



Hidden Lake Management Plan Feasibility Study

September 8, 2014

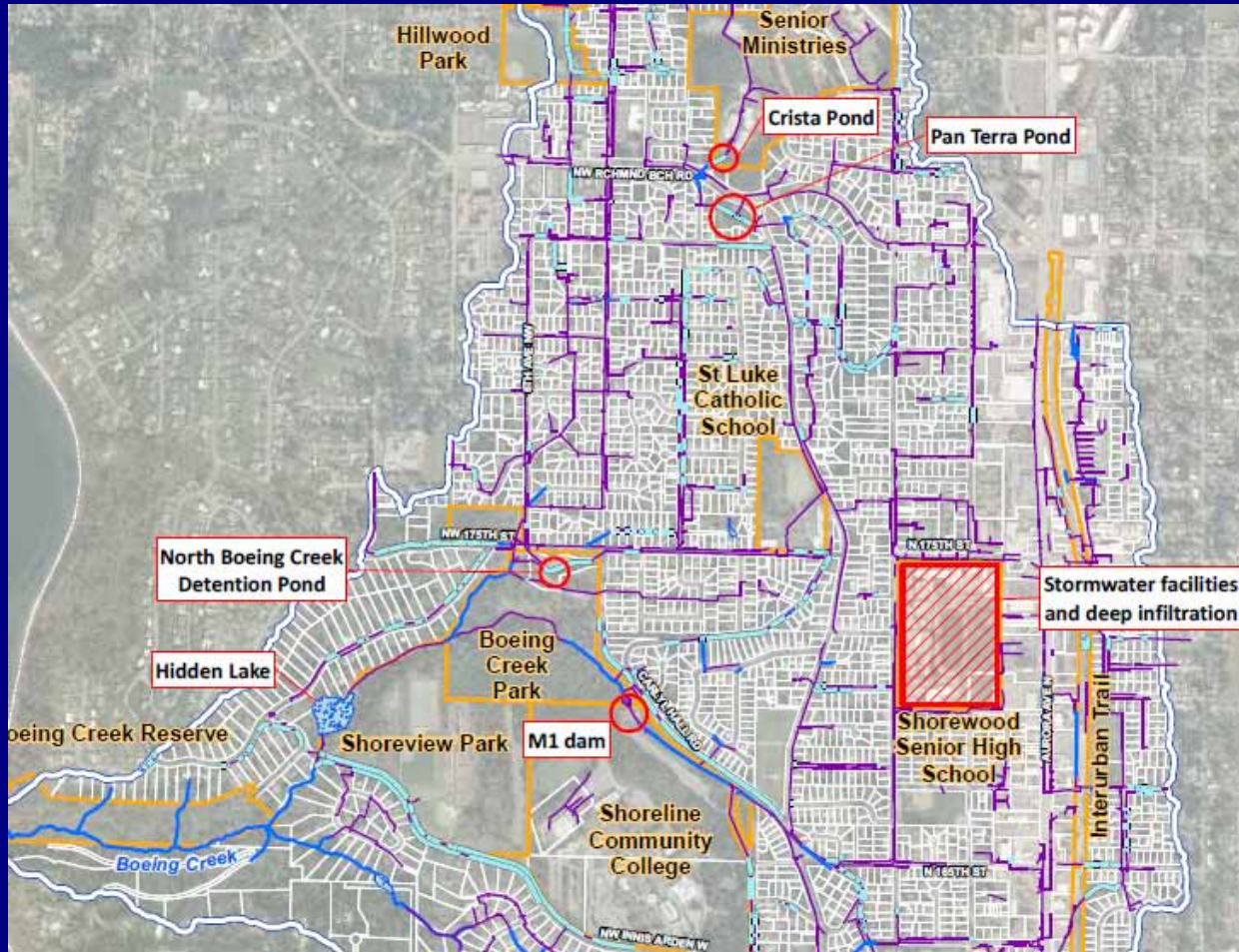


Goals of the Study:

