



CITY OF BELLEVUE

SHORELINE RESTORATION PLAN

WSSA edits and program additions can be found on pages

1-3, 16, 18, 21, 24, 29-32, 40, 49-51, 53, 56

Hint – in Word use CNTRL+G keys and enter desired page number

In Acrobat Reader, merely click on the page numbers above.

Prepared for:

City of Bellevue
Development Services Department
450 110th Avenue Northeast
Bellevue, WA 98009

Prepared by:

The Watershed Company
750 Sixth Street South
Kirkland, WA 98033

January 2011

Cite this document as:

The Watershed Company. January 2011. City of Bellevue Shoreline Restoration Plan. Prepared for the City of Bellevue.

TABLE OF CONTENTS

	Page #
1 Introduction.....	1
2 Restoration Goals and Objectives	3
2.1 Shoreline Restoration Goals and Objectives	3
2.2 Existing City Goals and Policies	4
2.3 Existing City Regulations	5
2.4 Contributing Plans	<u>7</u> 6
3 Shoreline Inventory Summary.....	<u>9</u>8
3.1 Introduction	<u>9</u> 8
3.2 Shoreline Boundary	<u>9</u> 8
3.3 Inventory and Analysis.....	<u>10</u> 9
3.3.1 Lake Washington	<u>13</u> 12
3.3.2 Kelsey Creek/Mercer Slough	<u>14</u> 13
3.3.3 Lake Sammamish	<u>15</u> 14
3.3.4 Phantom Lake	<u>17</u> 15
4 Ongoing City Programs	<u>19</u>16
4.1 Utilities – Stream Team.....	<u>19</u> 16
4.2 Utilities – Stormwater Management and Planning	<u>19</u> 17
4.3 Utilities – Other Programs.....	<u>21</u> 18
4.4 Parks and Community Services.....	<u>22</u> 19
5 Potential Projects	<u>24</u>21
5.1 Recommended Projects.....	<u>24</u> 21
5.2 Recommended Projects – Private	<u>33</u> 26
6 Partnerships.....	<u>34</u>29
6.1 Water Resource Inventory Area (WRIA) 8 Participation	<u>34</u> 29
6.2 Lake Sammamish Kokanee Work Group Efforts	<u>39</u> 33
6.3 Adopt-A-Stream Foundation Efforts	<u>41</u> 34
6.4 Cascade Land Conservancy Efforts	<u>41</u> 35
6.5 Eastside Audubon Society Efforts.....	<u>42</u> 36
6.6 Mountains to Sound Greenway Trust Efforts	<u>43</u> 37
6.7 Save Lake Sammamish Efforts.....	<u>44</u> 38
6.8 Trout Unlimited Efforts	<u>44</u> 38
7 Education and Outreach	<u>45</u>39
7.1 Utilities – Education and Outreach.....	<u>45</u> 39

7.2	Parks and Community Services – Education and Outreach	<u>46</u> <u>40</u>
7.3	Other Programs for Education and Outreach.....	<u>46</u> <u>40</u>
8	Timing, Commitment, and Performance Measurement	<u>47</u><u>41</u>
8.1	Performance Measurement	<u>49</u> <u>43</u>
9	Restoration Prioritization and Concept Development	<u>53</u><u>47</u>
9.1	Chism Beach Park shoreline restoration.....	<u>54</u> <u>48</u>
9.2	Clyde Beach Park shoreline restoration.....	<u>54</u> <u>48</u>
9.3	Newcastle Beach Park shoreline restoration	<u>55</u> <u>49</u>
9.4	Mercer Slough- Bellefield Office Complex buffer enhancement.....	<u>56</u> <u>50</u>
9.5	West Lake Sammamish shoreline restoration.....	<u>56</u> <u>50</u>
9.6	Larsen Lake stream restoration, fish passage, and revegetation.....	<u>57</u> <u>51</u>
10	References	<u>58</u><u>52</u>
11	List of Acronyms and Abbreviations	<u>60</u><u>54</u>

Appendix A City of Bellevue Resolution No. 7214

Appendix B Comprehensive Action-list for Potential Restoration and Protection
Projects for the Kelsey Creek Subarea

Appendix C Blank Project Restoration Ranking Form

Appendix D Project Ranking Forms

Appendix E WRIA 8 Proposed Outreach and Education Actions

Appendix F Shoreline Restoration Concept Plans

LIST OF FIGURES

Figure 1.	Map of the Lake Washington and Kelsey Creek/Mercer Slough Shoreline Jurisdictional Areas	<u>12</u> <u>10</u>
Figure 2.	Map of the Lake Sammamish and Phantom Lake Shoreline Jurisdictional Areas	<u>13</u> <u>11</u>
Figure 3.	Example of shoreline armor reduction.	<u>34</u> <u>29</u>

LIST OF TABLES

Table 1.	Area of shoreline jurisdiction within the City of Bellevue.	<u>109</u>
Table 2.	General surface water improvement projects.	<u>204</u> 17
Table 3.	Proposed or current broad-scale programs.	<u>21</u> 18
Table 4.	Park Redevelopment CIP Plan Elements.	<u>22</u> 19
Table 5.	List of Recommended Projects along Lake Washington.	<u>24</u> 21
Table 6.	List of Recommended Projects along Kelsey Creek/Mercer Slough. ...	<u>27</u> 23
Table 7.	List of Recommended Projects along Lake Sammamish.	<u>29</u> 25
Table 8.	List of Recommended Projects along Phantom Lake.	<u>31</u> 25
Table 9.	The Final Lake Washington/Cedar/Sammamish Watershed (WRIA 8) Chinook Salmon Conservation Plan Action Start-List for Lake Washington and Lake Sammamish, and Status of Implementation in the City of Bellevue.	<u>37</u> 34
Table 10.	Implementation Schedule and Funding for Restoration Projects, Programs and Plans.	<u>47</u> 41

1 INTRODUCTION

The Washington State Legislature, in the first lines of the “Shoreline Management Act (SMA),” finds *that the shorelines of the state are among the most valuable and fragile of its natural resources and that there is great concern throughout the state relating to their utilization, protection, restoration, and preservation.*

Bellevue is graced with abundant natural resources. It is located on the shores of both Lake Washington and Lake Sammamish, and ~~contains numerous fish bearing streams surrounded by significant wetlands~~ also contains Phantom Lake, a 64 acre kettle lake located entirely within City limits as well as numerous fish bearing streams and accompanying wetlands. These assets add immeasurably to Bellevue’s desirability as a place to live, work and play. Unfortunately, these natural features spur growth and development that can pose a risk to these resources and the benefits they provide. For this reason, the SMA and the Bellevue’s Shoreline Master Program (SMP) are in place to prevent the inherent harm in an uncoordinated and piecemeal development.

Bellevue’s SMP applies to all activities in the 200-foot shoreline jurisdiction zone and requires that activities that adversely affect ecological functions and values be mitigated by the proponent. It is understood that some uses and developments cannot always be mitigated fully, resulting in incremental and unavoidable degradation of the baseline condition. How then can shoreline processes and functions be protected when the baseline condition is incrementally degraded over time?

The answer on public lands and within public projects in some cases may be is, “restoration.”

Section 173-26-201(2)(f) of the Shoreline Master Program Guidelines (Guidelines) says: “master programs shall include goals and policies that provide for restoration of such impaired ecological functions. These master program provisions shall identify existing policies and programs that contribute to planned restoration goals and identify any additional policies and programs that local government will implement to achieve its goals. These master program elements regarding restoration should make real and meaningful use of established or funded nonregulatory policies and programs that contribute to restoration of ecological functions, and should appropriately consider the direct or indirect effects of other regulatory or nonregulatory programs under other local, state, and federal laws, as well as any restoration effects that may flow indirectly from shoreline development regulations and mitigation standards.”

However, shoreline degradation also results from pre-SMP activities, unregulated activities and exempt development. Because of this, the Guidelines also state that “[l]ocal master programs shall include regulations ensuring that exempt development in the aggregate will not cause a net loss of ecological functions of the shoreline.” Again, restoration is seen a viable solution.

The Guidelines define restoration as, “The reestablishment or upgrading of impaired ecological shoreline processes or functions...accomplished through measures including, but not limited to, revegetation, removal of intrusive shoreline structures and removal or treatment of toxic materials. Restoration does not imply a requirement for returning the shoreline area to aboriginal or pre-European settlement conditions.” Instead, it encompasses a suite of strategies that can be approximately delineated into four categories:

- Creation (of a new resource)
- Restoration (of a converted or substantially degraded resource)
- Enhancement (of an existing degraded resource)
- Protection (of an existing high-quality resource).

The restoration opportunities identified in this plan are focused primarily on publicly-owned open spaces and natural areas. There are, however, many other restoration opportunities throughout the city on private property. These opportunities would be similar to those available on public lands, but would occur only through voluntary means ~~or through re-development proposals~~.

As directed by the Guidelines, the following discussions provide a summary of baseline shoreline conditions, list restoration goals and objectives, discuss existing or potential programs and projects that positively impact the shoreline environment, and provide an analysis of restoration priorities. Finally, anticipated scheduling, funding, and monitoring of these various comprehensive restoration elements are provided. In total, implementation of the Shoreline Master Program (with mitigation of project-related impacts) in combination with this Shoreline Restoration Plan (for restoration of lost ecological functions that occurred either prior to a specific project or as part of a project that cannot fully mitigate its own impacts) should result in a net improvement in the City of Bellevue’s shoreline environment in the long-term.

In addition to meeting the requirements of the Guidelines, this Shoreline Restoration Plan is also intended to support the city’s or other non-governmental organizations’ applications for grant funding, and to provide the interested public with contact information for the various entities working within the city to enhance the environment.

2 RESTORATION GOALS AND OBJECTIVES

This section presents the goal and objectives of this plan and the framework used to develop them by summarizing goals, policies, and regulations identified in various other plans and city documents. The goals and objectives represent the general public interest of the citizens of Bellevue, and are consistent with the intent of the Shoreline Management Act.

2.1 Shoreline Restoration Goals and Objectives

Considering the city's current Comprehensive Plan, existing regulatory framework, and contributing regional efforts to sustain and improve ecological functions, the following goals and objectives have been developed for this Shoreline Restoration Plan.

- Goal 1 –** While assuring protection of private property rights as well as the developed nature of Bellevue shorelines, provide a balance between the protection and enhancement of shoreline ecological functions and the desire of the community to preserve and improve public access and water-oriented recreation opportunities in this unique environment.
- Goal 2 –** Maintain, restore or enhance watershed processes, including sediment, water, wood, light and nutrient delivery, movement and loss while assuring flood protection and maintenance of stable water levels and water quality.
- Goal 3 –** Maintain or enhance established fish and “urban appropriate” wildlife habitat during all life stages and maintain functional corridors linking these habitats while avoiding creation of public hazards and nuisances.

Objectives

The following objectives support the goals listed above and are intended to be specific, measurable and action-oriented items. A discussion of performance measurement related to these objectives is included in Section 8 of this Plan.

- A. Improve shoreline ecological functions by managing the quality and quantity of stormwater runoff, consistent at a minimum with the latest WDOE Stormwater Management Manual for Western Washington. Make any additional efforts to meet and maintain state and county water quality standards in tributary streams. Provide active management and monitoring of water levels and water quality to protect properties and the environment along Bellevue shorelines.
- B. Decrease the amount and impact of overwater and in-water structures when shown beneficial, through minimization of structure size and use of innovative materials such as grated decking consistent with sound safety

practices but relying on review and approval by State and federal regulatory agencies so as to reduce duplication of services.

- C. Identify hardened and eroding lakeshores and streambanks, and improve to the extent feasible with bioengineered stabilization solutions or by use of more traditional methods such as bulkheads modified to attenuate shoreline erosion.
- D. Increase quality, width and diversity of native vegetation in **public** riparian areas to improve fish and wildlife habitat by providing food, nest sites, shade, perches, and organic debris. Control and reduce populations of non-native aquatic and riparian vegetation that are harmful to native vegetation or habitats. Provide educational materials and information to the public to encourage retention of existing habitat on private parcels.
- E. Reconnect and ~~enhance~~ restore small creek mouths as juvenile salmon refuge and rearing areas where such populations are known to exist or have existed in the past.
- F. Improve stream ecological functions by eliminating old and preventing new fish passage barriers.
- G. Educate the property owners in the shoreline zone and the remainder of the city about the impacts of land management practices and other unregulated activities (such as vegetation removal, pesticide/herbicide use, car washing) on fish and wildlife habitats.

2.2 Existing City Goals and Policies

The *City of Bellevue Comprehensive Plan* (2008) is designed to be a readable, functional document that will guide Bellevue's future development and fulfill the city's regional responsibilities in growth management. In the city's 2025 vision, Bellevue is described as a "City in a Park." They are "a dedicated steward of environmental quality, where key natural features are preserved and restored." Therefore the *City of Bellevue Comprehensive Plan* (2008) includes an Environmental Element with the goal:

"To integrate the natural and developed environments to create a sustainable urban habitat with clean air and water, habitat for fish and wildlife, and comfortable and secure places for people to live and work."

Other specific, relevant goals in the Comprehensive Plan are as follows:

- Environmental Stewardship Goal: "To promote a sustainable urban environment by weighing environmental concerns in all decision-making processes."
- Water Resources Goal: "To preserve and enhance water resources."
- Earth Resources and Geologic Hazards Goal: "To preserve and enhance vegetation and earth resources."

- Fish and Wildlife Habitat Conservation Areas Goal: “To provide fish and wildlife habitat of sufficient diversity and abundance to sustain existing indigenous wildlife populations.”
- Air Quality Goal: “To meet federal, state, regional, and local air quality standards through coordinated, long-term strategies that address the many contributors to air pollution.”
- Noise Goal: “To control the level of noise pollution in a manner which promotes the use, value, and enjoyment of property; sleep and repose; and a quality urban environment.”

2.3 Existing City Regulations

The Bellevue City Code contains numerous chapters and sections enacted over the years to protect the quality of Bellevue’s environment. For example, these regulations include: the Environmental Procedures Code, the Storm and Surface Water Utility Code, the Clearing and Grading Code, and the Critical Areas Overlay District of the Land Use Code.

Environmental Procedures Code (BCC 22.02)

The purpose of these procedures is to implement the requirements of the State Environmental Policy Act of 1971 (SEPA), Chapter 43.21C RCW, as amended, and the SEPA rules adopted by the WDOE. These procedures establish principles, objectives, criteria and definitions to provide an efficient overall citywide approach for implementation of the State Environmental Policy Act and Rules. These procedures also designate the responsible official, where applicable, and assign responsibilities within the city under the National Environmental Policy Act (NEPA).

Storm and Surface Water Utility Code (BCC 24.06)

The purpose of this code is to provide for the planning, security, design, construction, use, maintenance, repair and inspection of the public and private storm and surface water system; to establish programs and regulations to assure the quality of the water in such system, to preserve the integrity of the system, and to minimize the chance of flooding; and to provide for the enforcement of the provisions of this code. This code supplements other city ordinances and regulations regarding protection of the storm and surface water system, including but not limited to the wetland and riparian corridor regulations included in Part 20.25H LUC, the Sensitive Area Overlay District.

Clearing and Grading Regulations (BCC 23.76)

The purpose of this code is to enact regulations consistent with the environmental element of the city’s comprehensive plan to protect water and earth resources, fish and wildlife habitat, and public health and safety from the potential adverse impacts associated with clearing and grading private and public land in the city.

