

# Restoration Plan

## APPENDIX B – RESTORATION PLAN

### Contents:

1. Introduction
  2. Restoration Plan Requirements
  3. Define Urban Restoration
  4. Restoration priority Goals and Objectives
  5. Shoreline Implementation Strategies and Restoration Opportunities
  6. Specific Restoration Projects
- 

### THE GOALS OF THE RESTORATION PLAN ARE TO:

- ⇒ **Improve water quality**
- ⇒ **Re-establish and restore natural shoreline processes, restore degraded and lost habitat, and wildlife corridors**
- ⇒ **Improve connectivity of the shoreline environments to one another and to adjacent habitat corridors and/or habitat blocks that support priority species and species of local significance.**

### 1. Introduction

The Restoration Plan (RP) is designed to meet the requirements for restoration planning outlined in the Department of Ecology Guidelines; WAC 173-26-201 (2) (f) or, Guidelines. A Restoration Plan is not a regulatory document or a set of regulatory requirements. There are several regulatory sections in the SMP, however, that point to this RP as a guide for improving shoreline ecological function. Ultimately, a RP should include a vision for ecological restoration, including goals, objectives and opportunities. It also establishes city strategies for implementation, including recognition of existing and ongoing programs and provides a framework for long-term monitoring of shoreline restoration and shoreline conditions. While this restoration plan includes broad goals and objectives, the specific implementation measures, budgets, schedules, and individual monitoring programs will be needed for individual restoration projects as they occur.

The restoration priority goals, objectives, natural process / ecological function and potential metrics for restoration are shown on TABLE 1. The restoration opportunities and the associated objectives, activities and monitoring are shown on TABLE 2. Individual restoration projects are shown on TABLE 3.

TABLE 1 and TABLE 2 (and the 6 'Sections' specified above) are the elements of the RP that is approved by DOE as part of the SMP. The specific projects identified in TABLE 3 are not a part of the approved SMP hence, may be revised and adaptively managed without the need to amend the SMP per the requirements in BMC Section 22.07.20.

A Restoration Plan is an integrated component of shoreline master programs that are intended to achieve overall improvements in shoreline ecological functions city wide over a certain time

# Restoration Plan

1 period when compared to the status of the shorelines upon adoption of an updated SMP. It must  
2 be noted that despite the intent of the RP to achieve overall improvements to shoreline  
3 ecological function over time it cannot be assumed that improvements to impaired systems is in  
4 and of itself adequate. The overarching goal of Restoration Plans is to return shorelines to  
5 functionally sustainable levels or, properly functioning conditions.

6 There is no required method or approach to development of Restoration Plans because  
7 jurisdictions vary by size, conditions of shorelines vary by watershed as do the ecological  
8 functions to be restored and availability of resources (grants, volunteers and equipment) can be  
9 questionable.

10 The restoration plan builds on the 2004 City of Bellingham Shoreline Inventory and the  
11 Characterization Report (Northwest Ecological Services, LLC) which provide a comprehensive  
12 inventory and analysis of shoreline conditions in Bellingham. The input of the Technical  
13 Advisory Committee (TAC) and the comments received from various agencies and special  
14 interest groups that reviewed this RP has also been added in terms of a baseline condition. The  
15 intent of this restoration plan is to provide the local governments, special interest groups, private  
16 property owners or non-profit agencies with the information and guidance necessary to  
17 implement a restoration project that will improve shoreline ecological function within a particular  
18 shoreline reach and is consistent with community restoration goals.

19 To ensure that restoration goals are being achieved, it is important for the city to evaluate the  
20 performance effectiveness of this plan and to adapt to changing conditions. At a minimum, this  
21 restoration plan (as well as the entire Shoreline Master Program) will be evaluated by the  
22 Department of Ecology for its ability to improve the overall ecological function of shorelines. The  
23 actual improvements to ecological function will be re-evaluated again in seven years when the  
24 2007 SMP is updated again.

## 25 **2. SMP Restoration Planning Regulatory Requirements**

26  
27 WAC 173-26-201(2)(f)(i-vi) identifies the following elements to be included in an adequate  
28 restoration plan.

29  
30 (i) Identify degraded areas, impaired ecological functions, and sites with potential  
31 for restoration.

32 (ii) Establish overall goals and priorities for restoration of degraded areas and  
33 impaired ecological functions.

34 (iii) Identify existing and ongoing projects and programs that are currently being  
35 implemented, or are reasonably assured of being implemented (based on an  
36 evaluation of funding likely in the foreseeable future), which are designed to  
37 contribute to local restoration goals.

38 (iv) Identify additional projects and programs needed to achieve local restoration  
39 goals, and implementation strategies including identifying prospective funding  
40 sources for those projects and programs.

41 (v) Identify timelines and benchmarks for implementing restoration projects and  
42 programs and achieving local restoration goals.