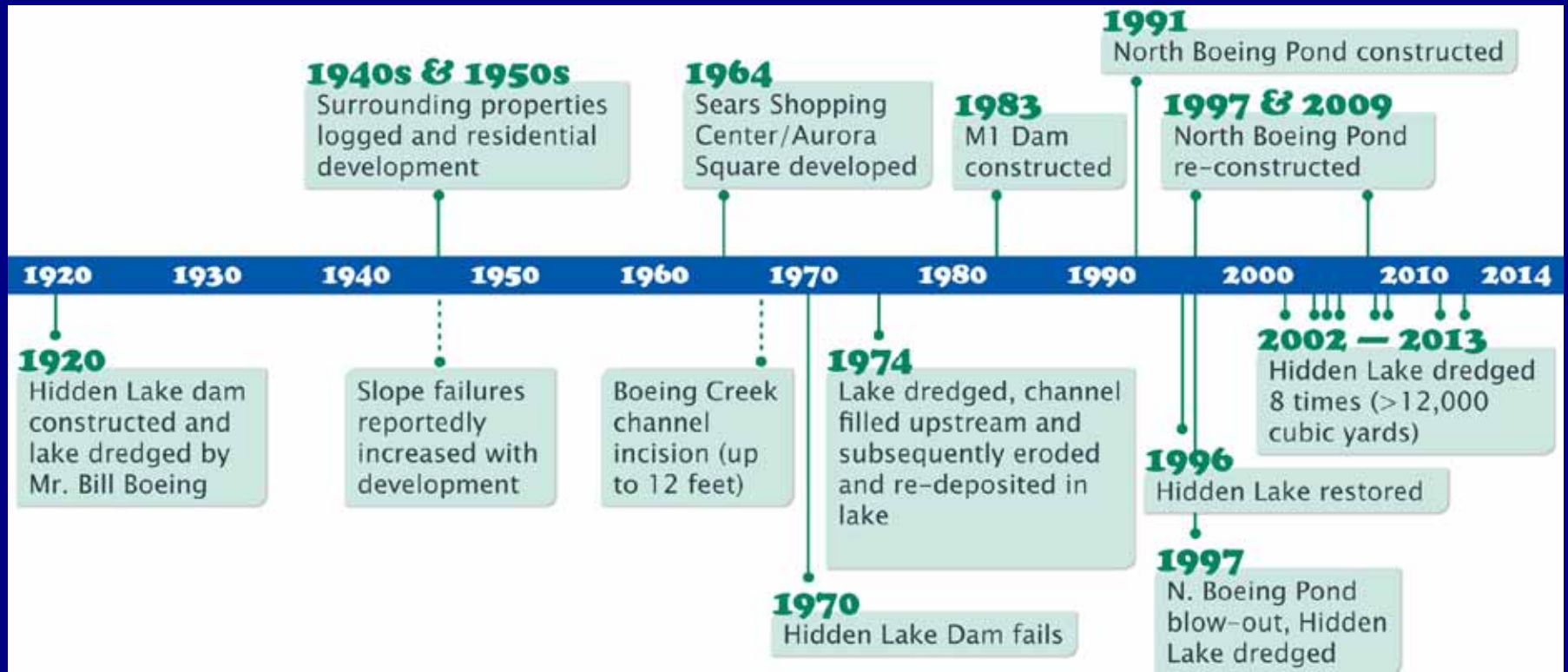
- Identify alternatives that will reduce the net maintenance cost for managing Hidden Lake
- Maintain or improve water quality in Hidden Lake and Boeing Creek
- Identify capital projects or strategies that could be incorporated in the City's next 6-year Capital Improvement Program (CIP) to achieve the above plan objectives