In addition to implementing goals of the environmental element, these regulations implement best management practices required to meet federal and state environmental law requirements.

These regulations focus on prevention of potential adverse impacts associated with clearing and grading activities through a proactive approach rather than remediation of (or a reactive approach to) adverse impacts. The intent and purpose of these Clearing and Grading regulations is to provide for and promote the health, safety, and welfare of the general public.

Critical Areas Overlay District (LUC 20.25H)

The Critical Areas Overlay District is a mechanism by which the city recognizes the existence of natural conditions which affect the use and development of property. Through this part, the city designates and classifies ecologically sensitive and hazard areas and imposes regulations on the use and development of affected property in order to protect the functions and values of these areas and the public health, safety and welfare, and to allow the reasonable use of private property.

The City of Bellevue has a long history of protecting environmentally critical areas, with its first Sensitive Areas regulations adopted in 1987. In 2001, the city began the process of updating their policies and regulations to protect streams, wetlands, shorelines and steep slopes, ensuring the city's response to the GMA fits with long-standing Bellevue principles. On June 26, 2006, the City Council adopted an ordinance amending the Bellevue Land Use Code to update critical areas regulations.

2.4 Contributing Plans

The *Final Lake Washington/ Cedar/ Sammamish Watershed (WRIA 8) Chinook Salmon Conservation Plan* (July 2005) identifies the following conservation strategies for the protection of chinook salmon and their habitat.

- Protect and restore habitat chinook salmon use during all of the life stages that are spent in the WRIA 8 watershed, from egg to fry to smolt to adult;
- Protect and restore the natural processes that create this habitat, such as natural flow regimes and movement of sediments and spawning gravels;
- Maintain a well-dispersed network of high-quality habitat to serve as centers for the population;
- Provide safe connections between those habitat centers to allow for future expansion.

The development of these strategies are based partly on findings from the *Salmon and Steelhead Habitat Limiting Factors Report for the Cedar-Sammamish Basin (Water Resource Inventory Area 8)* (Kerwin 2001) which identified the following limiting habitat factors and impacts for Lake Washington and Lake Sammamish:

- The riparian shoreline of Lake Washington is highly altered from its historic state. Current and future land use practices all but eliminate the possibility of the shoreline to function as a natural shoreline to benefit salmonids;
- Introduced plant and animal species have altered trophic interactions between native animal species;
- The known historic practices and discharges into Lake Washington have contributed to the contamination of bottom sediments at specific locations;
- The presence of extensive numbers of docks, piers and bulkheads have highly altered the shoreline; and

- Riparian habitats are generally non-functional.
- Eurasian water milfoil locally degrades water quality by reducing dissolved oxygen levels below minimum requirements for salmonids. The invasive nature of Eurasian water milfoil has likely decreased the overall diversity of macrophytes throughout Lake Sammamish

The City of Bellevue has approved and committed support for the *Final Lake Washington/Cedar/Sammamish Watershed (WRIA 8) Chinook Salmon Conservation Plan* (WRIA 8 Steering Committee 2005). Not only does this document provide guidance and recommended actions to conserve and recover chinook salmon and other anadromous fish, but it also recognizes the multiple benefits to people and fish of its implementation including water quality improvement; flood hazard reduction; open space protection, and maintaining a legacy of future generations, including commercial, tribal and sport fishing, quality of life, and cultural heritage.

3 SHORELINE INVENTORY SUMMARY

3.1 Introduction

The city completed a comprehensive inventory of its shorelines in 2008, as an element of its Shoreline Master Program update. The purpose of the shoreline inventory was to gain a greater understanding of the existing condition of Bellevue's shoreline environment to ensure the updated Shoreline Master Program policies and regulations are well-suited in protecting ecological processes and functions. The inventory describes existing physical and biological conditions in the shoreline zones within city limits, including recommendations for restoration of ecological functions where they are degraded. The *Shoreline Analysis Report* (TWC and Makers 2009) is summarized below.

3.2 Shoreline Boundary

As defined by the Shoreline Management Act of 1971, shorelines include streams whose mean annual flow is 20 cubic feet per second (cfs) or greater and lakes whose area is greater than 20 acres, plus their associated uplands extending landward for 200 feet as measured from the ordinary high water mark and associated wetlands. Shorelines in Bellevue include Lake Sammamish, Lake Washington, Phantom Lake, Kelsey Creek, Mercer Slough, and their associated wetlands (Table 1). Complete definitions for shorelines and shorelands can be found in RCW 90.58.030.

As part of the shoreline inventory, jurisdictional boundaries were recently adjusted according to new information regarding associated wetlands and stream waterflow volume. Six areas along the city's shorelines contain wetlands, including Meydenbauer Bay, Mercer Slough, Lower Kelsey Creek, Newcastle Beach Park, Phantom/Larsen Lakes, and Lake Sammamish (for more details see the *Shoreline Analysis Report - Technical Appendix Volume I* (TWC and Makers 2009)). Also, per a recent U.S. Geological Survey (USGS) study, the location of 20 cfs flow for Kelsey Creek has been adjusted slightly upstream, near the confluence with Richards Creek.

3.3 Inventory and Analysis

The City of Bellevue's shoreline inventory consists of approximately 960 acres (1.5 square miles) along 19.7 miles of stream and lakeshore (Table 1). The following inventory and analysis information is summarized from the *Shoreline Analysis Report*. Key statistics (Table 1) and maps (Figures 1 and 2) are provided for the four *Shoreline Analysis Report* sub-sections (Lake Washington, Kelsey Creek/Mercer Slough, Lake Sammamish, and Phantom Lake).

Table 1. Area of shoreline jurisdiction within the City of Bellevue.

	Shoreline	Units	Lake Washington	Kelsey Creek/Mercer Slough	Lake Sammamish	Phantom Lake	Total
Inventory Data	Length of Shoreline	miles	9.12	3.74	4.96	1.88	19.70
	Total Area	acres	219	449	119	173	960
		sq. miles	0.34	0.70	0.19	.027	1.50
	Associated Wetlands	% of area	10	92	NA ¹	87	N/A
	Vegetative Cover	% of area	57	83	55	94	76
Land Use	Single-Family Res	% of area	76	6	94	17	N/A
	Multi-Family Res	% of area	3	<1	2	0	N/A
	Park	% of area	13	71	4	83	N/A
	Marina	% of area	7	0	0	0	N/A
	Commercial	% of area	<1	23	<1	0	N/A
Shoreline Modifications	Impervious Surface	% of area	41	18	39	7	24
	Shoreline Armoring	% of length	81	-- ²	71	2	55
	Piers	#/mile	38	-- ²	67	15	36

¹Wetlands inventory not completed along Lake Sammamish shoreline

²Shoreline armoring and piers not inventoried as part of the GIS database.



Figure 1. Map of the Lake Washington and Kelsey Creek/Mercer Slough Shoreline Jurisdictional Areas

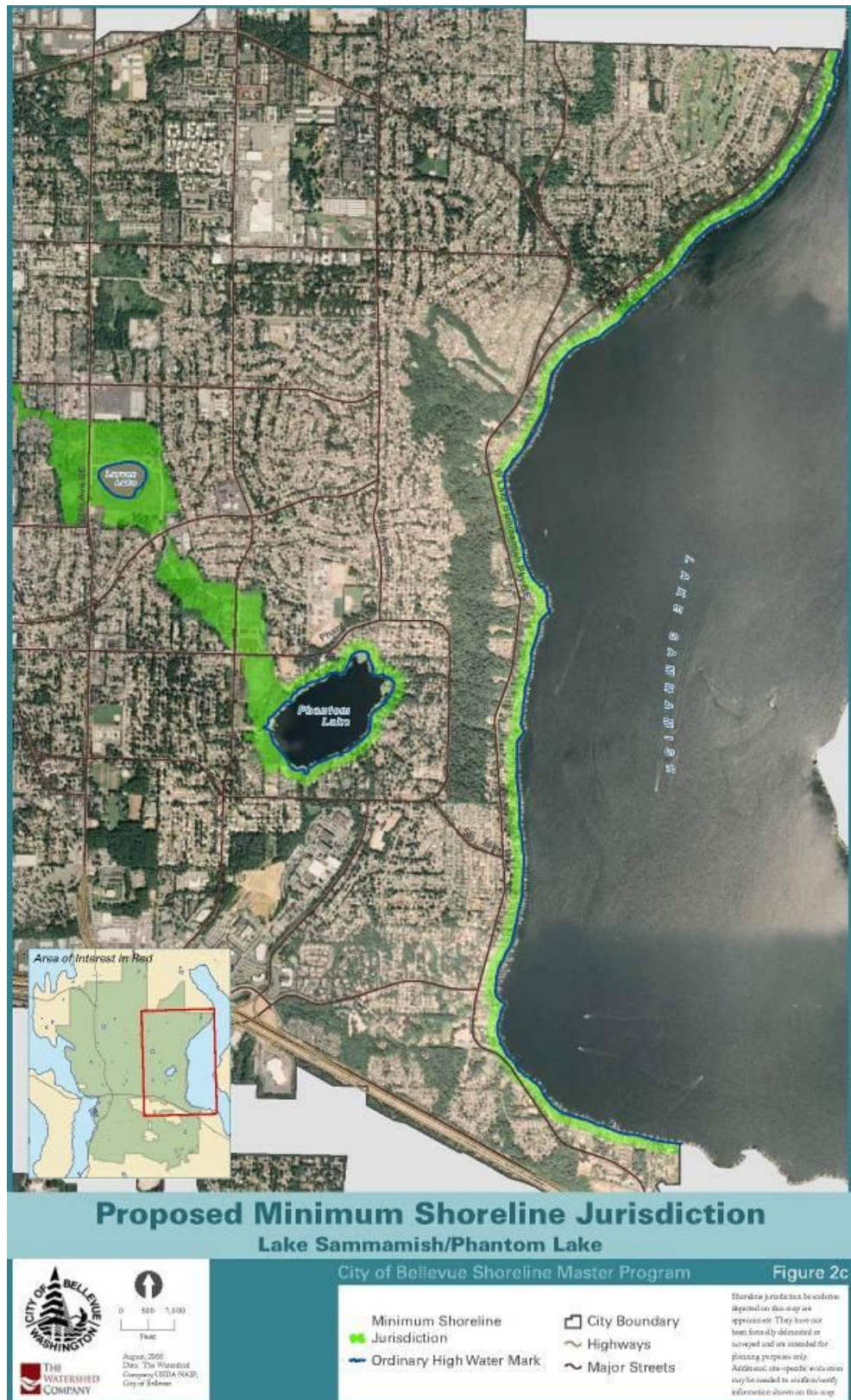


Figure 2. Map of the Lake Sammamish and Phantom Lake Shoreline Jurisdictional Areas

3.3.1 Lake Washington

Land Use and Physical Condition

The City of Bellevue is bordered on its western boundary by just over 9 miles of Lake Washington shoreline. The shoreline is made up almost exclusively of single-family residences (with the exception of one multi-family use property within Meydenbauer Bay), several marinas and yacht clubs, and public park facilities. Nearly completely developed, this shoreline has only approximately 23 small vacant/undeveloped lots sporadically spread along the shoreline, all of which are located within residential areas. There are also three unimproved street ends (Killarney Drive, SE 60th Street, and SE 62nd Street) that terminate at the shoreline of Lake Washington, all of which appear to be utilized by neighboring properties. In total, over 10 percent of shoreline jurisdiction is used as park/open space area. The city is actively pursuing the acquisition of additional waterfront properties to expand public access and better meet the city goal of increasing shoreline public access.

Biological Resources, Critical Areas, and Ecological Functions

The City of Bellevue's Lake Washington shoreline has several low-functioning and/or lake fringe wetlands located in Meydenbauer Beach Park, Newcastle Beach Park, and near the mouths of Meydenbauer Creek, Coal Creek, and Mercer Slough (see the *Shoreline Analysis Report - Technical Appendix Volume I* for more detail).

The City of Bellevue has eight recognized streams that empty into Lake Washington, including Meydenbauer Creek, Kelsey Creek, Coal Creek, Lakehurst Creek, and several other unnamed tributaries. Several of these streams are known to support fish use and contain fish habitat for chinook, coho, and sockeye salmon, winter steelhead, and resident cutthroat trout.

WDFW mapping of Priority Habitat and Species (WDFW 2007) identifies bald eagle nests in or adjacent to shoreline jurisdiction and an osprey nest near Meydenbauer Beach Park. There is little to no area of significant overhanging vegetation throughout the majority of shoreline jurisdiction, with the exception of high quality overhanging vegetation within parklands and along Mercer Slough. Most of the upland habitats within the Lake Washington shoreline jurisdiction are considered to be moderate, again with the exception of parklands, Mercer Slough (reserve habitat) and a few isolated properties that have high habitat value. Shoreline parks contain areas of significant forest patches or fragmented forest that provides improved urban habitat value. Areas of sedimentation have been noted in Meydenbauer Bay and the Newport Shores communities, as historical dredging occurred in both locations. Aquatic invasive

species, particularly Eurasian water milfoil are known to be very problematic along the Lake Washington shoreline. The City of Bellevue has a permit for treatment at high use public access areas, including the SE 40th Boat Launch and Newcastle Beach Park.

In general the ecological function of the Lake Washington shoreline is of low/moderate value, with pocket areas of moderate or higher rated shorelines near the mouths of both Mercer Slough and Coal Creek due mostly to a fairly intact vegetated condition and lack of shoreline modifications. Throughout the remainder of the city's Lake Washington shoreline, ecological functions have been impacted by urban development, through the loss of shoreline vegetation and increased impervious surface area (e.g. reduced terrestrial and aquatic habitat, poor nutrient and pollutant uptake rates, and diminished erosion control), and extensive shoreline armoring (e.g. diminished nearshore aquatic habitat, limited wave attenuation, and loss of substrate recruitment).

3.3.2 Kelsey Creek/Mercer Slough

Land Use and Physical Condition

Within shoreline jurisdiction, land use is dominated by parklands (primarily within Mercer Slough Nature Park) and single-family, multi-family, light industrial, and office land use designations. There are approximately 8 vacant or undeveloped lots within the Kelsey Creek/Mercer Slough shoreline jurisdiction, which includes lots that may already be encumbered by associated wetland areas. Kelsey Creek and Mercer Slough are relatively free of shoreline modifications with the majority of creek protected as public parkland, offering natural stream channel and extensive habitat features. There is some in-water structure and shoreline armoring associated with roadways and properties used for light industrial and office, but this information has not been mapped for inventory calculations. There are a few small docks found along Mercer Slough shorelines, primarily used for public access.

Biological Resources, Critical Areas, and Ecological Functions

The Mercer Slough area contains a large and unique shoreline wetland system that currently extends from just north of Coal Creek at its southern edge, northward to SE 6th Street near downtown Bellevue. The Mercer Slough Wetland is approximately 400 acres in size and provides important functions to the city's shoreline, even though it has been fragmented from alterations within the watershed. Additional, high functioning wetlands, are located in and adjacent to the shoreline jurisdiction of Lower Kelsey Creek, including areas along Sturtevant Creek. Nearly the entire Kelsey Creek/Mercer Slough area and associated wetlands are located within a 100-year floodplain. More detail on shoreline wetlands within city jurisdiction for Kelsey Creek and Mercer Slough can be found in the *Shoreline Analysis Report - Technical Appendix Volume I*.