# Restoration Plan

(vi) Provide for mechanisms or strategies to ensure that restoration projects and programs will be implemented according to plans and to appropriately review the effectiveness of the projects and programs in meeting the overall restoration goals.

### **3. Define Urban Restoration:**

The term “restoration” has a number of definitions, all of which share similar ideas. They often refer to the return of an area to a previous condition by improving the biological structure and function (Diefenderfer 2003). Examples of definitions of restoration put forth by various authors and agencies include bringing back a former, normal, or unimpaired state; a return to a previously existing natural condition; reestablishing vegetation; and returning a damaged ecosystem to its pre-disturbed state. The DOE shoreline master program guidelines state that:

“Restore,” “Restoration,” or “ecological restoration” means the reestablishment or upgrading of impaired ecological shoreline processes or functions. This may be 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.

The Society of Wetland Scientists (2000) defines wetland restoration, which is similar to shoreline restoration, as actions taken in a converted or degraded natural wetland that result in the reestablishment of ecological processes, functions, and biotic/abiotic linkages that lead to a persistent, resilient system integrated within its landscape. In an effort to be clear and consistent in the discussion of restoration, five key elements of the concept of restoration are adapted from the Society :

1. Restoration is the reinstatement of driving ecological processes.
2. Restoration should be integrated with the surrounding landscape.
3. The goal of restoration is a persistent, resilient system.
4. Restoration should generally result in the historic type of environment but may not always result in the historic biological community and structure.
5. Restoration planning should include the development of structural and functional objectives and performance standards for measuring achievement of the objectives.

In this SMP, restoration is used broadly to also include conservation and enhancement actions. Conservation is different from restoration as described above in that it protects areas relatively free of degradation. Enhancement, which improves shoreline functions, but may not result in restoration of underlying process, may be more viable than restoration in some instances.

### **Restoration in Urban Settings (adapted from Borde et al., 2004)**

More than 50% of the U.S. population lives on the coast, with a higher growth rate in coastal counties than in the country as a whole (NOAA 1998). The result of this development has been the loss of a high percentage of coastal habitats that were once present in urban areas.

# Restoration Plan

1 Restoration in urban areas presents the following challenges:

- 2
- 3 • Multiple inputs water-shed wide that are outside of a restoration site.
- 4 • Limited sites available for restoration
- 5 • Limited reference sites
- 6 • Confounding factors, such as poor water quality, chemical contamination, and
- 7 altered hydrology
- 8 • Fragmented habitat
- 9 • High costs due to land acquisition expenses and the amount of work required to
- 10 reverse habitat modifications
- 11 • Differing needs for coastal resources (e.g., economic, cultural, social, recreational,
- 12 environmental) (Brammeier 2003)
- 13 • Differing values of local citizens (Ehrenfeld 2000).
- 14

15 However, these challenges are often offset by the following benefits:

- 16
- 17 • The restored habitat provides pockets of habitat where otherwise there would be
- 18 none
- 19 • Restored habitat can provide a connectivity to adjacent, more functional habitats
- 20 (TAC)
- 21 • Additional natural landscapes for urban residents (Ehrenfeld 2000)
- 22 • A heightened public awareness of coastal ecosystems (Milano 1999)
- 23 • Educational opportunities
- 24 • Public involvement in the restoration process of highly visible projects, resulting in
- 25 community project stewardship
- 26
- 27

28 Urban restoration represents the perhaps the most critical and challenging situation to use the  
29 principles of landscape ecology for choosing a restoration site. While the challenges of urban  
30 restoration are many, the importance of habitat restoration in these settings is monumental from  
31 an ecological and societal perspective. The ecological importance of projects in urban areas can  
32 be disproportional to the size of the project because of the lack of ecological habitat in the  
33 surrounding areas (Borde et al., 2004).

## 34 **4. Restoration Priority Goals and Objectives**

35  
36  
37 The priority goals and objectives below were developed for the City of Bellingham 4-26-07  
38 DRAFT SMP in order to implement the following Bellingham Comprehensive Plan goals and  
39 visions:

40  
41 **Implementation of TMDL Response Plan for Lake Whatcom:** This Plan is currently being  
42 developed by the City of Bellingham and Whatcom County and is anticipated to have a draft  
43 completed for City / County Council review mid 2010.

