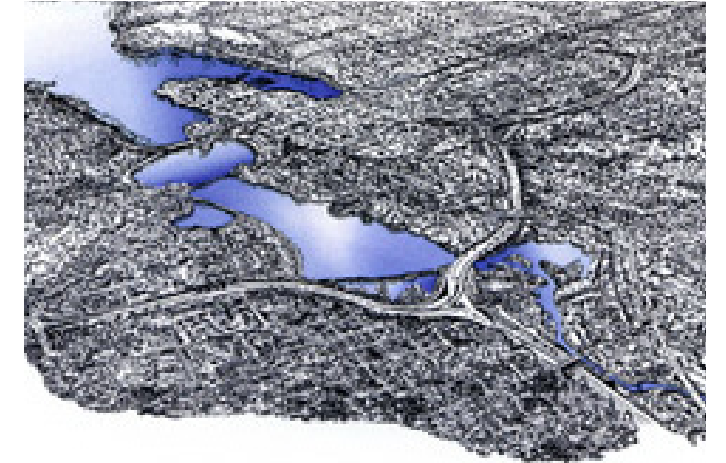
### Deschutes Estuary Feasibility Study



### Lake History & Management

Capitol Lake was created in 1951 when the state constructed a dam where the Deschutes River flowed into Puget Sound. The dam blocked the tidal flow of Budd Inlet and changed the Deschutes River estuary, a place where freshwater mixes with saltwater, into an artificial lake. The Washington Department of General Administration manages the day-to-day operations of the lake as part of the Capitol Campus.

The **Capitol Lake Adaptive Management Plan (CLAMP)** Steering Committee launched the Deschutes Estuary Feasibility study in 2003. The goal of the study is to gather objective, scientifically sound data on the feasibility of restoring a naturally functioning estuary as a long-term alternative to maintaining the lake. The study is scheduled for completion in late summer 2008.



### Management Challenges

The Deschutes River dumps about 35,000 cubic yards of sediment into the lake each year. The sediment build-up reduces the volume of the lake and increases the risk of flooding to downtown Olympia. It is estimated that the lake is about 21 percent smaller and holds approximately 60 percent less water now than it did in 1951. An estuary would likely distribute the river sediment more evenly throughout lower Puget Sound.



*The U.S. Environmental Protection Agency describes an estuary as a body of water where freshwater from a river or stream flows into a partially enclosed section of the ocean. Puget Sound and San Francisco Bay are two well-known estuaries.*

*Estuaries are among the most productive habitats on earth. Thousands of birds, mammals, fish, and other wildlife depend on estuaries. Many species of fish and shellfish rely on the sheltered waters of estuaries as protected places to spawn.*

To learn more, go to:

[www.epa.gov/owow/estuaries/about1.htm](http://www.epa.gov/owow/estuaries/about1.htm)



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## Management Challenges

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As the lake becomes shallower, summertime water temperatures increase, which can stress fish, such as salmon. High water temperatures can also stimulate the growth of algae and noxious weeds, such as Eurasian milfoil. A milfoil infestation was discovered in the lake in 2001. When algae dies it uses up dissolved oxygen in the water as it decomposes. Low levels of oxygen can harm fish and wildlife. Noxious weeds crowd out native vegetation reducing habitat for fish and wildlife. An estuary would maintain cool water temperature. Milfoil does not grow in Puget Sound estuaries.

A 2000 water quality computer model showed that removing the Capitol Lake dam could substantially improve dissolved oxygen levels in Budd Inlet. Low dissolved oxygen levels are a problem in the inlet. The state Department of Ecology is currently studying this and other water quality concerns in Budd Inlet and the Deschutes River watershed.

Restoring the Deschutes estuary cannot be accomplished by simply opening up the gates of the Capitol Lake dam. Also, an engineering study of Deschutes Parkway and the shoreline parks found that they were not designed to withstand the twice-a-day tidal forces of an estuary.

More information about the Deschutes Estuary Feasibility Study is available at: [www.ga.wa.gov/CLAMP/index.html](http://www.ga.wa.gov/CLAMP/index.html).

## DEFS - Study Goals

The **Deschutes Estuary Feasibility Study (DEFS)** goals are:

- Increase the understanding of how an estuary might function to a level equal to that of what is known about managing Capitol Lake.
- Determine if it is possible to create a viable, self-sustaining estuary given the existing physical constraints of an urban setting.
- Conduct an objective analysis of the social, economic, and environmental costs and benefits of restoring an estuary.