Existing Large Stormwater Facilities

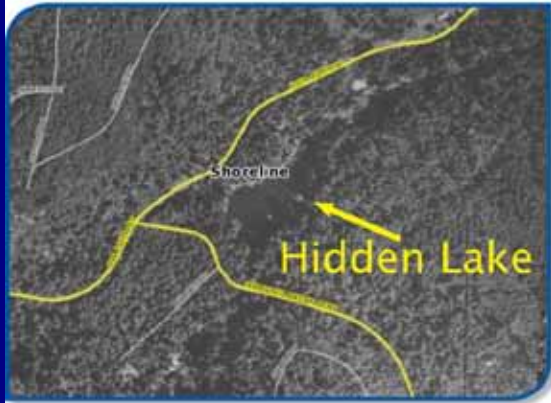


Timeline- History of Hidden Lake



Aerial History

1936



1970



1989



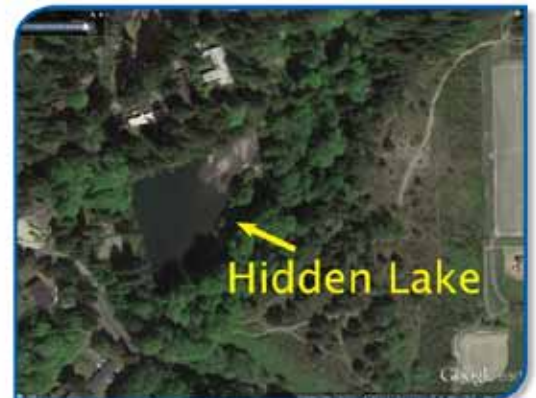
1995



2001

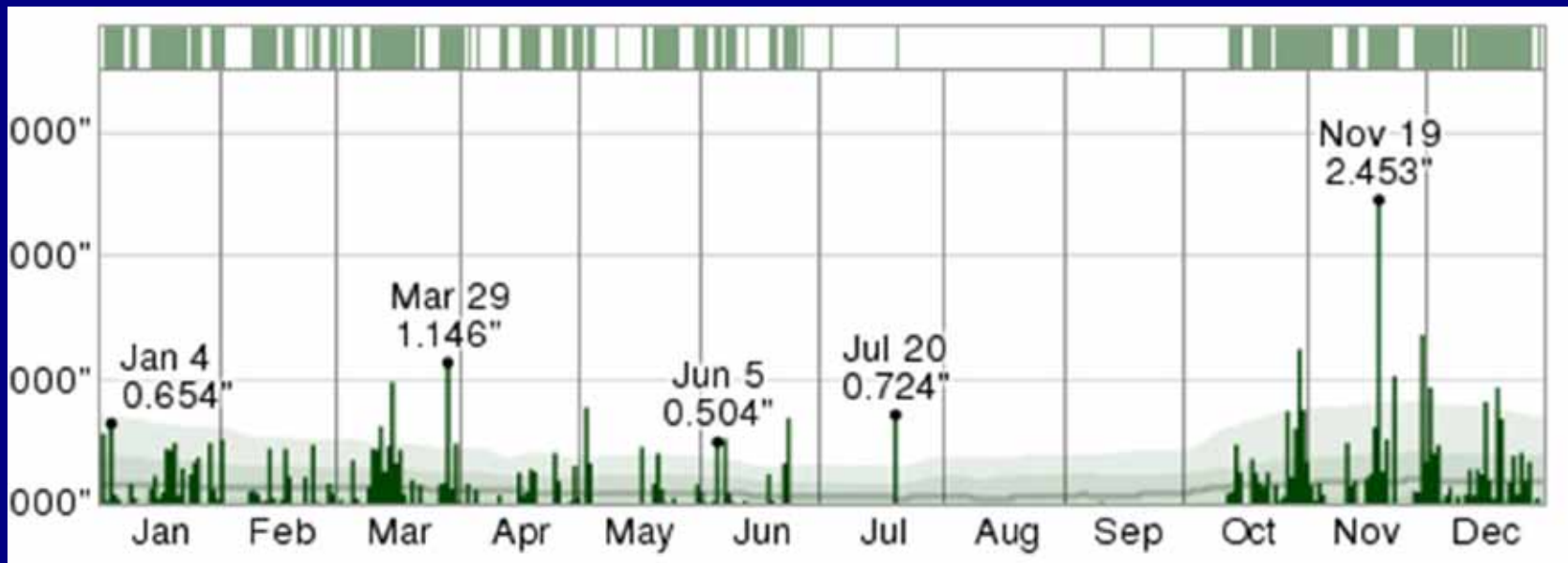


2013



Problem: Rain

- Example Scenario: November 2012 was a particularly rainy month



2012 rainfall data at Boeing Field Station (weatherspark.com)