44  
45 **Vision for Bellingham #57:** Citizens and property owners join forces to protect the quality of  
46 Lake Whatcom, its watershed, the City's other lades and creeks and Bellingham Bay. Through  
47 community education, regulations, performance based development standards and public  
48 private cooperation, the community as a whole supports protection of these natural resources  
49 as a priority. (Comprehensive Plan, Chapter 1, Framework Goals and Policies)

# Restoration Plan

1 Parks, Recreation and Open Space Plan; Chapter 8:  
2

## 3 **8.1 Resource conservancies**

4 Incorporate unique ecological features and resources into the park system to  
5 protect threatened species, preserve habitat, and retain migration corridors that  
6 are unique and important to local wildlife.  
7

### 8 **Wildlife habitat**

9 a: Identify and conserve critical wildlife habitat including nesting sites, foraging  
10 areas, and migration corridors within or adjacent to natural areas, open spaces,  
11 and the developed urban area.  
12

13 b: Preserve especially sensitive habitat sites that support threatened species and  
14 urban wildlife habitat - such as the shoreline areas along the Little Squalicum,  
15 Squalicum, Whatcom, and Padden Creeks.  
16

### 17 **Natural areas**

18 a: Preserve and protect significant environmental features including unique  
19 wetlands, open spaces, woodlands, shorelines, waterfronts and other  
20 characteristics that support wildlife and reflect Bellingham's resource heritage –  
21 such as Lake Padden and Lake Whatcom.  
22

23 b: Provide public access to environmentally sensitive areas and sites that are  
24 especially unique to the Bellingham area - such as Chuckanut Bay.  
25

## 26 **8.2 Open spaces and preserves**

27 Develop a high quality, diversified park system that preserves and enhances  
28 significant environmental resources and features.  
29

### 30 **Open spaces**

31 a: Define and conserve a system of open space corridors or separators to  
32 provide definition between natural areas and urban land uses within the  
33 Bellingham developing area – such as Connelly Creek Nature Area.  
34

35 b: Increase natural area and open space linkages within the developed area,  
36 particularly along the BNSF Railroad and I-5 Interstate corridors.  
37

38 c: Preserve environmentally sensitive areas as natural area linkages and urban  
39 separators, particularly the Whatcom, Padden, and Squalicum Creeks corridors.  
40 (Bellingham Comprehensive Plan. Chapter 7, Parks, Recreation and Open Space)  
41

## 42 **Bellingham Comprehensive Plan. Chapter 7, Parks, Recreation and Open Space** 43 **(2005 Parks, Recreation and Open Space Plan; Chapter 9, Plan Elements; Resource** 44 **Conservancies;)** 45

46 Vision: As described herein, wildlife habitat and resource conservancies may be realized  
47 through:  
48

- 49 • Acquisition of title and/or development rights of habitat lands - that would  
50 otherwise be developed for other land uses;

# Restoration Plan

- Provision for public access and interpretive use - which would not be possible if the lands remained in private ownership; and
- Conservation for wildlife migration corridors - through developing urban areas and neighborhoods.

The RP priority goals and objectives are also intended to be consistent with the 'Preservation / Enhancement Opportunities' specified within each reach in the 2004 City of Bellingham Shoreline Characterization. (APPENDIX C)

Ultimately, the City's foundational goal is to be able to show that there has been a net overall gain in shoreline ecological function – whether through restoration planning and implementation or via SMP policies and development regulations.

**Characterizing the variety of goals and visions stated above into three basic priority goals for restoration city-wide, they would be:**

1. Improve water quality
2. Re-establish and restore natural shoreline processes, restore degraded and lost habitat, and wildlife corridors,
3. Improve connectivity of the shoreline environments to one another and to adjacent habitat corridors and/or habitat blocks that support priority species and species of local significance.

---

**Objectives identify specific measurable actions that can be taken to achieve the stated goals. For example, to meet the goal of improving water quality, an objective might be to remove creosote pilings. The following objectives have been developed to achieve the restoration priority goals:**

1. Restore and protect habitat forming processes.
2. Restore and protect wildlife corridors.
3. Restore and protect native vegetation and native species.
4. Restore and protect wetlands and salt marsh habitat.
5. Remove intertidal fill, creosote contaminated logs, pilings and debris.
6. Remove or improve fish passage barriers.
7. Increase Large Woody debris availability and recruitment opportunities.
8. Manage and treat stormwater to improve water quality, decrease peak flow events, and increase implementation of LID practices.
9. Perform voluntary and/or State mandated remediation of contaminated sediments in aquatic and upland environments.
10. Purchase development rights on undeveloped tracts / blocks that are abutting critical areas in order to manage water quality and the land as fish and wildlife habitat conservation areas.
11. Purchase conservation easements that stipulate no development and allow public access for recreation, if compatible with the land.
12. Purchase right-of-first-refusal on property that includes important habitat; if acquired, consider a minimal development scheme to help cover the cost of acquisition while maintaining the ecological integrity of the property.