WDFW classifies four separate areas as Priority Habitat within the Kelsey Creek shoreline corridor, as either urban natural open space or wetlands (WDFW 2007).

According to WDFW, the urban natural open space area is described as “Relatively densely forested tracts. Some steep hillsides.” Associated wetlands along the north side of Kelsey Creek contain several areas rich in snags, and the lower portion of Mercer Slough contains areas of fragmented forest and significant perch trees. Nearly the entire length of Kelsey Creek/Mercer Slough within shoreline jurisdiction contains overhanging vegetation. Priority species noted by WDFW (2007) include a great blue heron colony located alongside Mercer Slough in addition to the anadromous and resident fish species present in Mercer Slough, Kelsey Creek and Richards Creek that includes fall chinook, coho and sockeye salmon, resident coastal cutthroat and rainbow trout.

Ecological function of Kelsey Creek/Mercer Slough is generally very good. With the exception of the Bellefield Office Park and the I-405 highway corridor, this area possesses a high percentage of natural shoreline with abundant overhanging vegetation and little shoreline armoring and impervious surfaces. However, there are large areas of invasive species in the associated wetlands.

3.3.3 Lake Sammamish

Land Use and Physical Condition

The City of Bellevue is bordered on its eastern boundary by approximately 5 miles of Lake Sammamish shoreline (Figure 2). The shoreline is made up almost exclusively of single-family residences, with the exception of small pockets of multi-family residential, several small retail establishments, and private park facilities. The shoreline is nearly completely developed with approximately 21 vacant/undeveloped lots in shoreline jurisdiction, all within residential areas.

The City of Bellevue currently has no developed parks or public access sites around Lake Sammamish. Due to the fact that the Lake Sammamish shoreline is primarily privately owned and dominated by residential uses, there is very little opportunity for public access. City of Bellevue standards propose that 10 to 20 percent of the city’s shoreline be available for public access, therefore land acquisition of these waterfront properties is being pursued. Currently the city owns three adjacent parcels containing approximately 190 lineal feet of shoreline.

Biological Resources, Critical Areas, and Ecological Functions

No major wetland areas have been identified along the Lake Sammamish shoreline within the City of Bellevue. However, there are likely many small, minor, lake-fringe wetlands marking the edge of the lake in some locations.

At least ten recognized streams flow into Lake Sammamish within the City of Bellevue. Most of these streams flow through culverts beneath West Lake Sammamish Parkway before entering Lake Sammamish. The more significant streams include Phantom Creek

and Vasa Creek, both of which are known to support fish use.

The entire Lake Sammamish shoreline is considered to be within a 100-year floodplain (up to 36.6 feet elevation [NAVD 88]). Additionally, the areas surrounding the mouth of Vasa Creek and areas upland approximately 0.5 miles have also been identified to be within a floodplain area.

WDFW did not classify any areas of Priority Habitat within Lake Sammamish shoreline jurisdiction. The shoreline is generally void of significant forest areas and is limited to only small fragmented forest with very little overhanging vegetation. Eurasian water milfoil (*Myriophyllum spicatum*) is a significant problem species with widespread infestations around the lake.

Similar to the Lake Washington shoreline, the ecological function of the Lake Sammamish shoreline is of low/moderate value, with only pocket areas with higher functions. Ecological functions have been impacted by urban development, through the loss of shoreline vegetation and increased impervious surface area (e.g. reduced terrestrial and aquatic habitat, poor nutrient and pollutant uptake rates, and diminished erosion control), and extensive shoreline modifications (e.g. diminished nearshore aquatic habitat, limited wave attenuation, and loss of substrate recruitment). Although only two significant fish bearing streams are present in the Shoreline Jurisdiction (Vasa and Phantom Creeks), many small tributaries flow into Lake Sammamish and may provide vital areas for juvenile salmon rearing.

The Community, Its' Concerns and Considerations

The City's eastern boundary is defined by the residential community along West Lake Sammamish Parkway. The area was primarily developed in the mid-1900's. Nearly completely developed today, many property improvements are approaching their useful life. A substantial hardship would befall the long-time owner occupants of these sites if radical changes are imposed by regulation, such as declaring improvements non-conforming.

The extensive level of development has integrated and maintained an exemplary level of forestation, retaining tree canopy far more extensively than other regions of the City. Characteristic of urban shorelines nationwide, tree cover is limited along the immediate shore, providing visual access not only for residents but the public as well.

Extensive additional vegetation, including trees, along the shoreline is not warranted for several reasons: (1) tree and vegetative cover is in adequate supply above the shoreline within the Shoreline Overlay District and beyond, (2) survival of trees along the shoreline would be doubtful and dangerous, given soil conditions, weather, and wind factors, (3) traditional lawns have been shown to provide adequate infiltration and

filtering of pollutants, and (4) experience has shown that heavy shoreline vegetation harbors nuisance, even dangerous animal life. Also, State code discourages creation of isolated pockets of habitat with respect to species of importance.

Present day needs of the shoreline and lake waters center on water quantity and its quality. Lake Sammamish receives flow from a basin approximately 250 sq. miles in size, with 40-50% flowing in from Issaquah Creek. Outflow is controlled through the Sammamish River where a flood control project was constructed (and modified) during the late 1900's. Most recently, that facility has been shown to be in disrepair through lack of maintenance. This deficiency has resulted in diminished flow capacity, the consequence being artificially raised water levels with accompanying erosion and shift landward of the High Water Mark. Designed and built by the Corps of Engineers, the project's disrepair has resulted in its deactivation by the Corps because of flow obstructions.

Properties along Lake Sammamish receive drainage from upland properties, some a mile and more from the lake. In addition, unlike most residential communities, arterial street drainage often flows unabated through pipes across these properties into the lake. Ironically, many of these drainage components are not publically owned and maintained and, thus, impacts such as sedimentation, erosion, and pollution far outweigh lakeside resident impacts.

From a community perspective, the SMP and its Restoration Program must be mindful of the need to balance environmental needs with those of the existing community and the need for increased public participation in problem resolution. Property values should not be diminished by unwarranted restrictions or promotion of wildlife where it has not existed for many years. The most beneficial improvements can be made by assuring stable water levels through proper outflow maintenance and more active management of the amount, timing and quality of drainage routed to the lake.

3.3.4 Phantom Lake

Land Use and Physical Condition

Phantom Lake is located in eastern Bellevue and is surrounded by public open space and single-family residential housing (Figure 2). The lake itself is approximately 65 acres, and drains near its northeast corner to Phantom Creek, which flows into Lake Sammamish. There are approximately 15 vacant/undeveloped lots in Phantom Lake shoreline jurisdiction, including the areas around Larsen Lake and their associated wetlands.

Although primarily surrounded by residential uses, Phantom Lake has two park sites along its shoreline and other expansive public open spaces throughout its associated wetland areas. The Robinsglen Nature Park (225 lineal feet of shoreline frontage) and a

portion of the Lake Hills Greenbelt (935 lineal feet of shoreline frontage) provide public shoreline access opportunities to Phantom Lake. Both offer limited shoreline access due to shoreline vegetation and associated wetlands. The remainder of the Phantom Lake shoreline jurisdiction is made up entirely of public open space contained within the Lake Hills Greenbelt, north of SE 16th Street. In total, the Lake Hills Greenbelt offers over 150 acres of open space, over three miles of trails, picnic areas, non-motorized water access, fishing, blueberry farms and seasonal produce stands.

Biological Resources, Critical Areas, and Ecological Functions

Historically, a 170-acre wetland complex extended north approximately 1.8 miles from the south edge of Phantom Lake to the area northwest of Larsen Lake. This wetland complex has now been divided by human alterations into four distinct wetland units that are considered to be hydrologically associated with the Phantom Lake shoreline jurisdiction. Additionally, the majority of Phantom Lake's perimeter contains fringe wetlands. Nearly the entire area within Phantom Lake's shoreline jurisdiction has been mapped as a flood hazard area, but is void of any geologically hazardous areas.

WDFW mapping of Priority Habitat and Species classifies eleven separate areas as Priority Habitat within the Phantom Lake corridor. These areas are categorized as riparian zones, urban natural open space, or wetlands (WDFW 2007). Areas surrounding Larsen Lake are rich in snags and overhanging vegetation. In 1985 Phantom Lake was found to be eutrophic and suffering from deteriorating water quality caused by very high nutrient concentrations (primarily excessive inputs of phosphorus), low water clarity, a severe dissolved oxygen deficiency, and was dominated by nuisance concentrations of blue-green algae. Several restoration efforts were implemented in the early 1990's to address these issues (see *Shoreline Analysis Report* for more details).

Ecological functions within the Phantom and Larsen Lake areas rate moderate/high to high primarily due to the large associated wetland system that connects the two waterbodies which subsequently provides many functions such as hydrologic storage, support of an extensive vegetative community, terrestrial and aquatic habitats, and water quality improvement. While the residential areas which surround most of Phantom Lake have some impacted shoreline functions, they are generally unarmored and maintain some semblance of lake fringe wetlands. However, similar to Mercer Slough, there are large areas of invasive species in the associated wetlands which surround both Phantom and Larsen Lakes which impacts both habitat and vegetative functions.

The Community, Its' Concerns and Considerations

The Phantom Lake neighborhood is centered on a 64 acre kettle lake sitting on a bluff about a mile west of the southern section of Lake Sammamish. Originally skirted partially by farm land, the neighborhood's focus shifted in the 1950's toward more suburban activity as the area that is

now along I-90 began to develop. Concurrent with this development pattern, the northern end of a now defunct airfield was converted to a landfill by King County and later rezoned for offices and manufacturing. Landfill impacts continue to be a concern to residents.

Studies in the 1970's recommended use of the lake for stormwater detention, despite it being a private lake. In the early 1980's a major change in drainage occurred when commercial development in the Eastgate/I-90 area redeveloped the gravel airfield to intense commercial/office uses. During this period factors impacting the lake occurred including greatly expanded impervious surfaces, creation of the first of three detention ponds, and piping of stormwater to the lake from the landfill and a portion of Eastgate.

Studies followed in the 1980's, resulting in recommendations of an outlet weir and berm to block natural NW surface flows, and to increase summer water levels. An aerator was installed to increase dissolved oxygen and alum treatment was used to, hopefully, seal contaminants at the bottom of the lake.

There has been a continuing concern from the residential community that impacts to the lake have been predominantly caused by these changes and external sources. Residents seek equitable resolution of the lake's issues, including factors key to shoreline management. The use of the lake as a receiving (water) body for drainage (which it should not be categorized as) is at issue, as are the implications downstream and at Lake Sammamish where outlet waters are directed.

Overall, residents believe that the non-regulatory aspects of the SMP should seek reduction of flows into the lake from external sources. This will not only improve lake conditions but will also lessen downstream impacts to Lake Sammamish. This can be accomplished through proper maintenance, active water balancing, and monitoring of water quantity and quality.

Ongoing City Programs

3.4 Utilities – Stream Team

The city's Stream Team mission is to provide information, increase community involvement and awareness, and initiate changes that will protect the quality of the city's water systems and fish and wildlife habitat. Stream Team volunteers can learn about local streams, and fish and wildlife habitat in a variety of ways through volunteering to plant stream corridors with native trees and shrubs, observing streams for returning adult salmon, helping to collect stream bug samples (macroinvertebrate) for water quality monitoring, or by inviting a Stream Team staff member to speak at a local school or club. Stream Team volunteers play a vital role in preserving fish and wildlife habitat and are able to be a part of the following volunteer groups: Salmon Watchers, Peamouth Patrol, Earth Day/Arbor Day, and Macroinvertebrate Workshop and Field Collection.

3.5 Utilities – Stormwater Management and Planning

To protect water quality, Bellevue manages stormwater runoff in a number of ways. The city follows "best management" practices and operates under a NPDES Phase II Municipal Stormwater Permit issued by Ecology in January 2007. This permit is a

requirement of the Federal Clean Water Act. The best management practices in the permit are collectively referred to as the NPDES Stormwater Management Program. Under the conditions of the permit, the city must protect and improve water quality through public education and outreach, detection and elimination of illicit non-stormwater discharges (i.e. spills, illegal dumping, and wastewater), management and regulation of construction site runoff, management and regulation of runoff from new development and redevelopment, and pollution prevention and maintenance for municipal operations. The city describes their Storm and Surface Water Utility in the Utilities Element of the *City of Bellevue Comprehensive Plan* (2008).

The following table (Table 2) outlines some of the general surface water improvement projects excerpted from the City of Bellevue's *2009-15 Capital Investment Program* (2009):

Table 2. General surface water improvement projects.

CIP Plan Number	Project Name	Description	Funding	Timeline
D-59	Minor Storm and Surface Water Capital Improvement Projects	Program to fund minor capital improvements to the city's storm drainage system which are generally too small to justify as separate CIP projects, and oftentimes can't be anticipated.	\$2,334,000 (\$1,174,000 appropriated to date)	Ongoing
D-64	Storm Water System Conveyance Infrastructure Rehabilitation	Program to rehabilitate or replace defective storm drainage pipelines and ditches identified in the Utility's condition assessment program or other means. Projects are prioritized based on the severity of deterioration, the risk and consequence of failure, and coordination with planned street improvement projects.	\$12,394,000 (\$6,251,000 appropriated to date)	Ongoing
D-94	Flood Control Program	This program will construct improvements to drainage systems to alleviate flooding where the Utility's goal for level of service for protection from flooding is not met. Project improvements could involve increasing conveyance capacity; re-routing drainage; or adding detention, infiltration, or other runoff control mechanisms.	\$5,372,000 (\$1,603,000 appropriated to date)	Ongoing

3.6 Utilities – Other Programs

City Utilities provides numerous services to the community and residents, including garbage and recycling, drinking water conservation, flood prevention, water pollution prevention, storm and surface water planning/management and salmon and stream conservation. One of the city's Utilities goals is to "promote and encourage the provision of reliable utility service in a way that balances the public's concerns about safety and health impacts of utility infrastructures, consumers' interest in paying no more than a fair and reasonable price for the utility's product, Bellevue's natural environment and the impacts that utility infrastructures may have on it, and the community's desire that utility projects be aesthetically compatible with surrounding land uses."

It has become increasingly apparent to the City that its role as a participant in regional flood control efforts relates to success of its shoreline programs. Flooding and raised water levels neutralize regulatory and non-regulatory program benefits. The City recognizes that the key means to protect shorelines and lake waters will come from active financial and management participation on an expanded basis. Efforts are needed to remove private barriers within the stormwater system to allow the City full control of the system. Only in this manner can the populace of Bellevue be assured a stormwater management system befitting its high quality urban development.

The following table (Table 3) lists proposed and current broad-scale programs and projects that are either in shoreline jurisdiction or have the propensity to affect shoreline ecological functions:

Table 3. Proposed or current broad-scale programs.