Problem: Material Mobilization

- Heavy rainfall caused high water flows in Boeing Creek to mobilize material from hillslope failures and channel erosion



Problem: Deposition

- Mobilized slope and channel material was then deposited in Hidden Lake

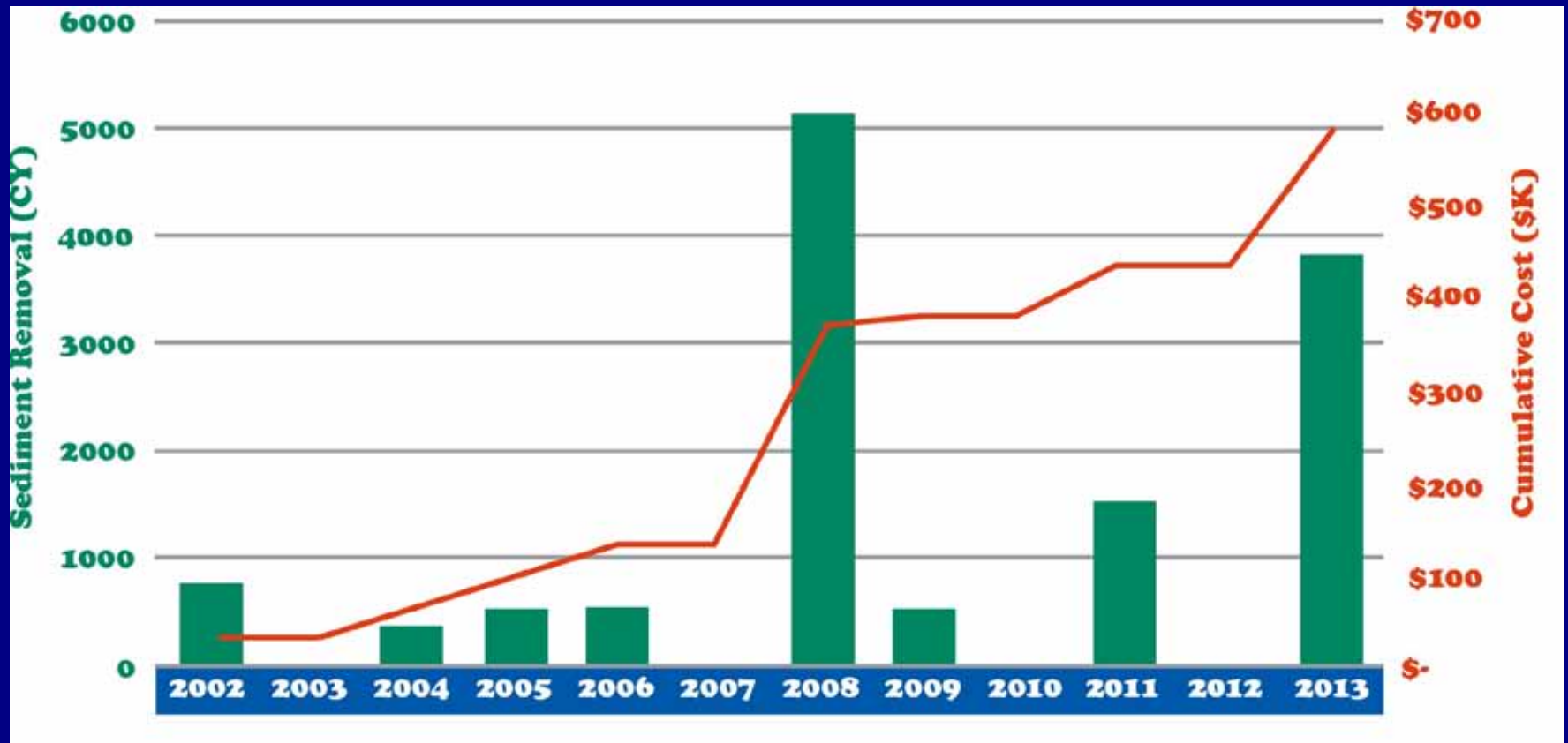


Current Solution: Dredging

- In 2013, the City of Shoreline dredged 3,800 cubic yards (~ 380 dump trucks) of deposited slope and channel material from Hidden Lake.