# Restoration Plan

1  
2 These objectives assist with defining actions or projects to restore the natural processes and  
3 ecological functions identified in the Characterization Report as ‘not properly functioning.’  
4

5 Opportunities and strategies are then identified as means of implementing the objectives. At this  
6 level, no measurable performance standards are applied to goals. For example, the overall goal  
7 is to improve water quality to meet the vision of a restored ecosystem, not to improve it by "X"  
8 amount. Individual restoration projects that may be implemented as part of this plan are  
9 expected to include specific measurable goals.  
10

11 In accordance with the DOE shoreline guidelines, it is also valuable to establish general  
12 priorities. Restoring environmental processes (such as hydrology) provides the foundation for  
13 habitat structures (i.e., Large Woody Debris and back or side channels, braided channels), and  
14 that structure in turn, supports habitat functions. (i.e., production, food support, rearing, etc.)  
15 (Thom. 2003) That is, restoration of habitat functions may be ineffective if habitat structures and  
16 controlling factors are not also restored. While Thom states, “There is no universally accepted  
17 method for setting priorities for nearshore sites for restoration or for determining what strategies  
18 are best applied to each site. We have found that restoration of controlling factors is the key to  
19 successful and long-term restoration.” General priorities for shoreline management could follow  
20 mitigation sequencing, specified in the 4-26-07 DRAFT SMP; Section 22.08.100. That is,  
21 conservation and preservation should be the highest priority, followed by avoidance, followed by  
22 restoration, then enhancement and monitoring.  
23

24 Overall priority should be given to protection and restoration of natural processes that are  
25 needed to support habitat structure and habitat functions.  
26

27 Thorough scientific evaluation and prioritization of all restoration opportunities was not feasible  
28 for this SMP. However, Bellingham can work with local and regional agencies and scientists to  
29 help identify restoration of the greatest importance according to scientific criteria.  
30

31 Ultimately, priorities will be opportunistic based on site access, available funding, and feasibility.  
32 Of the restoration opportunities listed, stormwater system improvements to address untreated  
33 stormwater outfalls may be the most readily feasible for the City due to public control of the  
34 system, a dedicated funding sources and the need to also address clean water planning  
35 requirements to meet EPA standards.  
36

37 Table 1, below, shows the relationship of the goals, objectives, restored natural processes,  
38 ecological functions and how those improvements might be measured. Table 1 is not meant to  
39 be an exhaustive list and does not prohibit other meaningful objectives from being pursued. The  
40 first column shows the goals, the second column shows the objectives associated with those  
41 goals and the third column shows the natural process and ecological function that will be  
42 enhanced by completing the objectives. Objectives are found under multiple goals affecting  
43 different natural processes and ecological functions. Potential metrics for measuring and  
44 monitoring each objective are listed in the far right hand column. Opportunities for  
45 implementation are listed in Table 2 in the next section.  
46

# Restoration Plan

**Table 1: Restoration Goals and Objectives**

Restoration Goal	Objective	Restored Natural Process	Ecological Function	Potential Metrics
<b>Improve water quality</b>	Implement the TMDL Response Plan for Lake Whatcom	Minimize pollutant loading (phos & fecals) to Lake Whatcom. Re-introduce clean water to Lake.	Increase dissolved oxygen and reduce bacteria	De-listing of water-body pursuant to 303 (d) list; Federal Clean Water Act
	Protect and restore wetlands and salt marsh habitat	Hydrologic Processes, Sediment Transport, Nutrients	Spawning rearing habitat area created	water quality measurements
			Water Storage	Wetland acreage
			Sediment Storage	Wetland functions
	Manage and treat stormwater to improve water quality, decrease peak flow events, increase implementation of LID practices	Hydrologic Processes, Sediment Transport, Nutrients	Toxic Compound Removal Nutrient Removal	Wetland ratings Water quality measurements
			Water Storage	
Sediment Storage Toxic Compound Removal			Water quality measurements Storm flows	



## Restoration Plan

	Protect and restore native vegetation and native species	Hydrologic Processes, Nutrients	Nutrient Removal Water Storage	% impervious surface in basin
			Sediment Storage Toxic Compound Removal Nutrient Removal Water Storage	Acreage of vegetation Water quality measurements
	Remove intertidal fill/restore beach deposits and processes	Sediment Transport		Acreage or number of restored/remaining impaired areas
			Sediment Storage	
	Perform voluntary and / or State mandated remediation of contaminated sediments in aquatic and upland environments. Sediment Transport	Hydrologic Processes; in-water and ground-water	Nutrient Removal Toxic Compound Removal	Linear feet of bulkhead Cubic yards of material removed
Remove/replace creosote contaminated logs, pilings and debris		Toxic Compound Removal, Support Vegetation	# creosote pilings	
<b>Restoration Goal</b>	<b>Objective</b>	<b>Natural Process</b>	<b>Ecological Function</b>	<b>Potential Metrics</b>