CIP Plan Number	Project Name	Description	Funding	Timeline
D-81	Fish Passage Improvement Program	This program corrects migration barriers, such as culverts, debris jams, and beaver dams that prevent salmonids and other fish species from utilizing upstream habitat suitable for spawning and rearing. This includes several sections of Kelsey Creek.	\$3,239,000 (\$958,000 appropriated to date)	Ongoing
S-58	Sewer Lake Line Replacement Program	This ongoing program will have an initial construction project to replace approximately 1,150 feet of sewer line (currently under Meydenbauer Bay) with on-shore pipe between Grange Pump Station and Meydenbauer Beach Park. It would also provide ongoing condition assessment of critical pipe segments, to provide pre-design information for future sewer lake line replacement projects.	\$3,012,000	Ongoing

D-74	Lower Newport Creek - Stream Channel Modification	This project will place large woody debris and boulders and replant natives along approximately 1,500 feet of the stream to stabilize the streambed, reestablish stream meander, reduce bank erosion, improve pool to riffle ratios, and fish and riparian habitat.	\$714,000 (\$660,000 appropriated to date)	Completed in 2008, permit compliance monitoring through 2011.
------	---	---	---	---

3.7 Parks and Community Services

The Parks and Community Services Department manages 60 percent of Bellevue's wetlands, 30 percent of the riparian corridors and 10 percent of its shorelines. Environmental stewardship is woven into Park programs to acquire land and to sensitively manage its natural resources. Parks must balance opportunities for stewardship against other fundamental missions, including providing parks, recreation and public access opportunities. Programs may address degraded habitat conditions resulting from existing land use and the cumulative impacts of ongoing urban development.

Of particular relevance to the objective of improving shoreline function is the Park Redevelopment element of the city's CIP (City of Bellevue 2009). This includes numerous projects that provide fish passage improvement, bioengineered streambank stabilization, restoration of armored streambanks, flood abatement, water quality improvement, and riparian vegetation enhancement among others. Many of these projects are planned "upstream" of shoreline jurisdiction, but will still have positive effects on the shoreline environment. Some of these projects have been included in Table 4 below.

Table 4. Park Redevelopment CIP Plan Elements.

CIP Plan Number	Project Name	Description	Funding	Timeline
P-AD-15	Property Acquisition	This project allows additional properties to be purchased as future opportunities arise, to meet existing and future park and open space demand. The city is also interested in providing a Lake Sammamish waterfront park, that would accommodate swimming, picnicking, and support facilities. The city owns three adjacent properties within Lake Sammamish shoreline jurisdiction, totaling 190 lineal feet of shoreline, which may be developed into a public park sometime in the future when funding sources allow.	\$66,682,000 (\$56,594,000 appropriated to date)	Ongoing

CIP Plan Number	Project Name	Description	Funding	Timeline
P-AD-27	Planning/Design for Existing and Future Park Facilities	The Parks and Community Services Department will prepare master plans and/or updates to existing master plans for park sites in response to changing needs, site conditions, and community issues. In some cases, master plans may be prepared for new park sites. Current initiatives include completion of master plans for the Meydenbauer Bay waterfront, Boeing/I-90 property, Bellevue Botanical Garden visitor center, Surrey Downs and Ashwood Park.	\$5,112,000 (\$3,394,000 appropriated to date)	Ongoing
P-AD-34	Trail Development	This trail project will identify, design, build and sign “missing links” in or connecting to the Lake to Lake Greenway Trail, Richards Valley Trail and South Bellevue Greenway and Trail system connecting Lake Washington to Lake Sammamish and many of the city’s major parks and open spaces. Connections and enhancements are planned for Meydenbauer Bay to Wilburton Hill, Mercer Slough to Wilburton Hill, Woodridge to Richards Valley, Richards Valley to Robinswood Park, Kelsey Creek to the Lake Hills Greenbelt, Coal Creek Park to Newport Hills, Sunrise Park to Lewis Creek and the South Bellevue Trail system.	\$2,245,000 (\$821,000 appropriated to date)	Ongoing

Additional projects not specifically listed in the city’s 2009 CIP, but located along or adjacent to city-owned property, include:

Mercer Slough – Restoration along 112th Avenue SE

This restoration effort consists of the removal of an extensive stand of noxious Himalayan blackberry in order to create a park-like setting. A soft surface path and pedestrian bridge will cross a small creek, and native riparian trees, shrubs, and groundcover will be planted and monitored. Restoration efforts also include added complexity to the streambank and wetlands throughout the property.

West Kelsey Open Space – Revegetation Plan

Located east of Mercer Slough between I-405 and Kelsey Creek Park, the West Kelsey Open Space contains a segment of Kelsey Creek, two tributaries, and one wetland. A

revegetation plan was developed to manage vegetation within the buffers of wetlands and streams in the Open Space, located on the south side of SE 8th Street between 121st Avenue SE and Lake Hills Connector Road. The proposed project involves removing twelve existing trees, thinning an alder grove, and removing invasive weeds. Native plantings will in-fill areas where invasive plants are removed to increase plant diversity in the buffer thereby improving habitat. Large woody debris from the hazard trees and thinned alder grove will be left on-site for habitat value.

Chism Beach Park

As part of the master planning process, four concept redesign options were completed of the lower terrace and waterfront area of Bellevue's 15-acre Chism Beach Park. Plans include: a reinvigorated and reprogrammed sandy beach, play areas, 1,200 lineal feet of shoreline restoration, and interpretive opportunities. Several low impact development techniques including rain gardens, green roofs, and green walls have been included in the designs. The City of Bellevue is working to balance opportunities for habitat enhancement with the need for continued public beach access.

Clyde Beach Park

Also part of the master planning process, concept design options are currently being developed for Meydenbauer Bay's Clyde Beach Park (The Watershed Company 2009). Design will include the removal of an old boat house and associated docks, and shoreline restoration and improved beach access for park users.

4 POTENTIAL PROJECTS

4.1 Recommended Projects

The following list of potential projects (Tables 5-8) is developed from opportunity areas identified within the *Shoreline Analysis Report*, collaboration and input from various city departments, and the city's current CIP list. This information is intended to contribute to improvement of impaired functions on public property. The majority of proposed projects are on public property; however, a number of projects are on private land. It is important to recognize that these projects represent potential ideas for voluntary restoration, and they are not required. The list of potential projects is further evaluated, prioritized, and conceptualized in Section 9 of this report.

NOTE: all projects calling for placement of LWD (Large Woody Debris), or any "flow altering changes", or creation of habitat will be preceded by an assessment of risk to include but not limited to safety, flood hazard potential, and potential of artificially altering common and ordinary water levels.

Table 5. List of Recommended Projects along Lake Washington.

Ref. Number	Location	Lake or Stream Project	General Description	Land Ownership
LW-1	Clyde Beach Park	Lake	Restore ~160 feet of armored shoreline and riparian zone using bioengineered solution to enhance ecological function. <u>provided enhanced armoring is proven to withstand high wave action over time</u> Plant native plants but maintain public beach access and general character of park.	Public
LW-2	Meydenbauer Beach Park	Lake	Implement Meydenbauer Bay Park Plan - Plan calls for the restoration of approx. 800 linear feet of shoreline currently armored, a 35% <u>possible</u> reduction of overwater coverage by removing a portion of the docks, enhancement of public access and recreation amenities, revegetation of over 4,000 s.f. and the daylighting of a native stream. <u>All restoration in Meydenbauer Bay Beach Park/Marina is subject to the Council-adopted Masterplan & Implementation Principles. Any armoring enhancement shall be proven to withstand high wave action over time, due to high boat-generated/some storm-generated wave action).</u>	Public
LW-3	Meydenbauer Marina	Lake	Convert Meydenbauer Marina into a fish friendly marina by improving light penetration (install deck grating, remove large canopies or install windows to allow light through), reducing predator habitat (remove <u>design new piers to minimize</u> unnecessary piles), and improving water circulation (grated decking, pile size and quantity minimization, elevated pier decking, etc)	Public and Private
LW-4	Meydenbauer Creek	Stream	Restore creek outfall to the lake to improve fish and wildlife habitat - install LWD for in-stream stabilization and fish rearing habitat.	Private
LW-5	Chism Beach Park	Lake	Restore large section of shoreline by removing riprap, restabilizing shoreline using bioengineered solution (<u>provided enhanced armoring is proven to withstand high wave action over time).</u> , and planting native vegetation (up to ~1,200 linear feet) <u>Ensure public access is as near to shoreline as feasible by not increasing depth of vegetative buffer along apx 1200 linear feet nearshore pathway.</u> . Maintain public beach access <u>and general beach configuration with pier to</u>	Public

Ref. Number	Location	Lake or Stream Project	General Description	Land Ownership
			one side of swimming beach section. but focus park user activity to central location.	
LW-6	Burrows Landing, Just South of Chism Beach Park	Lake	Shoreline is small, approximately 45 feet wide. The immediate shoreline area contains an approximately 150 square foot planting area that could be enhanced. <u>provided visual and physical access to nearshore area is maintained,</u> along with ~23 linear feet of shoreline armoring improvements. <u>provided any armoring improvements are proven to withstand high wave action over time</u> —Reduce pier impacts by reducing overwater cover through installation of deck grating on existing pier.	Public
LW-7	Sisters of Saint Joseph, South of Chism Beach Park	Lake	Opportunity to restore large section of shoreline (~600 feet long) by removing riprap, restabilizing shoreline using bioengineered solution, and planting native vegetation.	Private
LW-8	Chesterfield Beach Park- SE 25 th St Street End	Lake	Restore shoreline ecological function across small, approximately 60 feet wide shoreline, ~30 feet of which could be improved by reducing shoreline armoring. <u>provided any armoring improvements are proven to withstand high wave action over time.</u>	Public
LW-9	Enatai Beach Park	Lake	Limited opportunity to restore shoreline ecological function due to location of boathouse and swimming beach. However, the potential to remove or minimize the impacts of shoreline armoring. <u>provided any armoring improvements are proven to withstand high wave action over time</u> and improve nearshore native vegetation exists further north and under I-90.	Public
LW-10	Newcastle Beach Park	Lake	Opportunities to restore shoreline ecological functions include reducing overwater cover through installation of deck grating on existing pier, removing or minimizing the impacts of shoreline armoring, and improving nearshore native vegetation. Small wooden bulkhead near the wetland could be removed and shoreline restored. <u>Any armoring improvements must be proven to withstand high wave action over time.</u>	Public

Table 6. List of Recommended Projects along Kelsey Creek/Mercer Slough.

Ref. Number	Location	Lake or Stream Project	General Description	Land Ownership
MS-1	Mercer Slough at I-90	Stream	Remove creosote wall near I-90 (~250 feet long) - replace with something inert if necessary.	Public
MS-2	Mercer Slough	Stream	Remove invasive vegetation and replant with native trees and shrubs to improve overhanging vegetation along slough.	Public
MS-3	Mercer Slough-Bellefield Tributary and West Channel	Stream	Remove invasives and revegetate with native successional forest plants such as cottonwood, dogwood and willow with cedar, spruce, etc. where soils permit. Place LWD along edges and create off-channel habitat.	Private
MS-4	Mercer Slough - Bellefield Office Complex	Stream	Restore buffer, remove invasive vegetation and replant with native riparian species along Mercer Slough to provide dense overhead cover and shade to reduce heating. Develop and implement aquatic weed management plan.	Private
MS-5	Mercer Slough - Sturtevant Creek	Stream	Enhance confluence of Sturtevant Creek and Mercer Slough with LWD and native plants/ trees.	Private
MS-6	Kelsey Creek-Between I-405 and Lake Hills Connector	Stream	Between I-405 and the culverts under Lake Hills Connector (~1,700), install LWD to provide hydraulic refuge areas during peak flows, remove non-native vegetation and revegetate with native trees/shrubs, remove rip-rap.	Public
MS-7	Kelsey Creek Park- 401 130th PI SE	Stream	Knotweed, reed canarygrass, and policeman's helmet removal and native replanting in Kelsey Creek Park Wetland, upstream of Lake Hills Connector. Initiate a reforestation program which includes wetland willow rehabilitation project & LWD on banks.	Public
MS-8	Kelsey Creek-South of SE 7 th PI	Stream	Acquire parcels just south of SE 7th along north side of the West Tributary and Kelsey Creek confluence and associated wetland buffer and replant riparian zone with native trees and shrubs.	Private
MS-9	West Tributary-Kelsey Creek Park and SE 7 th PI	Stream	Reduce invasive, non-native plants, replant with natives, install LWD and improve floodplain in lower West Tributary stream corridor through the undeveloped portion of Kelsey Creek Park, south of SE 7th PI.	Public
MS-10	Richards Creek-Richards	Stream	At interchange of Richard's Road and Lake Hills Connector, modify existing culverts that are partial barriers by placing low-flow	Public

Ref. Number	Location	Lake or Stream Project	General Description	Land Ownership
	Road and Lake Hills Connector		deflectors on multichannel box culverts to increase depth of low-flow channel. Reduce invasive, non-native plants, replant with natives, install LWD and reduce armoring in lower Richards Creek. Purchase parcels along the south side of Lake Hills Connector to protect hillside springs/seeps and forest parcels (PINs 0424059002 and 0424059114).	

Table 7. List of Recommended Projects along Lake Sammamish.

Ref. Number	Location	Lake or Stream Project	General Description	Land Ownership
LS-1	West Lake Sammamish Parkway	Lake	REWORD - West Lake Sammamish Parkway stormwater LID program - improve water quality from WLSP outfalls. - West Lake Sammamish Parkway stormwater Low Impact Development (LID) program - Parkway improvement projects shall be designed to ensure that all pollution generating impervious surfaces, new and existing, comply with current water quality treatment requirements, and that all conveyance systems to the Lake are publically controlled and adequately sized and designed to handle stormwater outfall without causing impacts to adjacent properties or the Lake. Any water quality problems identified during project design and construction will be cataloged for potential future action (e.g., identify generators of Lake pollution including sources of sediment and turbidity.)	Public and Private
LS-2	West Lake Sammamish-Former Spady property	Lake	After carrying out a thorough assessment of neighborhood compatibility and the ability of the surrounding environment to absorb increased activity, r Restore former Spady property and other two adjacent city owned parcels along West Lake Sammamish Parkway by reducing overwater coverage, planting native shoreline vegetation and adding large wood along the shoreline. Public access needs to be a part of this project. Total shoreline length is ~200 feet and includes two piers. One pier could be removed. Look to coordinate with eventual master plan.	Public
LS-3	West Lake Sammamish	Lake	Eurasian water milfoil is widespread throughout Lake Sammamish – control efforts are needed along city owned shorelines. <u>Cooperate and participate in efforts to remove invasives in the Sammamish River which degrades needed outflow capacity.</u>	Public
LS-4	Vasa Creek	Stream	Purchase Boscole Property along north side of Vasa Creek & Vasa Park. Open/daylight Vasa Creek through private property. Position LWD <u>Design safe means</u> in Vasa Creek <u>to mitigate the</u> incised channel sections. Revegetate stream shoreline with native trees and shrub cover	Private

Ref. Number	Location	Lake or Stream Project	General Description	Land Ownership
			(>4,000 s.f.) <u>keeping in mind the established neighborhood nearby-</u>	
LS-5	Vasa Park	Lake	<u>Vasa Park restoration of shoreline and native vegetation, including adjacent King County pump station site (~ 700 feet of total shoreline).</u> <u>(This is private property and is now being considered in the residential zone and safety considerations override revegetation/restoration.)</u>	Private
LS-6	West Lake Sammamish	Lake	Develop plan to work with private landowners who live adjacent to creek outfalls (whether piped or not) and encourage and plan for riparian enhancement to these openings for juvenile salmon rearing habitat <u>but only where it has definitively been proven that ESA salmon have historically been reared in these locations.</u> [Staff – we recommend that <u>these locations be listed explicitly since they are finite in number.</u> Mileposts or a map would be acceptable.]	Private
<u>LS-7</u>	<u>Samm. Rvr</u>	<u>River</u>	<u>Support King County in maintaining the Marymoor Transition Zone's outflow from the lake as designed by the Corps of Engineers and to regulate water levels to maintain the Corps' 27 ft. (NGVD) OHWM.</u>	<u>Public</u>
<u>LS-8</u>	<u>Lake Basin</u>	<u>Basin</u>	<u>Establish internal policies and programs and participate at the regional level to seek a balance of lake inflow and outflow so as to stabilize lake levels and assure water quality; including establishment of standards, regular monitoring, and annual reporting.</u>	<u>Public</u>
<u>LS-9</u>	<u>Phantom and Vasa Creeks</u>	<u>Stream</u>	<u>Carry out an assessment of the current and future contribution these and other tributary creeks will impose on Lake Sammamish's water levels and water quality (such as sedimentation and creation of deltas). Identify mitigation options and prepare cost estimates and sources of those impacts so as to distribute costs equitably.</u>	<u>Public</u>

Table 8. List of Recommended Projects along Phantom Lake.