Once the study is complete, the CLAMP committee will make a recommendation to the General Administration director on whether to proceed with the estuary restoration or to maintain a lake.

### CLAMP 10-Year Management Plan

*In 2002 the State adopted an adaptive management plan for Capitol Lake. Called the CLAMP 10-Year Management Plan it includes 14 objectives. Undertaking an estuary feasibility study is one of its recommended actions.*

*The objective from the Plan is to, **“Complete an estuary feasibility study to determine a long-range management decision.”** This objective was not immediately adopted as a part of the CLAMP Plan, but was added in 2003 once there was a better understanding of its details.*



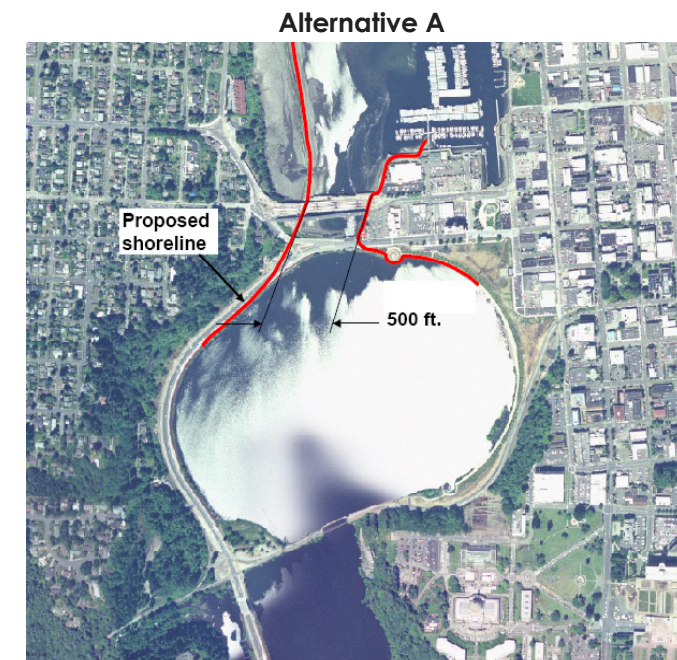
## DEFS - Study Tasks

The Deschutes Estuary Feasibility Study contains a number of study tasks. These are grouped into four Phases which are listed below.

<b>All Phases</b>	<ul style="list-style-type: none"> <li>• CLAMP Technical Advisory Committee Review &amp; Steering Committee Oversight</li> <li>• Project Management</li> </ul>
<b>Phase 1</b>	<ul style="list-style-type: none"> <li>• Conceptual Model of Estuarine Process and Community Values</li> <li>• Bathymetric Survey</li> <li>• Hydraulic and Sediment Transport Analysis and Modeling – Phase 1</li> </ul>
<b>Phase 2</b>	<ul style="list-style-type: none"> <li>• Reference Estuary Survey</li> <li>• Biological Conditions Report</li> <li>• Hydraulic and Sediment Transport Analysis and Modeling – Phase 2</li> <li>• Independent Technical Review</li> <li>• Community Review</li> </ul>
<b>Phase 3</b>	<ul style="list-style-type: none"> <li>• Design and Preliminary Cost Estimates</li> <li>• Net Benefit Analysis</li> <li>• Independent Technical Review</li> <li>• Community Review</li> </ul>
<b>Phase 4</b>	<ul style="list-style-type: none"> <li>• Report Development</li> <li>• Community Review</li> </ul>

## Restoration Alternatives

It was decided to study a range of restoration scenarios or alternatives in the estuary feasibility study. Each would have a slightly different opening between Capitol Lake and Budd Inlet. Currently, fresh water from the lake flows one-way through the tide gates in the Capitol Lake dam and into Budd Inlet. The tide gates prevent most salt water from entering the lake.



### Alternative A - 500 Foot Opening

Alternative A would have a 500-foot opening between Capitol Lake and Budd Inlet. This is the widest possible opening between the river and the inlet.

Alternative A would remove the Capitol Lake dam and a part of Deschutes Parkway west of the dam. It would require the construction of a new bridge, similar to the one recently constructed on 4<sup>th</sup> Avenue, but would leave other buildings and roads in place.