# Restoration Plan

<p><b>Re-establish and restore shoreline ecological function and processes AND restore degraded and lost habitat and corridors.</b></p>	<p>Protect and restore habitat forming processes, wildlife corridors, native vegetation and species.</p>	<p>Sediment Transport</p>	<p>Large Woody Debris Recruitment</p>	<p>Acreage of vegetation</p>
	<p>Protect and restore wetlands salt marsh habitat, and estuarine and lagoon functions</p>	<p>Sediment Transport</p>	<p>Organic Material</p>	<p>Wetland functions</p>
		<p>Vegetation</p>	<p>Organic Material Availability</p>	<p>Degree of diversity</p>
		<p>Nutrients</p>	<p>Rearing Habitat</p>	<p>Species supported</p>
		<p>Habitat</p>	<p>Resting Habitat</p>	<p>Connectivity/areas of isolation</p>
			<p>Predation Avoidance Habitat Migration Corridors Food Production Food Delivery Support Vegetation Support Vegetation</p>	<p>Extent of tree canopy</p>
		<p>Hydrologic Processes</p>		<p>Wetland acreage</p>

# Restoration Plan

		Vegetation Nutrients Habitat	Availability Rearing Habitat Resting Habitat Predation Avoidance Habitat Migration Corridors Food Production Food Delivery Support Vegetation	Wetland ratings
	Manage and treat stormwater to improve water quality, decrease peak flow events, increase implementation of LID practices	Sediment Transport		Acreage or number of restored/remaining impaired areas
		Vegetation Nutrients Habitat	Woody Debris Recruitment Organic Material Availability Rearing Habitat Resting Habitat Predation Avoidance Habitat Migration Corridors Food Production	

## Restoration Plan

	Manage and treat stormwater to improve water quality, decrease peak flow events, increase implementation of LID practices	Hydrologic Processes  Sediment Transport Nutrients	Food Delivery  Water Storage  Sediment Storage Toxic compound removal Nutrient Removal	Water quality measurements
<b>Restoration Goal</b>	<b>Objective</b>	<b>Natural Process</b>	<b>Ecological Function</b>	<b>Potential Metrics</b>
<b>Improve connectivity of the shoreline environments to one another and to adjacent habitat corridors and/or habitat blocks that support priority</b>	Purchase development rights on undeveloped properties, conservation easements and right-of-first refusal on properties identified for serving important habitat functions		Allows subject properties to remain undisturbed and foster strategic connection of habitat corridors and blocks.	

# Restoration Plan

species and species of local significance.				
	Protect and restore native vegetation and native species	Hydrologic Processes Sediment Transport Vegetation Nutrients Habitat	Woody Debris Recruitment Organic Material Availability Rearing Habitat Resting Habitat Predation Avoidance Habitat Migration Corridors Food Production Food Delivery Support Vegetation	Acreage of vegetation Connectivity/areas of isolation Extent of tree canopy Linear feet of bulkhead
	Protect and restore wetlands, salt marsh habitat and estuarine and lagoon functions	Hydrologic Processes Sediment Transport Vegetation	Woody Debris Recruitment Organic Material Availability	Wetland acreage Wetland functions Wetland ratings

# Restoration Plan

	<p>Remove intertidal fill/ restore beach deposits and processes</p>	Nutrients	Rearing Habitat	Connectivity/areas of isolation
		Habitat	Resting Habitat Predation Avoidance Habitat Migration Corridors Food Production Food Delivery	
		Hydrologic Processes	Support Vegetation	acreage of restored remaining impaired acres
		Sediment Transport	Woody Debris Recruitment	
		Vegetation	Organic Material Availability	shoreline connectivity/areas of interruption
	Nutrients	Rearing Habitat		
	Habitat	Resting Habitat Predation Avoidance Habitat Migration Corridors Food Production Food Delivery		

# Restoration Plan

## 5. Restoration Implementation Strategies and Opportunities

Restoration implementation strategies are adopted or identified programs and/or plans that help achieve the Restoration Plan priority goals from Section 4 which were:

1. Improve water quality
2. Re-establish and restore natural shoreline processes, restore degraded and lost habitat, and wildlife corridors,
3. Improve connectivity of the shoreline environments to one another and to adjacent habitat corridors and/or habitat blocks that support priority species and species of local significance.

These implementation strategies should include at least one of the objectives from Section 4, which were:

1. Restore and protect habitat forming processes.
2. Restore and protect wildlife corridors.
3. Restore and protect native vegetation and native species.
4. Restore and protect wetlands and salt marsh habitat.
5. Remove intertidal fill, creosote contaminated logs, pilings and debris.
6. Remove or improve fish passage barriers.
7. Increase Large Woody debris availability and recruitment opportunities.
8. Manage and treat stormwater to improve water quality, decrease peak flow events, and increase implementation of LID practices.
9. Perform voluntary and/or State mandated remediation of contaminated sediments in aquatic and upland environments.
10. Purchase development rights on undeveloped tracts / blocks that are abutting critical areas in order to manage water quality and the land as fish and wildlife habitat conservation areas.
11. Purchase conservation easements that stipulate no development and allow limited public access for recreation, if compatible with the land.
12. Purchase right-of-first-refusal on property that includes important habitat; if acquired, consider a minimal development scheme to help cover the cost of acquisition while maintaining the ecological integrity of the property.