Ref. Number	Location	Lake or Stream Project	General Description	Land Ownership
PL-1	Phantom Lake	Lake	Initiate a reforestation program @ Phantom Lake which specifically identifies the area south of the main park and Robinsglen. Revegetation area is well over 4,000 square feet. <u>In addition, a program to “manage” beavers and their destructive activity will be included, since these animals frequently cause blockages to the lake outflow channel.</u>	Public
PL-2	Phantom Lake Inlet Channel	Stream	Phantom Lake inlet channel – create > 100 feet of stream meanders, install LWD, replant with native veg (>4,000 s.f.), reduce shoreline hardening and improve overall habitat complexity. <u>Remove – incompatible with resolving documented water imbalance and pollution problems, and this is not a natural stream and as such cannot be “restored”</u>	Private
PL-3	Phantom Lake	Lake	Acquire lake front property as it becomes available & set up conservation easement along shoreline. <u>Remove – such a nebulous program will result in depressed land values and might result in unnecessary law suits.</u>	Private
PL-4	Larsen Lake Outlet Channel	Stream	Improve habitat functions and retain or improve flood control functions in outlet channel (~500 feet) at Larsen Lake. Restore riparian vegetation (>4,000 s.f.) in the Larsen Lake stream channel and initiate a reforestation program at Larsen Lake <u>(Portions completed under Kelsey Creek Village conditions)</u>	Public
PL-5	Lake Hills	Lake	Develop a Street Edge Alternatives (SEA streets) program for <u>this area of</u> Bellevue with a pilot project. Rehabilitate the neighborhood drainage in the SE 9th <u>and other streets in the</u> area using infiltration for flood control similar to the "C" street model <u>but only after analyses indicate Phantom Lake and its shorelines will not be negatively impacted.</u>	Public
PL-6	Lake Hills Greenbelt-Ranger Station	Lake	Approximately 500 feet north of the Lake Hills Greenbelt Ranger Station is a constructed open water pond that helps retain sediments and control flood flows	Public

Ref. Number	Location	Lake or Stream Project	General Description	Land Ownership
			through the greenbelt. The pond is dominated by invasive species on its banks and would benefit from restoration and enhancement.	
<u>PL7</u>	<u>Phantom Lk</u>	<u>Lake</u>	<u>Phantom Lake Outlet Channel – City shall: (a) acquire permanent access easements along entire outlet channel for maintenance and water balance management purposes. (b) Operate weir gate so as to maintain an administrative OHWM of 260.7 ft. NAVD. (Note: this is a level approx. 6 inches above the current weir threshold and was the recommendation of the weir engineer in its 1991 redesign).</u>	<u>Public</u>
<u>PL-8</u>	<u>Phantom Lake</u>	<u>Lake</u>	<u>Designate Phantom Creek and Lake basin as a Flood Problem Area requiring heightened flow control management assuring mitigation of existing and forecast development impacts.</u>	<u>Public/Private</u>
<u>PL-9</u>	<u>Phantom Creek in Weowna Park</u>	<u>Stream</u>	<u>While maintaining existing ecological functions, identify and fund changes to this waterway that mitigate impacts to Lake Sammamish and adjoining properties.</u>	<u>Public</u>
<u>PL-10</u>	<u>Eastgate as affects Phantom Lake Basin</u>	<u>Pond A</u>	<u>Expand Detention Pond-A in Eastgate Land Use Plan and/or Airfield Park Plan with a goal of reducing illicit discharge of sludge and heavy metals into Phantom Lake. Review use of and re-engineer Detention Pond-B and re-institute its use as needed.</u>	<u>Public/Private</u>
<u>PL-11</u>	<u>Phantom Lake</u>	<u>Lake</u>	<u>Upgrade lake maintenance program with following components:</u> <u>(1) Seasonal adjustment of weir-gate timbers to avoid flooding.</u> <u>(2) Monitor and remove beavers/beaver dams on Phantom Lake due to the importance of maintaining the limited outlet channel's capacity.</u> <u>(3) Incorporate 1980 Concomitant Agreement terms as program actions.</u>	<u>Public</u>
<u>PL-12</u>	<u>Phantom Lake</u>	<u>Lake</u>	<u>City shall remove the abandoned aerator located in the lake.</u>	<u>Public</u>
<u>PL-13</u>	<u>Phantom</u>	<u>Lake</u>	<u>Establish policies and implement monitoring</u>	<u>Public</u>

Ref. Number	Location	Lake or Stream Project	General Description	Land Ownership
	<u>Lake</u>		<u>program of Phantom Lake waters for: 1) nutrients, phytoplankton and zooplankton, as indicator of lake's biotic balance, and 2) contaminants, including heavy metals (which are believed to be coming from abandoned Eastgate landfill).</u>	

4.2 Recommended Projects – Private

Projects and options listed below will only be offered in an educational format and not alluded to or “construed as necessary” at any time in the permit process.

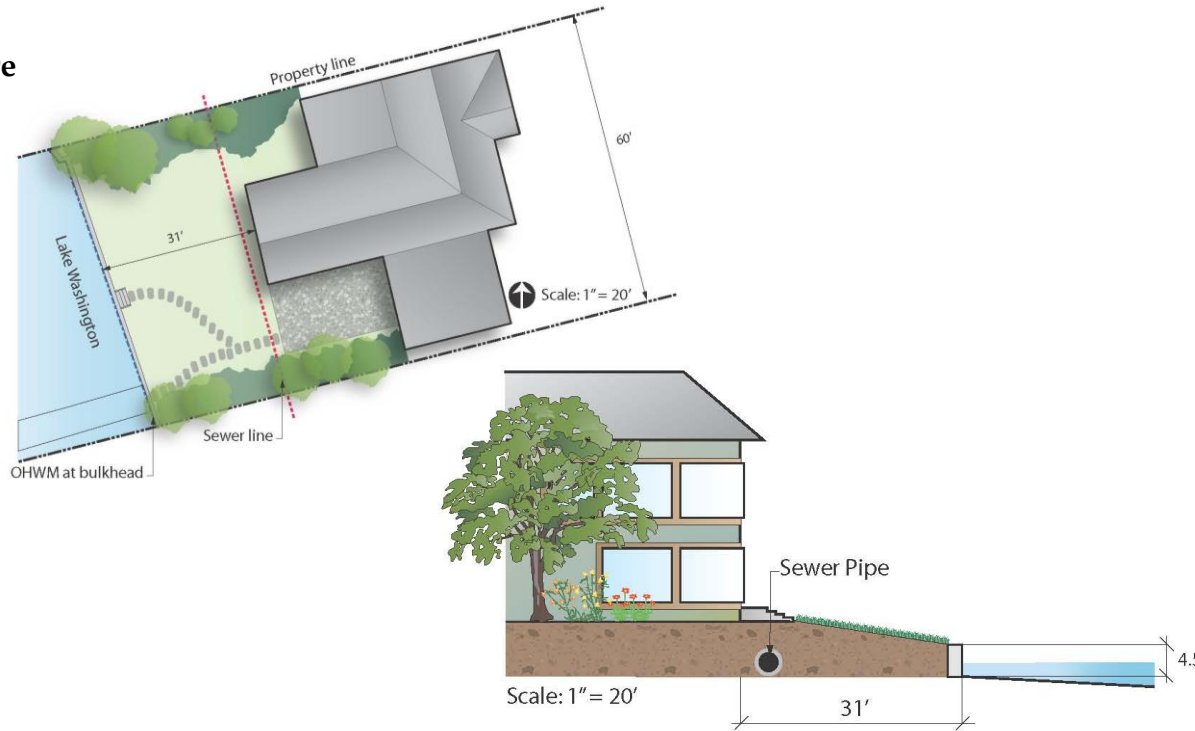
The city's Shoreline Master Program does not require restoration on private properties; however, there are many opportunities for property owners to restore or enhance shoreline functions on a voluntary basis. Many shoreline properties have the potential for improvement of ecological functions through: 1) reduction or modification of shoreline armoring, 2) reduction of overwater cover and in-water structures (grated pier decking, pier size reduction, pile size and quantity reduction, moorage cover removal), 3) improvements to nearshore native vegetative cover, and/or 4) reductions in impervious surface coverage. Similar opportunities would also apply to undeveloped lots which may be used as community lots for upland properties or local street-ends and utility corridors. Other opportunities may exist to improve either fish habitat or fish passage for those properties which have streams discharging to Lake Sammamish or Lake Washington.

An example of how shoreline armoring might be reduced on some lots along the city's residential areas is depicted below (Figure 3). This example displays before and after images of a typical lot in which the existing bulkhead is partially pulled back to create a shallow cove beach combined with natural materials. This example combines the effort to improve habitat conditions with improved access and aesthetics.

Similar opportunities for ecological improvements exist for the residential properties on Phantom Lake that exist for properties on Lake Sammamish or Lake Washington. However, given the size of the waterbody and surrounding basin, the Phantom Lake properties have much greater potential per parcel to provide ecological benefit. Mechanisms such as reduction or modification of shoreline armoring, minimizing overwater cover, providing native shoreline vegetation, reducing or eliminating applications of chemicals, pesticides, and herbicides, and reducing impervious surfaces,

are all applicable measures to achieve improvements in shoreline ecological function for Phantom Lake. Similar opportunities would also apply to any undeveloped lots and city owned parcels. The associated wetlands surrounding both Phantom and Larsen Lakes could benefit from the removal of invasive vegetation and replanting with native vegetation.

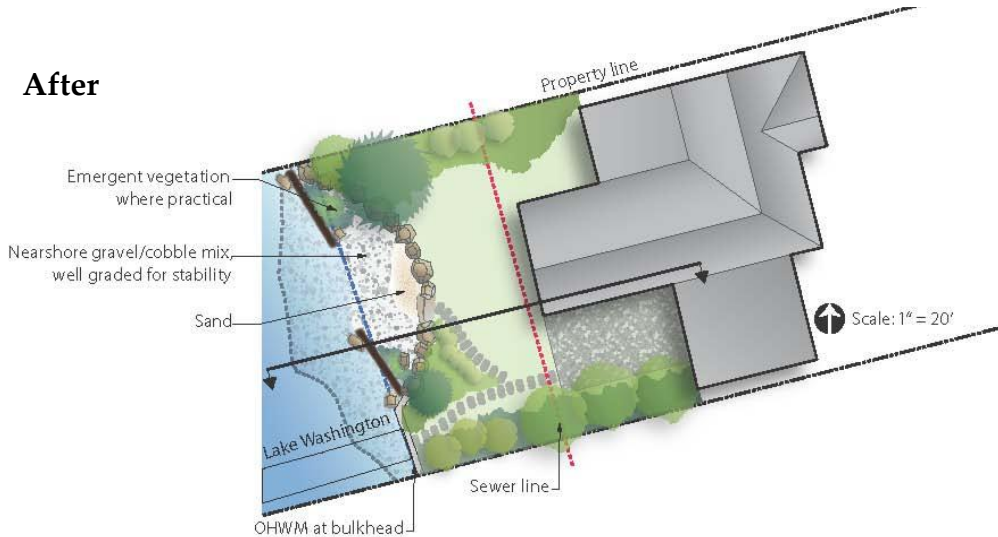
Before



After

Figure :

Restora
restoral
includi
shorelin
benefits
restoral



5 f

5.1 V
Bellevu
particip



Watershed (WRIA 8) Chinook Salmon Conservation Plan (WRIA 8 Steering Committee 2005). The Chinook Salmon Conservation Plan includes the Bellevue's implementation commitment in the form of City Council Resolution No. 7214, approved 27 June 2005 (Appendix A).

The city is taking important steps towards furthering the goals and objectives of the *WRIA 8 Chinook Salmon Conservation Plan* through preparation of the *Shoreline Analysis Report* that includes an inventory and characterization of City of Bellevue shorelines, and by developing this Shoreline Restoration Plan. In its Resolution, the city committed to, among other things, "using the scientific foundation and the conservation strategy as the basis for local actions recommended in the Plan (*Chinook Salmon Conservation Plan*) and as one source of best available science for future projects, ordinances, and other appropriate local government activities." Resolution No. 7214 also states that the city will use the "comprehensive list of actions, and other actions consistent with Plan (*Chinook Salmon Conservation Plan*), as a source of potential site specific projects and land use and public outreach recommendations." The city's Shoreline Master Program update products rely heavily on the science included in the WRIA 8 products, and incorporate recommended projects and actions from the WRIA 8 products.

To review, the WRIA 8 Steering Committee's mission and goal statements state that the Chinook Salmon Conservation Plan shall:

- 1) Recognize that local governments are key implementing entities for the plan, because of their responsibilities for land use.
- 2) Direct most future population growth to already urbanized areas, because new development has greater negative effects on hydrology and ecological health of streams in rural than in urban areas.
- 3) Create incentives for behavior that would support Chinook Salmon Conservation Plan goals.
- 4) Be coordinated with the Growth Management Act, local and regional responses to the Clean Water Act, other environmental laws and past/current planning efforts.

The Chinook Salmon Conservation Plan presents a start-list that attempts to compile the land use, site-specific habitat protection and restoration projects, and public outreach and education recommendations into a single strategy list which focuses watershed priorities yet also provides a manageable number of actions (Table 9). A detailed comprehensive action-list for potential restoration and protection projects is found in chapter 11 of the Chinook Salmon Conservation Plan and is provided for the Kelsey Creek subarea in Appendix B of this Shoreline Restoration Plan. Conservation priority and technical priority actions identified for WRIA 8 chinook salmon habitat within Lake Washington and Lake Sammamish included in the Chinook Salmon Conservation Plan are as follows:

- Reduce predation on juvenile migrants by providing increased rearing and refuge opportunities.

- Restore shallow water habitats and creek mouths for juvenile rearing and migration.
- Protect existing levels of forest cover, soil infiltrative capacity and wetland areas, and minimize impervious areas, to maintain watershed function and hydrologic integrity (especially maintenance of sufficient base flows) and protect water quality.
- Protect and restore riparian function, including revegetation, to provide sources of large woody debris to improve channel stability, contribute to pool creation, to reduce peak water temperatures.
- Protect and improve water quality to prevent adverse impacts from fine sediments, metals (both in sediments and in water), and high temperatures to key chinook life stages.
- Adverse impacts from road runoff should be prevented through stormwater best management practices and minimization of number and width of roads in the basin. Opportunities to retrofit existing roadways with stormwater treatment best management practices should be pursued. Road crossings should be minimized to maintain floodplain connectivity.
- Provide adequate stream flow to allow upstream migration and spawning by establishing in-stream flow levels, enforcing water rights compliance, and providing for hydrologic continuity.