Removal & Cost of Dredging



Evaluation Components

- Qualitative review of existing conditions in Hidden Lake including biological and geomorphologic components
- Review of documents pertaining to previous conditions and studies
- Functional ecological assessment of different management alternatives using “credit/debit” methodology



Public Outreach

- Two public meetings (May 6 and July 1)
- Three presentations to Parks Board
- Public survey advertized at the lake/public meetings/City webpage.

Some of the primary points of feedback:

- Private property concerns of parks users unknowingly trespassing onto private property
- Addressing the source of material
- Flow control upstream from uncontrolled stormwater
- Not adversely affecting water quality or wildlife



Preferred Alternatives at Lake

Alt	Brief Description	One-time Cost	Annual Cost	Total Cost over 10 years	Pros	Cons
1	Status quo (keep dredging)	\$0	\$54,000	\$540,000	<ul style="list-style-type: none"> Remains a lake Provides open water habitat for larger cutthroat trout Waterfowl habitat 	<ul style="list-style-type: none"> Surface Water Utility continues to incur cost of sediment removal Corps permit likely needed for continued dredging. Such federal permitting would be expensive and may ultimately be denied.
2	Cease dredging	\$0	\$2,500	\$25,000	<ul style="list-style-type: none"> Surface Water Utility reduces long-term maintenance costs Maximizes wetland and riparian areas (ecological lift compared to lake) Higher functioning wetland area would form 	<ul style="list-style-type: none"> Loss of aesthetic associated with open water Outlet still requires some periodic maintenance/repair and replacement
3	Remove dam	\$600,000	\$8,000	\$640,000	<ul style="list-style-type: none"> Eliminates the long term maintenance and liability of the existing dam (including costs of repair and replacement) Sediment removal needs and associated costs would be reduced or eliminated Higher functioning wetland and stream area would be created (i.e. closest to restoration of site) Potential grant funding available for dam removal 	<ul style="list-style-type: none"> Culverts under Innis Arden Way would need to be monitored for blockage by debris during extreme events
4	Lower outlet	\$160,000	\$2,500	\$185,000	<ul style="list-style-type: none"> Increase in wetland area Extension of stream channel would likely form over time 	<ul style="list-style-type: none"> All drawbacks of Alternative 2 (cease dredging), through with a smaller footprint Marginal benefits for substantial cost



Alternatives – Upstream Flow Control

Alt	Brief Description	One-time Cost	Annual Cost	Total Cost over 10 years	Pros	Cons
5	Upstream Flow Control	Varies – likely >\$10,000,000	Varies	>\$10,000,000	<ul style="list-style-type: none"> • Addresses the ultimate cause of on-going problems • Can be done independent of Boeing Creek and Hidden Lake • Will begin to occur without additional public cost via redevelopment (flow control is required by the City for all new projects) • Can be dispersed throughout the City • Improved water quality in Boeing Creek 	<ul style="list-style-type: none"> • Benefits may not be realized for decades (or longer) • Sediment removal would still be needed in the medium term, but may be reduced over time • Many large facilities or hundreds of small facilities would be necessary to control flow adequately • Facility costs can be high, especially when land is needed



Staff Recommendation

Staff recommends a phased management approach:

1. Phase 1: Immediately implement Alternative 2: Cease Dredging and abandon the project until permitting, easements, and funding are allotted,
2. Phase 2: Execute Alternative 3: Remove Dam which follows the Parks Board recommendation.



Questions?