The City has restoration implementation strategies that are currently in place and existing plans and programs that are being updated. These strategies are not usually regulatory provisions found within Bellingham's Municipal Code. (BMC) Typically, they are developed in a comprehensive planning effort and result in a set of recommended strategies developed by a technical team comprised of those that have expertise or experience with the relevant topic.

What follows is an up-to-date summary, although not exhaustive, of restoration implementation strategies that the City is currently involved in order to achieve the Priority Goals.

# Restoration Plan

1 **“TMDL Response Plan” by City of Bellingham and Whatcom County.**

2 This Plan is currently being developed by the City of Bellingham and Whatcom County  
3 and is anticipated to have a draft completed for City / County Council review mid 2010.

4  
5 **“City of Bellingham Wildlife Habitat Assessment” by Nahkeetah Northwest  
6 Wildlife Services, December 2003, and as amended.**

7 In cases where the City (and in cooperation with the County, Water District #10 and  
8 other applicable agencies including non-profit organizations) intend to take action  
9 relevant to Priority Goal #3 and Objectives 10-12, from above, the ‘City of Bellingham  
10 Wildlife Habitat Assessment’ should be consulted and it’s management  
11 recommendations implemented whenever feasible and practical.

12  
13 **“Stream Habitat Restoration Guidelines” prepared for the Washington State  
14 Aquatic Habitat Guidelines Program, 2004.**

15 This document provides uses with a comprehensive list of watershed scale factors and  
16 criteria to consider which are crucial to make informed decisions when planning and  
17 designing stream restoration and rehabilitation projects. Factors and criteria include:

- 18  
19 Site, reach and watershed assessments  
20 Problem identification  
21 Identifying and selecting an approach  
22 General approaches to solving common restoration objectives  
23 Stream and riparian restoration techniques

24  
25 Watershed processes and conditions that shape stream channels, stream ecology,  
26 geomorphology, hydrology, hydraulics, planting considerations and erosion control and  
27 construction considerations are also presented in this document.

28  
29 City staff should consult this manual as part of their planning and design for restoration  
30 projects. Private restoration projects should be informed of this document and utilize it  
31 when conducting required or voluntary habitat restoration.

32  
33 Private property owners should also explore opportunities for enrollment in the Open  
34 Space Taxation Program as specified in RCW 84.34 and WAC 448-30 in order to satisfy  
35 Objectives 10-12. The basics of this program can be found on Whatcom County’s  
36 webpage under the “Assessor” sub-category.

37  
38 **Lake Whatcom Management Program. WEBSITE: [lakewhatcom.wsu.edu](http://lakewhatcom.wsu.edu)**

39 This program has been developed by the legislative bodies, a management team, the  
40 Inter-jurisdictional Coordinating Team, agency staff, and advisory committees from The City  
41 of Bellingham, Whatcom County and Water District 10. The initial piece of legislation  
42 that jumpstarted these efforts was the Joint Resolution that was adopted by the City of  
43 Bellingham, Whatcom County, and Water District 10 in 1992; Joint Resolution Whatcom County  
44 92-73, Bellingham No. 92-69, District No. 560.

45  
46 The goals within this Resolution are as follows:  
47



# Restoration Plan

- 1 • To recognize Lake Whatcom and its watershed as the major drinking-water reservoir  
2 for the County and develop public and private management principles for the lake  
3 and watershed consistent with a drinking water reservoir environment. Affirm this  
4 goal by establishing the name: Lake Whatcom Reservoir.
- 5 • To protect, preserve and enhance water quality and manage water quantity to  
6 ensure long-term sustainable supplies for a variety of uses, with priority placed on  
7 domestic water supply. Management programs and actions will be made in  
8 recognition of existing contractual agreements and potential for review and  
9 renegotiation in light of these goals.
- 10 • To prioritize protection over treatment in managing Lake Whatcom and its  
11 watersheds. Management actions shall reflect a long-term view of replacement or  
12 treatment costs.
- 13 • To manage water quantity to sustain long-term efficient use of the water for  
14 beneficial uses within the county that are consistent with a drinking-water reservoir,  
15 and recognize the integral link with the Nooksack River and associated water  
16 resource concerns.
- 17 • To ensure that opportunities for public comment and participation are provided in  
18 policy and management program development, and to promote public awareness  
19 and responsible individual actions.
- 20 • To promote learning, research, and information opportunities which better our  
21 understanding of the watershed system, the impacts of activities, and the benefits  
22 and potentials of policies implemented.

23  
24 (This program is an implementing strategy of Priority Goal #1, Objective #8)

## 25 26 **Lake Whatcom Watershed Property Acquisition Program; Public Works** 27 **Department.**

28 This program is funded through water usage fees and its main objective is to protect our  
29 drinking water source by purchasing tracts of undeveloped land within the Lake  
30 Whatcom Watershed. This essentially removes a certain density or, number of units  
31 from the development folio within the watershed. The City places a higher importance  
32 on parcels that are contiguous to already protected lands or contain sensitive  
33 environmental features such as tributaries to the Lake. This program also helps to  
34 protect parcels by utilizing conservation easements or restrictive covenants.