Table 9. The Final Lake Washington/Cedar/Sammamish Watershed (WRIA 8) Chinook Salmon Conservation Plan Action Start-List for Lake Washington and Lake Sammamish, and Status of Implementation in the City of Bellevue.

Action Item	Bellevue Implementation
<i>Reduce predation to outmigrating juvenile chinook by: reducing bank hardening, restoring overhanging riparian vegetation, replacing bulkhead and rip-rap with sandy beaches with gentle slopes, and use of mesh dock surfaces and/or community docks.</i>	
Encourage salmon friendly shoreline design during new construction or redevelopment by offering incentives and regulatory flexibility to improve bulkhead and dock design and revegetate shorelines.	<p>The proposed SMP includes...</p> <p><i>COMMENT: Statement needs to be completed at the end of the SMP development. Needs statement regarding incentives and code flexibility offered to encourage salmon friendly shoreline design. The existing code contains much of this emphasis, but we will need to confirm that the language remains or is modified to meet this action item.</i></p> <p>The Parks and Community Services Department is currently working to implement shoreline restoration at two Lake Washington parks.</p>
Increase enforcement and address nonconforming structures over long run by requiring that major redevelopment projects meet current standards.	<p>Code enforcement is responsible for enforcing regulations which address public health and safety issues, including regulations related to rubbish, garbage, specific nuisances, removal of vegetation, zoning, housing, dangerous buildings, and inoperable and unlicensed vehicles on private property. Enforcement actions are taken both proactively and in response to requests for action received from citizens.</p> <p>The city updated its code enforcement policies in</p>
Discourage construction of new bulkheads; offer incentives (e.g., provide expertise, expedite permitting) for voluntary removal of bulkheads, beach improvement, riparian revegetation.	<p>Code provides zoning and development regulations for the use and development of land within the city. The proposed SMP includes</p> <p><i>COMMENT: Statement needs to be completed at the end of the SMP development. Needs statement regarding code language which discourages new bulkheads and what incentives are offered to encourage beach restoration. The existing code contains much of this emphasis, but we will need to confirm that the language remains or is modified to meet this action item.</i></p>
Support joint effort by NOAA Fisheries and other agencies to develop dock/pier specifications to streamline federal/state/local	The city has been coordinating on a regular basis with state and federal agencies to help develop consistent pier and bulkhead design

Action Item	Bellevue Implementation
permitting; encourage similar effort for bulkhead specifications.	standards, including coordination with adjacent jurisdictions.
Promote value of light-permeable docks, smaller piling sizes, and community docks to both salmon and landowners through direct mailings to lakeshore landowners or registered boat owners sent with property tax notice or boat registration tab renewal.	<p>The city has implemented this Action Item through development of its current Critical Areas Ordinance as well as the current update of the Shoreline Master Program, both in public outreach conducted during the update process and in the pier regulations.</p> <p>The city has hosted workshops for lakeshore owners which has highlighted the value of eco-friendly pier construction. This includes King County Lakeshore Living workshops.</p>
Offer financial incentives for community docks in terms of reduced permit fees, loan fees/percentage rates, taxes, and permitting time, in addition to construction cost savings.	<p>The proposed SMP includes...</p> <p>COMMENT: The city will need to complete this statement at the completion of the SMP development. This may or may not be applicable depending upon city direction.</p>
Develop workshop series specifically for lakeshore property owners on lakeside living: natural yard care, alternatives to vertical wall bulkheads, fish friendly dock design, best management practices for aquatic weed control, porous paving, and environmentally friendly methods of maintaining boats, docks, and decks.	King County has led this effort. As mentioned above, the city has hosted workshops on this topic in the past (Lakeshore Living). This work is expected to continue in the near future.
Protect and restore water quality in tributaries and along shoreline. Restore coho runs in smaller tributaries as control mechanism to reduce the cutthroat population. Reconnect and enhance small creek mouths as juvenile rearing areas.	
Address water quality and high flow impacts from creeks and shoreline development through National Pollutant Discharge Elimination System (NPDES) Phase 1 and Phase 2 permit updates, consistent with WDOE's 2001 Stormwater Management Manual, including low impact development (LID) techniques, on-site stormwater detention for new and redeveloped projects, and control of point sources that discharge directly into the lakes.	To protect water quality, Bellevue manages stormwater runoff in a number of ways. The city follows "best management" practices and operates under a NPDES Phase II Municipal Stormwater Permit issued by Ecology in January 2007. This permit is a requirement of the Federal Clean Water Act. The best management practices in the permit are collectively referred to as the NPDES Stormwater Management Program. Under the conditions of the permit, the city must protect and improve water quality through public education and outreach, detection and elimination of illicit non-stormwater discharges (e.g., spills, illegal dumping, wastewater), management and regulation of construction site runoff, management and regulation of runoff from new development and redevelopment, and pollution prevention and maintenance for municipal operations.

Action Item	Bellevue Implementation
Encourage LID through regulations, incentives, education/training, and demonstration projects.	The City's Comprehensive Plan contains policies which promote LID. The city believes, "LID and green buildings can contribute to long-term environmental sustainability." Several proposed city Park projects have incorporated green building and LID techniques into their design (i.e. Chism Beach Park).
Protect and restore water quality and other ecological functions in tributaries to reduce effects of urbanization and reduce conditions which encourage cutthroat. Protect and restore forest cover, riparian buffers, wetlands, and creek mouths by revising and enforcing critical areas ordinances and Shoreline Master Programs, incentives, and flexible development tools.	The city updated the Critical Areas Ordinance (No. 5680) in 2006, and published a <i>Critical Areas Handbook</i> as a tool to educate property owners about critical areas and city regulations. The city's non-regulatory measures and incentives, critical area regulations, city clearing and grading regulations, and stormwater regulations provide protection of critical area functions and values.
Promote through design competitions and media coverage the use of "rain gardens" and other low impact development practices that mimic natural hydrology.	The city's Mercer Slough Environmental Learning Center was designed and built to have minimal impact on the environment. The complex has earned a King County "Excellence in Building Green Award." Key features include special gutters, porous concrete and catchment ponds, green roofs and renewable, recycled, local materials, along with sustainably harvested wood were used in the construction of the buildings. The city has applied for a silver LEED (Leadership in Energy and Environmental Design) rating.

5.2 Lake Sammamish Kokanee Work Group Efforts

The Lake Sammamish Kokanee Work Group is a multi-stakeholder and inter-governmental group focused on developing and implementing a strategy to conserve the native kokanee population. Historically, kokanee used extensive areas of the Lake Washington watershed but are now limited to a few tributaries of Lake Sammamish. The Work Group's current focus is documenting their conservation strategy, assembling a prioritized list of conservation projects, and developing a project proposal for funding in the current grant process (D. St. John, e-mail communication, April 9, 2009). Active members of the group include watershed residents and representatives of watershed jurisdictions (Bellevue, Issaquah, Redmond, Sammamish, and King County), WDFW, Trout Unlimited, and the U.S. Fish and Wildlife Service (D. St. John, letter, January 9, 2009).

The ultimate goal of the Work Group is to improve the health of the native kokanee population such that it is viable and self-sustaining and supports fishing opportunities. The Work Group is developing priorities to support achieving these goals. Draft priorities currently under consideration are illustrated by these examples:

- Prevent the near term extinction of the population.
- Correct discrete habitat conditions that are directly causing mortality or reducing productivity.
- Protect existing intact habitat areas at risk of damage or conversion.
- Improve our certainty that we are implementing the highest priority and effective restoration, protection, or conservation action.
- Protect or improve ecological processes that form or sustain habitat currently used by late run kokanee at any life stage.
- Protect or improve ecological processes that form or sustain habitat that currently is not used by kokanee at any life stage but could be necessary to sustain a viable population.
- Build and maintain public awareness of kokanee conservation needs.
- Build and maintain public support for implementation of high priority actions.

A near term project list will primarily focus on creeks that currently support kokanee spawning, including Lewis Creek, which has its headwaters in the City of Bellevue. In the long-term, the Work Group may identify opportunity areas within the city's Lake Sammamish shoreline jurisdiction, including Vasa Creek and lakeshore areas that are identified as ongoing or potential spawning areas (D. St. John, e-mail communication, April 9, 2009). Over the much longer term, the Work Group may investigate kokanee restoration opportunities within the Lake Washington drainage (D. St. John, e-mail communication, April 9, 2009).

While the investigation of the population's decline continues, Work Group members have been taking actions vital to kokanee recovery, including:

- King County has made improvements to fish passage on streams that flow beneath the East Lake Sammamish Trail.
- The City of Issaquah has made improvements to habitat along Lewis Creek, while the City of Sammamish has been doing similar work on Zaccuse Creek.
- Trout Unlimited has been operating a kokanee fry trap that provides managers with an accurate count of fish production on Lewis Creek.
- WDFW staff have performed spawner surveys and are working with biologists to develop protocols for a kokanee supplementation program, which would be housed at the Issaquah Hatchery.

For more information about the Lake Sammamish Kokanee Work Group, contact David St. John, Government Relations Administrator at the King County Department of Natural Resources and Parks, at (206)296-8003.

The City fully recognizes that Lake Sammamish Kokanee have not and do not inhabit the shorelines and tributaries within City limits. Kokanee are not listed as Endangered. Therefore, no attempts will be made to create habitat that would lead to establishment of new populations.

5.3 Adopt-A-Stream Foundation Efforts

The Adopt-A-Stream Foundation's (AASF) Fish & Wildlife Division was created to address degraded stream and wetland ecosystems. AASF has surveyed several watersheds and successfully identified areas with erosion, fish passage barriers, pollution sources, and other associated problems. Habitat restoration has included culvert repair and replacement, streambank stabilization, stream channel reconfiguration, and the placement of in-stream fish ladders and large woody debris (LWD).

To restore habitat, the AASF works with many partners, including several government agencies, local jurisdictions, non-profit environmental and community organizations, as well as private landowners. Many of the AASF projects are funded through Ecology and National Fish & Wildlife Foundation grants. Additionally, AASF can be contracted for site specific restoration.

Education and Outreach

- *Streamkeeper Academy*
AASF achieves its mission of teaching people to become stewards of their watersheds through a variety of educational programs and publications which fall under the umbrella name of *Streamkeeper Academy*. AASF staff continues to develop programs and create new educational and outreach opportunities for young and old, students and professionals alike.
- *Northwest Stream Center*
The Northwest Stream Center (near Everett) is a regional environmental learning facility that provides "basic training" in watershed ecology and stewardship.

Additional information about AASF's programs and projects can be found online at <http://www.streamkeeper.org>.

5.4 Cascade Land Conservancy Efforts

Cascade Land Conservancy (CLC) conserves land in the central Puget Sound region. They are committed to "protecting important natural spaces in urban neighborhoods and rural communities, along precious rivers and streams, and across the foothills of the Cascades" (CLC website). The CLC also works to conserve working farms and forests. Their strategies range from land purchases and donations, to conservation easements and ownership agreements that use innovative and creative tools and methods to conserve. The CLC goal is to "maximize the ecological value of land while meeting the needs of landowners."

The CLC has completed 163 projects since 1989 to conserve nearly 150,000 acres in the Puget Sound region and has played an important role in thousands more (CLC website).

The CLC has completed 71 projects and protected approximately 99,657 acres within King County (CLC website). About nine years ago, the CLC acquired an approximately 1.5-acre property with a conservation easement within the City of Bellevue, but outside of shoreline jurisdiction (L. Malone, e-mail correspondence, April 8, 2009). Each protected property requires consistent and regular monitoring, followed by active maintenance or management to assure that no human health and safety issues exist, there are no encroachments, and the conservation values of the land remain protected forever.

More information about the CLC can be found online at <http://www.cascadeland.org>.

5.5 Eastside Audubon Society Efforts

Formed in 1980, the Eastside Audubon Society is dedicated to the appreciation, study and conservation of birds and their habitats. Eastside Audubon's service area includes Bellevue, Bothell, Kirkland, North Bend, Redmond, Woodinville and East King County. Eastside Audubon supports local Greenspace and Parks initiatives, protection of threatened and endangered species, community environmental education projects for adults and children, and is active in several local and regional environmental issues and projects.

Eastside Audubon volunteers monitor monthly permitting bulletins issued by the city to ensure that community development is supported by the best available science and is sensitive to Audubon's mission, "to conserve and restore natural ecosystems, focusing on birds, other wildlife, and their habitats for the benefit of humanity and the earth's biological diversity" (A. McCormick, personal communication, April 13, 2009).

Volunteers have also been instrumental in preserving many areas for birds, including Lake Hills Greenbelt in Bellevue, Juanita Bay Park in Kirkland, Marymoor Park in Redmond and Hazel Wolf Wetlands in King County. In 2008, the Bellevue Golf Course was recognized for their environmental efforts by the Audubon Society and certified as a sanctuary for wildlife by the Audubon Cooperative Sanctuary Program for Golf Courses. Located at 5500 140th Ave. NE, the golf course features increased plantings of native vegetation for birds and wildlife and enhancement of natural corridors to other habitat areas.

Citizen Science

The National Audubon Society website states that "citizen science is about learning, empowerment, building a constituency, as people count birds for conservation. Audubon's vision is to engage citizens in asking questions about their environment, and to help them gather information to answer questions that they and professional biologists are asking." Volunteers and members collect data each spring and fall during the Eastside Audubon Society's bird migration census and Christmas bird count. The goal is provide those responsible for land management with data for making land use decisions that takes wildlife into account (Eastside Audubon Society website).

Education and Outreach

Eastside Audubon offers monthly presentations, workshops, and field trips for chapter members and the public. They also offer school programs for Eastside classrooms, scholarships for children to attend summer camp, scholarships for college students, and grants for teachers to be used in classroom programs.

More information about the Eastside Audubon Society and their upcoming events can be found online at <http://www.eastsideaudubon.org>.

5.6 Mountains to Sound Greenway Trust Efforts

Plans for the Mountains to Sound Greenway (Greenway) were created in 1990 by local citizens to maintain “accessible landscape of forests, wildlife habitat and open spaces as breathing room for people, and a place of incomparable beauty, history and outdoor recreation for their children and grandchildren” (Greenway website). Today, the Greenway stretches along 100 miles of Washington’s Interstate 90 from the waterfront in Seattle to the edge of desert grasslands in Central Washington. This stretch of highway is a National Scenic Byway with much of the landscape in public ownership. The Greenway includes communities and historic towns, working farms and forests, spectacular alpine scenery, wildlife habitat, campgrounds, trails, lakes and rivers (Greenway website).

Based in Seattle, the Mountains to Sound Greenway Trust (Trust) was founded in 1991 as a nonprofit organization that helps protect these lands and preserve them for public benefit. The Trust encourages public land acquisition and environmental stewardship while providing environmental education and events. The Trust also works to “unite hikers, corporate executives, government leaders, environmentalists and community advocates who share a vision of careful planning for growth balanced by preservation of forested open spaces, clean air and water, for ourselves and for future generations” (Greenway website).

The Trust is not currently implementing any restoration projects within the city, yet they are working towards developing a partnership and are eager for future opportunities within Bellevue’s watershed (T. Bell, personal communication, April 9, 2009). The Trust’s Lands Program is hopeful that the city will acquire new lands for open space and the funds needed for Bellevue Greenways and Open Space Projects (M. Sollitto, e-mail communication, April 9, 2009). Trust education programs include “classroom presentations and field trips to 5th - 10th grade students that focus on land use issues, biosolids, analyzing forest/stream environments and the soil/water/forest connection” (S. Kentch, e-mail communication, April 10, 2009). The Education Program also participates in special events at the Mercer Slough Environmental Education Center such as Bellevue Natural Resource Week and the Envirothon (S. Kentch, e-mail communication, April 10, 2009).

More information about the Mountains to Sound Greenway and the Trust can be found online at <http://www.mtsgreenway.org>.

5.7 Save Lake Sammamish Efforts

Save Lake Sammamish (SLS) is “a non-profit Washington corporation established to promote the water quality of Lake Sammamish and its watershed by increasing community awareness of the lake and its watershed and fostering greater public awareness of the environmental and wildlife concerns relating to Lake Sammamish and its watershed and any potential development thereon” (SLS website). SLS promotes community awareness by making press releases about environmental issues and publishing newsletters that are delivered to over 3,000 Puget Sound homes.

More information about Save Lake Sammamish can be found online at <http://www.scn.org/savelake>.

5.8 Trout Unlimited Efforts

The mission of the Washington Council of Trout Unlimited and the Icicle Chapter is to, ““Conserve, Protect and Restore” cold water fisheries, their watersheds and ecosystems, as a means of maintaining our quality of life!” Trout Unlimited has been on the forefront of fisheries restoration work at the local, state and national levels. Their website explains that they remain committed to applying “the very best information and thinking available” to conservation work and have developed cutting-edge tools to help direct efforts toward those fish populations most in need of protection or restoration.

Trout Unlimited’s Bellevue/Issaquah chapter has concluded that the fish that needs the most attention in the basin is the Lake Sammamish Kokanee. They have adopted a new slogan to “Help to save our little red fish!” Trout Unlimited believes the best way the general public can help is to adopt- a-kokanee.

Adopt-A-Kokanee

Beginning in February of 2009, the Bellevue/Issaquah Chapter of Trout Unlimited in cooperation with the King Co. Department of Natural Resources, WDFW and the U.S. Fish and Wildlife Service will begin a research program by placing acoustical tags on native kokanee, cutthroat trout and northern pike minnow to track their movement throughout the Lake Sammamish watershed utilizing listening stations throughout the lake and its tributaries. This research will provide vital information and a better understanding of the habits of these fish throughout their lives.

More information about Trout Unlimited and their restoration efforts can be found online at <http://www.tu-bi.org>.

6 EDUCATION AND OUTREACH

With 54 percent of adult residents having achieved a Bachelor's Degree or higher, the City of Bellevue is one of the most highly educated communities in the Nation. The city is also increasingly diverse, with almost one in four Bellevue residents born outside the United States (according to the 2000 federal Census). City residents enjoy high levels of civic engagement in community groups, volunteer associations, businesses and individuals work with city staff to identify and achieve community goals.

The City of Bellevue's community programs and services respond to social concerns by focusing on enhancement, prevention, and intervention. Special emphasis is placed on providing services and programs for the youth, the senior citizens, the disadvantaged, and those with disabilities. The following city policies help keep residents connected to their natural environment.

POLICY PA-39. Offer programs that utilize the unique resources and variety of indoor and outdoor facilities within the park system.

POLICY PA-40. Provide a nature interpretation program to increase the community's awareness, understanding, and appreciation of natural areas.

6.1 Utilities – Education and Outreach

Stream Team

As a city-organized volunteer-based effort, the Stream Team focuses on teaching citizens about local streams, and fish and wildlife habitat in a variety of ways. Volunteering efforts may include planting stream corridors with native trees and shrubs, observing streams for returning adult salmon, helping to collect stream bug samples (macroinvertebrate) for water quality monitoring, participating in a habitat monitoring project, or by inviting a Stream Team staff member to speak at your school or club. Stream Team volunteers play a vital role in preserving fish and wildlife habitat and are able to be a part of the following volunteer groups: Salmon Watchers, Peamouth Patrol, Earth Day/Arbor Day, and Macroinvertebrate Workshop and Field Collection. Contact the Stream Team at (425) 452-5200 or e-mail streamteam@bellevuewa.gov to receive volunteer information

Water All Around Us

City of Bellevue Utilities produces a guidebook to Bellevue's streams, lakes, wetlands, watersheds, salmon migration and other information. To receive a copy, call the Utilities Department at (425) 452-6932.

Pollution Prevention

Outreach efforts include storm drain marking, articles in local newspapers, display and participation at community events, local school programs, and special outreach campaigns. The city is also part of the “Puget Sound Starts Here” campaign (www.pugetsoundstartshere.org) with a website and advertising to teach residents simple ways they can help prevent pollution every day.

6.2 Parks and Community Services – Education and Outreach

Mercer Slough Environmental Education Center

The Mercer Slough Environmental Education Center (MSEEC) is located in the heart of urban Bellevue on a biologically diverse 320-acre wetland nature park. The MSEEC is a collaborative effort between the city and the Pacific Science Center that brings year-round education and interpretation of freshwater ecosystems, wetland ecology, environmental stewardship and the effect of urban development to adults, youth and families. The MSEEC is a keystone of interpretive facilities and programs for the city that offers interpretive displays, an interactive library for all ages, an artist’s nook, and a community building. Visitors to MSEEC can view the slough, surrounding wetlands, and wildlife from the tree house, elevated boardwalk systems, and the many viewing overlooks.

The MSEEC has earned a King County “Excellence in Building Green Award” through its design and construction that had minimal impact on the environment. Key features include special gutters, porous concrete and catchment ponds that slow and filter water runoff at the site, green roofs that help reduce impermeable surfaces and warming around buildings, and renewable, recycled, local materials, along with sustainably harvested wood were used in the construction of the buildings. The city has applied for a silver LEED (Leadership in Energy and Environmental Design) rating.

Event and environmental education program information can be found online at <http://www.pacsci.org/slough/index.html>.

6.3 Other Programs for Education and Outreach

The *Final Lake Washington/Cedar/Sammamish Watershed (WRIA 8) Chinook Salmon Conservation Plan* (2005) includes a table outlining 53 “Outreach and Education Actions” with target audiences for each action ranging from the general public, to shoreline property owners in general, to lakeshore property owners specifically, to businesses, to youth, and others. The complete list of WRIA 8 “Outreach and Education Actions” is included as Appendix E.

7 TIMING, COMMITMENT, AND PERFORMANCE MEASUREMENT

As previously noted, the city's shoreline area is occupied by multi- and single-family residences, public recreation/open space areas, marinas/yacht clubs, and some professional office areas. A number of opportunities exist to improve shoreline ecological functions through the promotion of restoration and healthy practices at all levels, from single-family properties to large-scale marinas. As discussed above, there are numerous governmental and non-governmental groups interested and participating in the protection and restoration of ecological functions of Bellevue's shorelines. Continued improvement of shoreline ecological functions requires a focused and comprehensive watershed-level approach, which integrates upland and shoreline projects and programs.

The following table (Table 10) outlines possible schedule and funding sources for implementation of a variety of efforts that could improve shoreline ecological function, and are described in previous sections of this report.

Table 10. Implementation Schedule and Funding for Restoration Projects, Programs and Plans.

Restoration Project/Program	Schedule	Funding Source or Commitment
City Programs/Projects		
Utilities – Stream Team	Ongoing	Currently, staff time and materials are utilized to coordinate volunteer efforts to monitor streams in the fall and spring.
Utilities - Stormwater Planning and Other Programs	Ongoing	Currently, staff time, materials and an unspecified amount of funding support stormwater planning studies and projects. The city currently follows their <i>Draft 2009 Stormwater Management Program</i> , best management practices, operates under a NPDES Phase II Municipal Stormwater permit and reports annually to Ecology.
Parks & Community Services	Ongoing	Currently, staff time, materials, city funding and various grants support these programs.

Restoration Project/Program	Schedule	Funding Source or Commitment
Public Education / Outreach	Ongoing	Currently, staff time, materials and an unspecified amount of funding support public education and outreach efforts. City policies help keep residents connected to their natural environment and help guide city staff and local citizen groups in developing mechanisms to educate the public and broaden the interest in protecting and enhancing local environmental resources. On-going and future education efforts should be coordinated with the city and partnering agencies, including funding sources (grant funding, monetary donations, and volunteer hours).
Recommended Projects - Public	As funds and opportunity allow	Projects identified in this section would likely be implemented either when grant funds are obtained, when partnerships are formed between the city and other agencies or non-profit groups, or as may be required by the critical areas regulations and the Shoreline Master Program during project-level reviews by the city.

Partnerships

WRIA 8 Participation	Ongoing	The city is an active member of the WRIA 8 Forum. Membership at this time entails a commitment of staff time.
Lake Sammamish Kokanee Work Group	Ongoing	Bellevue is an active member of the Work Group. The city makes a substantial commitment of staff time towards finalizing a Work Group strategy, prioritizing conservation projects and seeking funding for project/program implementation.
Adopt-A-Stream Foundation	As funds and opportunity allow	The city may partner or contract with this organization on future restoration projects or education/outreach efforts. The city does not have authority over or a formal relationship with the Adopt-A-Stream Foundation.
Cascade Land Conservancy	As funds and opportunity allow	The city may partner with this organization on future restoration projects or education/outreach efforts. The city does not have authority over or a formal relationship with the Cascade Land Conservancy.
Eastside Audubon Society	As volunteer time and opportunity allow	Eastside Audubon will continue to be an active participant in the local community, providing education/outreach opportunities for the public. The city does not have authority over or a formal relationship with the Eastside Audubon Society.
Mountains to Sound Greenway Trust	As funds and opportunity allow	The city does not have authority over or a formal relationship with the Trust. Currently, the Trust is working towards developing a partnership with the city and is eager to address conservation and education/outreach opportunities within Bellevue.
Save Lake Sammamish	As funds and opportunity allow	The city does not have authority over or a formal relationship with this organization. Save Lake Sammamish promotes community awareness about environmental issues and conservation efforts within Bellevue.

Restoration Project/Program	Schedule	Funding Source or Commitment
Trout Unlimited	As funds and opportunity allow	This organization is an active member of the Lake Sammamish Kokanee Work Group and is currently working to raise money to support research and other conservation efforts surrounding Lake Sammamish Kokanee. The city does not have authority over or a formal relationship with this organization.

7.1 Performance Measurement

In order to document progress toward the goals and objectives of the Shoreline Restoration Plan, city planning staff should keep a record of all development activity, including exemptions, within shoreline jurisdiction, with a minimum level of detail that includes date, location, permit type issued, project description, impacts, mitigation (if any), and monitoring outcomes as appropriate. Specific to projects including restoration and/or mitigation, particular data measures should document changes that affect the objectives of this restoration plan (outlined in Section 2.1).

As discussed in the introductory section, the Shoreline Master Program Update and, by extension, the Restoration Plan are to be put in place to ensure no net loss of shoreline ecological function over time. Performance measures will provide a sense of the activities contributing to shoreline changes. In some cases, these performance measures may be intimately linked with ecological functional performance, such that they are sufficient to assess changes in shoreline function. In other cases, specific functional indicators (e.g., water quality, hydrography, benthic indicators of biotic integrity (BIBI)) may provide a better synthesis of the cumulative effects of actions on ecological functions. In order to effectively measure functional performance, performance indicators should be identified, consisting of a unit of measure and a baseline point against which to measure progress. The identification of specific indicators and baseline levels of comparison exceeds the scope of the Restoration Plan, but could be developed with additional resources.

Below, performance measures, ecological functions, and where applicable, functional indicators are associated with the objectives identified in Section 2.1 of this report.

Objective A. *Improve shoreline ecological functions by managing the quality and quantity of stormwater runoff, especially that being contributed by the predominant source – upland development beyond the Overlay District boundaries, consistent at a minimum with the latest WDOE Stormwater Management Manual for Western Washington. Make any additional efforts to meet and maintain state and county water quality standards in tributary streams.*

Measures include but are not limited to 1) the volume of additional stormwater detention capacity; 2) changes in the square footage of impervious surfaces, and 3) the square footage of rain gardens, bioswales, and other Low Impact Development (LID) tools installed. These measures are well suited as indicators of changes associated with development, but since stormwater quality and quantity is affected by a broad range of actions, direct monitoring of water quality and quantity at various points around the City may provide a more comprehensive synthesis of how cumulative changes across the City impact water quality and quantity.

Objective B. ~~Decrease the amount and impact of overwater and in-water structures through minimization of structure size and use of innovative materials such as grated decking.~~ Cooperate with state and federal agencies having jurisdiction for overwater and in-water structures, assuring applicants have obtained their review and conditioning of proposed waterward activity.

The performance measure would document the change in square footage of overwater and in-water structures. A reduction in square footage would occur when overwater structures are removed or when decking is converted to a grated surface. Since overwater cover is directly related to nearshore shading of aquatic vegetation and fish habitat, the measured change in overwater and in-water structures would be well suited as an ecological indicator, as well as a performance measure.

Objective C. *Identify hardened and eroding lakeshores and streambanks, the source and causes of such erosion, appropriate mitigation alternatives, and improve to the extent safe and economically feasible, with bioengineered stabilization solutions.*

In order to capture the total change in armoring, the linear feet of shoreline stabilization installed using a hard engineered approach (rip rap or bulkhead), linear feet of shoreline stabilized using a bioengineering approach, and linear feet of shoreline stabilization removed should be documented as performance measures. Changes in shoreline armoring will influence several ecological processes and functions, most notably, sediment transport processes and fish and wildlife habitat. The ratio of armored to bioengineered or unarmored shorelines could serve as an indicator of ecological function.

Objectives D & E. *D) Increase quality, width and diversity of native vegetation in riparian areas to improve fish and wildlife habitat by providing food, nest sites, shade, perches, and organic debris. E) Control and reduce populations of non-native aquatic and riparian vegetation that are harmful to native vegetation or habitats.*

Performance measures for these two frequently interrelated objectives would identify the square footage of native vegetation planted, removed, or maintained in riparian areas, as well as the area of non-native aquatic and riparian vegetation removed. Native terrestrial and aquatic vegetation are critical to providing foraging, nesting, and refuge

habitat for native fish and wildlife. The width and quality of native shoreline and upland vegetation also influences the extent to which stormwater is naturally filtered prior to entering surface water of creeks and lakes. Since native riparian vegetation is associated with improved water quality and healthy macroinvertebrate populations, the composition of benthic macroinvertebrates could be used as an indicator of ecological function.

Objective F. *Reconnect and enhance small creek mouths as juvenile salmon refuge and rearing areas where it can be shown such activity has occurred in the past.*

Any changes to small creek mouths should be documented. Small creek mouths provide important and unique habitat areas for juvenile salmon. Performance indicators could be based on specific data on water depths and connectivity. This level of specificity may be feasible given the limited number of small creek mouths within shoreline jurisdiction.

Objective G. *Improve stream ecological functions by eliminating old and preventing new fish passage barriers where it can be shown such functions and associated habitat has occurred in the past.*

This measure would document the number of fish passage barriers corrected, as well as any new passage barriers that develop. The ecological significance of fish passage barriers is generally related to the potential habitat area upstream of the barrier. For example, a barrier located at the downstream end of a large river system would have a greater impact on fish passage than a barrier in a headwater stream with little potential habitat above it. Therefore, in addition to the number of barriers removed, the length of stream or area of habitat made accessible is also a useful indicator of ecological function.