35  
36 Whatcom County, Water District #10 and Sudden Valley Community Association are  
37 also instrumental in this program to protect our drinking water source.

38  
39 At the time of this publication the program has protected approximately 1,340 acres and  
40 eliminated about 660 developable units from impacting the watershed. This program is  
41 expected to continue long into the future in order to protect the Lake Whatcom  
42 Reservoir.

43  
44 (The total amount of acres preserved in the Lake Whatcom watershed as of this printing  
45 by a variety of agencies including the Whatcom Land Trust, the City and County Park

# Restoration Plan

1 Departments and the Department of Natural Resource is 2,519. (This program is an  
2 implementing strategy of Priority Goals #1-3, Objectives #10-12)

## 3 4 5 **Urban Streams Monitoring by City of Bellingham Public Works Department and** 6 **TMDL study's in coordination with Department of Ecology.**

7 This program, initiated in 1990, was developed and designed to provide water quality  
8 data for all the City's urban streams in order to measure compliance with the State's  
9 surface water quality standards specified in WAC 173-201. For example, within the  
10 streams, the City monitors the following parameters: temperature, fecal coliform,  
11 dissolved oxygen, pH, turbidity and conductivity. This program is not regulatory and  
12 does not provide management recommendations.

13  
14 When a stream (or any water of the state) exceeds water quality thresholds, the  
15 Department of Ecology in coordination with the applicable jurisdiction, initiates a water  
16 cleanup plan or 'TMDL.' (Total Maximum Daily Load) These water clean up plans  
17 describe the type, amount and sources of water pollution in a particular water body, they  
18 analyze how much the pollution needs to be reduced or eliminated to meet water quality  
19 standards and they provide targets and strategies to control the pollution. (This program  
20 is an implementing strategy of Priority Goal #1, Objective #8)

## 21 22 **Update of the City's 1995 Watershed Master Plan (Ongoing)**

23 The update of this plan is being conducted by the City's Public Works Department and  
24 is anticipated to be complete in July; 2007. This plan will include hydrologic simulation of  
25 different flow patterns and intensities within the City's streams and floodplains and  
26 ultimately, create a basis for basin or, watershed planning. This planning will assist the  
27 City anticipate impacts from flooding and high flows, delineate areas within basins for  
28 future build-out and identify restoration opportunities and capital improvement projects  
29 that will restore shoreline ecological functions and processes. This plan will not be a  
30 regulatory document but will provide management recommendations in order to achieve  
31 its objectives. (This plan is an implementing strategy of Priority Goal # 2, Objective #'s 1-4,  
32 6-8 and 10)

## 33 34 **Nooksack Salmon Enhancement Association Strategic Plan. WEBSITE: [n-sea.org](http://n-sea.org)**

35 Nooksack Salmon Enhancement Association (NSEA) is a community-based nonprofit  
36 organization dedicated to restoring sustainable wild salmon runs in Whatcom County.  
37 Their Strategic Plan from October, 2005 has ten goals aimed at achieving their mission.  
38 Paraphrased, these are:

- 39 1. Enhance, rehabilitate and restore critical salmonid habitat.
- 40 2. Evaluate NSEA's salmonid restoration activities through implementation,  
41 effectiveness and validation monitoring.
- 42 3. Develop partnerships with landowners to identify and implement salmonid  
43 recovery projects.

# Restoration Plan

- 1 4. Implement watershed based stewardship programs that integrate education with
- 2 restoration outreach.
- 3 5. Develop and implement education programs for elementary through post-
- 4 secondary level students.
- 5 6. Develop community awareness of NSEA.
- 6 7. Maintain NSEA's focus and identity as a community based nonprofit.
- 7 8. Integrate and empower volunteers to assist NSEA in all parts of its mission.
- 8 9. Strengthen internal structure to support effective and efficient operations.
- 9 10. Maintain a diverse, stable and predictable funding base and strong financial
- 10 resources and reserves.

11 NSEA has recently expanded their focus to partner with the Washington State  
12 Department of Fish and Wildlife in order to develop the 'Lake Whatcom Native Salmon  
13 and Trout Conservation and Recovery Plan.' This plan targets the recovery of native  
14 salmonids in Lake Whatcom including kokanee and cutthroat trout. With the cooperation  
15 from the City of Bellingham, Whatcom County and Water District #10, this plan will  
16 support the restoration and conservation efforts necessary to recover these fish  
17 populations. (This plan is an implementing strategy of Priority Goal #2 and #3, Objective  
18 #'s 1-4, 6-8, 10)

19  
20 **October 10, 2006 Draft Supplemental EIS: Bellingham Bay Comprehensive**  
21 **Strategy – APPENDIX A and the Habitat Restoration Documentation Report.**  
22 The Bellingham Bay Comprehensive Strategy (CS) was developed by the Bellingham  
23 Bay Demonstration Pilot Project team as a supplement to the original EIS (October  
24 2000) for the Whatcom Waterway Cleanup Site. This CS was a bay-wide approach to  
25 planning and included 8 sub-areas; each with its own recommended strategy, a  
26 description of anticipated land uses, habitat restoration opportunities and potential  
27 sediment sites, cleanup, disposal and source control issues.