Objective H. *Educate the property owners in the shoreline zone and the remainder of the city about the impacts of land management practices and other unregulated activities (such as vegetation removal, pesticide/herbicide use, car washing) on fish and wildlife habitats.*

Progress toward this objective can be challenging to measure because public education can occur through many different avenues (e.g., workshops and educational events or everyday experiences and encounters with neighbors). Education is meant to encourage the public to voluntarily engage in ecologically beneficial or lower impact activities. Any of the above measures and indicators would also provide information on progress property owner willingness to make changes that will benefit shoreline ecological functions. An annual survey of landowner attitudes could also provide a more direct measure of public awareness of ecological concerns.

Information on any performance measures and/or functional indicators should be collected in such a way that a report can be produced at some later date with minimal manual research into hard copy permit files. The report should also outline implementation of various programs and restoration actions (by the city or other groups) that relate to watershed health

The report should be assembled to coincide with Comprehensive Plan updates and may be used, in light of the goals and objectives of the Shoreline Master Program, to determine whether implementation of the SMP is meeting the basic goal of no net loss of ecological functions relative to the baseline condition established in the *Shoreline Analysis Report*. In the long term, the city should be able to demonstrate a net improvement in the City of Bellevue's shoreline environment.

8 RESTORATION PRIORITIZATION AND CONCEPT DEVELOPMENT

This *Shoreline Restoration Plan* includes goals, policies, current and ongoing non-regulatory, primarily public sector actions and recommendations for restoration of impaired shoreline ecological functions which are designed to achieve overall improvements in shoreline ecological functions over time. Through prioritization of restoration opportunities which recognize the developed nature of the City, a balance is found that matches Bellevue's ecological goals with a variety of site-specific constraints.

Briefly restated, the city's environmental protection and restoration goals include 1) balancing shoreline restoration with public access and recreation opportunities, 2) protecting watershed processes to achieve improved ecological functions over time, and 3) protecting fish and wildlife habitat. Constraints specific to Bellevue include a highly developed residential shoreline along Lake Sammamish and Lake Washington. While some areas may already offer fairly good ecological functions (Mercer Slough Nature Park and the Lake Hills Greenbelt), there are additional opportunities to further enhance ecological functions. These goals and constraints were used to help develop a prioritization of restoration projects. Programmatic actions, like continuing WRIA 8 involvement and conducting outreach programs to local residents, are considered ongoing efforts which should continue to receive funding and recognition for their importance throughout the city. Other factors that influenced the project prioritization are based on scientific recommendations specific to WRIA 8, potential funding sources, the projected level of public benefit, and project feasibility.

Although the following project ranking and conceptual plan development is based on evaluation of both ecological benefits and feasibility, the actual order of implementation may not always correspond with the ranking level assigned to that project. This discrepancy is caused by a variety of obstacles that interfere with efforts to implement projects in the exact order of their perceived priority. Some projects, such as those associated with riparian planting, are *relatively* inexpensive and easy to permit and should be implemented over the short and intermediate term despite the perception of lower priority than projects involving extensive shoreline restoration or large-scale capital improvement projects. Straightforward projects with available funding should be initiated immediately for the worthwhile benefits they provide and to preserve a sense of momentum while permitting, design, site access authorization, and funding for the larger, more complicated and more expensive projects, are under way.

Six potential restoration projects from Table 5 were selected through the project prioritization and ranking process for further development of conceptual designs. These projects include: Chism Beach Park shoreline restoration (LW-5); Clyde Beach Park

shoreline restoration (LW-1); Newcastle Beach Park shoreline restoration (LW-10); Mercer Slough- Bellefield Office Complex buffer enhancement (MS-4); West Lake Sammamish shoreline restoration (LS-2); and Larsen Lake stream restoration, fish passage, and revegetation (PL-4). Conceptual designs were developed with consideration to present condition, potential for improved ecological function, and public use interests at each site. Details of the concept designs are provided in Appendix F.

8.1 Chism Beach Park shoreline restoration

The proposed project area extends west approximately 260 ft from the existing pier, to the existing forested shoreline. The project shoreline is armored with rip-rap, which reflects wave energy and eliminates shallow-water nursery habitats for small fishes, like juvenile Chinook salmon. The area immediately landward of the rip-rap bulkhead contains a large concrete walkway along the southeastern side of the project area and mown lawn to the northwest. A pier extends out over the lake from the southeastern edge of the concrete walkway. Shoreline vegetation is limited to mown grass.

The project will replace rip-rap with a more natural shoreline gradient, stabilized by anchored large wood, boulders, and a well-graded mix of gravel. Regrading the shoreline will help attenuate wave energy, restore sediment transport processes, and restore shallow water shoreline habitat for native fish. Large wood along the shoreline will provide refuge opportunities for small fish and amphibians.

The large existing concrete trail will be set back and replaced by a smaller pervious 'nature path.' Shoreline revegetation will provide habitat, hydrologic, and vegetative functions by shading the nearshore, providing a source of organic debris and insect prey to the lake, and improving the filtration capacity of the area.

The existing dock will be relocated to a more central, accessible location, and will feature grated decking and widely spaced pilings to reduce nearshore shading and limit habitat for non-native fish.

8.2 Clyde Beach Park shoreline restoration

The entire 160 ft of shoreline in the park is either concrete bulkhead or concrete steps. This creates a steep, uniform shoreline that reflects wave energy and eliminates shallow nearshore habitat. The shoreline presently lacks vegetation, and the upland areas of the park are dominated by lawn and impervious surfaces. The park features two piers: one functions as a swimming pier, and the other is used by boats and has a boat house but is in structural disrepair and may be removed.

The conceptual design will remove the concrete armoring along the shoreline, and use large wood and boulders to stabilize the shoreline. This shoreline restoration will

improve wave attenuation and sediment transport, and providing physical habitat features for fish and amphibians.

A large sandy beach area will replace lawn that presently extends up to the concrete bulkhead. The beach will concentrate shoreline use in the central area and allow for shoreline revegetation on either side. Planting native shrubs in shoreline and upland areas will provide foraging, refuge, and nesting habitat for wildlife, as well as vegetative functions, such as temperature regulation in the shallow nearshore areas and water quality improvement by filtering pollutants from runoff from nearby roads and residences.

The conceptual design includes the removal of the existing swimming pier, and the replacement of the existing pier to the south with fully grated decking to reduce shading in the nearshore area. Pier removal and improvement will enhance aquatic habitat.

8.3 Newcastle Beach Park shoreline restoration

This park features a large swimming pier with chemically treated wood decking, and thick wooden skirting that reduces light penetration into the lake. A large concrete bulkhead, backed by a wide concrete path, just south of the pier creates an abrupt, tall vertical shoreline that reflects wave energy and eliminates shallow-water nursery habitats for juvenile Chinook salmon and other small fish. A forested wetland and small stream with high-quality natural shoreline habitat lies just south of the concrete bulkhead. In the nearshore area at the northern end of the park, the pilings remain from a derelict wooden bulkhead.

The shoreline restoration will improve habitat, vegetative, and hydrologic functions by restoring shallow water habitat, enhancing shoreline habitat complexity, planting native trees and vegetation, and reducing overwater cover. The bulkhead south of the pier will be removed and the area will be regraded to create a natural, shallow beach gradient, stabilized by large wood and boulders. The existing grass mound will be graded back, and native vegetation will be planted along the lakeshore. Large wood and boulders will be used to reinforce the area where the restored beach will meet the existing pier.

The pier deck will be replaced with a grated surface, and skirting along the existing pier will be removed in places to allow light penetration and juvenile salmon migration along the nearshore area, while continuing to protect the swimming beach from wave energy.

The bulkhead pilings at the northern end of the park will be removed to restore shallow water habitat for native fish.

8.4 Mercer Slough- Bellefield Office Complex buffer enhancement

This proposed project is on private property, and it provides an example of a potential voluntary action that could provide significant ecological benefits. Project implementation is not required of the property owners or management.

The West Channel of Mercer Slough presents several opportunities to increase vegetated buffer functions by planting large conifers and shade trees along the shoreline. A wooded buffer will increase shading to reduce late-summer water temperatures and improve water quality by filtering out contaminants from road and parking lot runoff. The vegetated buffer would also provide diverse habitat for wildlife. The placement of large wood along the shoreline would increase aquatic refuge habitats and the diversity of habitat niches available for aquatic species.

8.5 West Lake Sammamish shoreline restoration

This project would enhance the Lake Sammamish shoreline and improve public access on three former residential parcels owned by the city. The shoreline is currently unarmored and has a gradual, mostly natural lakeshore gradient. The southern half of the property, near the lake, is poorly drained, and contains vegetation, soil and hydrology indicative of wetland conditions. The northern portion of the property features an existing pavilion structure and a large paved patio set back approximately 50 feet from the lakeshore. Much of the upland area is well vegetated, with several large coniferous and deciduous trees.

The lakeshore on the southern portion of the property will be planted with native wetland shrubs and trees appropriate for the saturated soils. Wetland planting will increase vegetative functions, particularly water quality improvement, and habitat diversity along the shoreline. Active recreational use will be focused in the northern parcel of the future park. **Parking and access to the lower portion of the properties will be improved so that this park may function as both a recreational outlet, as well as a shoreline restoration model.** To assure compatibility with the surrounding neighborhood, residents ¼ mile in each direction of these parcels will be directly involved in the design process.

The project would remove one of the two existing docks and reduce the total size of the other dock. The remaining dock will be designed to minimize shoreline habitat impacts. Design improvements will include grated decking and a narrower 'bridge' over the nearshore area to allow for light penetration to the nearshore. Nearshore 'bridge' decking could be removed in the winter and early spring to minimize impacts for migrating juvenile salmonids.

8.6 Larsen Lake stream restoration, fish passage, and revegetation

The project area stretches from the outlet of Larsen Lake to the first culvert under a commercial development. The existing outlet to Larsen Lake is a low-gradient, straight, uniform channel lacking woody debris or overhanging woody vegetation. The outlet is actively maintained for flood control purposes. The southernmost ~80 ft of the channel is surrounded by mown grasses and blueberry bushes, associated with the Larsen Lake blueberry farm. Several areas, including most of the east bank of the channel are dominated by reed canary grass. Himalayan blackberry is also present at this site.

The banks of the channel and surrounding areas will be regraded to increase the total flood storage capacity and create meanders and backwater areas that will also enhance physical habitat functions. The project will add large wood to create habitat complexity within the channel, and to encourage slight channel meanders. Revegetation with dense wetland shrubs and trees will be used to control reed canary grass and Himalayan blackberry. Revegetation will enhance wildlife habitat diversity, shade, and the provision of wood and organic matter to the channel.

Three to four rows of blueberries will be removed on each side of the channel, and a narrow buffer of native plants will be planted along the channel in the uppermost 80 feet of the channel. This buffer will improve water quality by reducing the quantity of nutrients and possible contaminants entering the channel.

9 REFERENCES

- Bell, Tor. Mountains to Sound Greenway Trust. Phone conversation with C. Strickwerda, The Watershed Company. April 9, 2009.
- City of Bellevue. 2008. Comprehensive Plan. Originally adopted December 6, 1993. Amended August 4, 2008.
- City of Bellevue. 2007. City of Bellevue Draft Stormwater Management Program.
- City of Bellevue. 2009. 2009 to 2015 Capital Investment Program Plan.
- City of Bellevue. 2003. 2003 Parks and Open Space System Plan.
- City of Bellevue. 2003. Bellevue Critical Areas Update Wetland Inventory.
- CLC [Cascade Land Conservancy] website. <http://www.cascadeland.org>
- Eastside Audubon Society website. <http://www.eastsideaudubon.org>.
- Greenway [Mountains to Sound Greenway] website. <http://www.mtsgreenway.org>.
- Kentch, Sally. Education coordinator, Mountains to Sound Greenway Trust. E-mail correspondence to C. Strickwerda, The Watershed Company. April 10, 2009.
- Kerwin. 2001. Salmon and Steelhead Habitat Limiting Factors Report for the Cedar Sammamish Basin (Water Resource Inventory Area 8).
- Malone, Lindsay. King County Project Manager , Cascade Land Conservancy. E-mail correspondence to C. Strickwerda, The Watershed Company. April 8, 2009.
- McCormick, Andrew. Conservation Committee Chair, Eastside Audubon Society. Phone conversation with C. Strickwerda, The Watershed Company. April 13, 2009.
- Paulsen, K. 2008. Environmental Scientist. City of Bellevue Utilities. Personal interview with T.Hall, The Watershed Company. March 31, 2008.
- SLS [Save Lake Sammamish] website. <http://www.scn.org/savelake>.
- Sollitto, Mark. Acquisition Consultant, Mountains to Sound Greenway Trust. E-mail correspondence to C. Strickwerda, The Watershed Company. April 9, 2009.

- St. John, David. 2009. King County Department of Natural Resources and Parks, on behalf of the Lake Sammamish Kokanee Work Group. Letter to Heidi Bedwell, Shoreline Master Plan Program, City of Bellevue. January 9, 2009.
- St. John, David. 2009. King County Department of Natural Resources and Parks, on behalf of the Lake Sammamish Kokanee Work Group. E-mail communication with C. Strickwerda, The Watershed Company. April 9, 2009.
- Thompson, R. Utilities Department, City of Bellevue. Personal interview with D. Nickel, The Watershed Company. May 14, 2008.
- Trout Unlimited website. <http://www.tu-bi.org>.
- TWC [The Watershed Company] and Makers (Architecture and Urban Design). 2009. Shoreline Analysis Report. Prepared for City of Bellevue Planning and Community Development. January 2009.
- Varner, Phyllis. 2008. City of Bellevue Utilities. Utilities Project Lead. Personal communication with T. Hall, The Watershed Company. August 4, 2008.
- Washington Department of Fish and Wildlife (WDFW). 2007. Priority Habitats and Species database search results prepared for the City of Bellevue. 2007.
- WRIA 8 Steering Committee. 2002. Lake Washington/Cedar/Sammamish Watershed (WRIA) Near-Term Action Agenda For Salmon Habitat Conservation. August, 2002. <http://dnr.metrokc.gov/wrias/8/near-term-action-agenda.htm>.
- WRIA 8 Steering Committee. 2005. Final Lake Washington/Cedar/Sammamish Watershed (WRIA 8) Chinook Salmon Conservation Plan. July 2005.

10 LIST OF ACRONYMS AND ABBREVIATIONS

AASF.....	Adopt-A-Stream Foundation
Cfs.....	cubic feet per second
CIP	Capital Investment Program
GMA	Growth Management Act
NGPA	Native Growth Protection Area
NGPE.....	Native Growth Protection Easement
NPDES.....	National Pollutant Discharge Elimination System
OHW/M	ordinary high water/mark
USACE	U.S. Army Corps of Engineers
USGS.....	U.S. Geological Survey
WDFW.....	Washington Department of Fish and Wildlife
WDOE	Washington Department of Ecology

APPENDIX A

City of Bellevue Resolution No. 7214

APPENDIX B

Comprehensive Action-list for Potential Restoration and Protection Projects* for the Kelsey Creek Subarea.

***Projects were indentified in chapter 11 of the *Final WRIA 8 Chinook Salmon Conservation Plan* for the Kelsey Creek Subarea (including Goff, Kelsey, Richards and Valley Creeks and the West Tributary).**

APPENDIX C

Blank Project Restoration Ranking Form

APPENDIX D

Project Ranking Forms

APPENDIX E

**WRIA 8 Proposed Outreach and
Education Actions**

APPENDIX F

Shoreline Restoration Concept Plans