28  
29 The anticipated land uses and habitat restoration opportunities in the CS was the basis  
30 for more detailed work developed by the Habitat Subcommittee, (a sub-group of the  
31 Pilot Team) the Waterfront Futures Group, and an interagency workshop that created  
32 the "Opportunities and Ideas for Habitat Restoration and Water Access on Urban  
33 Bellingham Bay" in January, 2004 as part of the Waterfront Futures Group's planning  
34 efforts.

35  
36 The overall goal of the Habitat Restoration Documentation Report (February, 1999) is to  
37 'Maximize Bellingham Bay habitat productivity to the extent possible.' The objectives  
38 developed to achieve this goal are listed below – some of which are condensed and  
39 captured in TABLE 2:

- 40
- 41 ⇒ Containing or removing shoreline landfills.
- 42 ⇒ Maximizing shoreline riparian vegetation.
- 43 ⇒ To the extent possible achieving a net gain in in-water habitat, saltmarsh, and
- 44 marine buffer.

# Restoration Plan

- 1 ⇒ Providing habitat connectivity.
- 2 ⇒ Restoring the viable estuaries known to support a variety of species.
- 3 ⇒ Removing remnant in-water structures.
- 4 ⇒ Removing historic shoreline fills.
- 5 ⇒ Removing or replacing creosote treated timber piles.
- 6 ⇒ Identifying opportunities for restoration that would not necessarily be associated
- 7 with compensatory mitigation.
- 8 ⇒ Restore historical eelgrass beds. (Zostera Marina)
- 9 ⇒ Modify substrates.
- 10 ⇒ Create shallow water habitat by modifying elevations.
- 11 ⇒ Establishing habitat reserve areas in areas where certain habitats are difficult to
- 12 replace and/or that support multiple species and/or multiple life history stages for
- 13 a variety of species.

14

15 The Bellingham Bay Action Team remains active in identifying ways in which the habitat  
16 restoration opportunities specified in the plans specified above and those within TABLE  
17 3 can be implemented. (This plan is an implementing strategy of Priority Goal #1-3,  
18 Objective #'s 1-9)

19

## 20 **Master Restoration Plan (MRP): City's Environmental Resources Division of** 21 **Public Works. (Ongoing)**

22 In 2007, the City's Environmental Resources Division of the Public Works Department  
23 will be retaining a consultant to begin developing a restoration master plan which will  
24 identify priority restoration projects based on the foundation laid by this Restoration  
25 Plan. This work can be added to TABLE 3 without having to amend the RP via the SMP  
26 Amendment process outlines in BMC Section 22.07.20.

27

## 28 **Residential Stormwater Retrofit Project (RSRP): City's Environmental Resources** 29 **Division of Public Works.**

30

31 This project makes it easy for single family home owners within the Lake Whatcom  
32 watershed to voluntarily retrofit or install SFR stormwater treatment systems.

33

## 34 **Whatcom County's Shoreline Master Program Update – Background Information,** 35 **Volume III; Restoration Plan**

36 The County's Restoration Plan has three watersheds that overlap into City Jurisdiction.  
37 These are the Squalicum Creek, Lake Whatcom and Bellingham Bay watersheds.

38

39 The portion of the Squalicum Creek watershed that is within the County is not  
40 considered a shoreline of the state (does not have adequate flow) but nonetheless is a  
41 critical area. These upper reaches have restoration potential that can affect the  
42 shoreline ecological function of the portion of Squalicum Creek that is within the City  
43 limits and Shoreline jurisdiction. (Please see Section 4.2.1 of the County's Restoration  
44 Plan.)

45

# Restoration Plan

1 Lake Whatcom is jointly managed by Whatcom County, the City and Water District #10.  
2 The County is responsible for the nearly all of the Lake's tributaries through their CAO,  
3 SMP and other applicable development regulations. The County also references the  
4 Lake Whatcom Management Program in their Restoration Plan as the main body of  
5 work utilized as a guide for improving the ecological function of that water-body over  
6 time. (Please see Section 4.2.2 of the County's Restoration Plan.)  
7

8 The City and the County restore through a variety of existing programs whenever  
9 feasible within the many watersheds that contribute to Bellingham Bay. Specifically, the  
10 County's Restoration Plan identifies those shorelines within Bellingham Bay proper that  
11 are not within the city limits. These are shorelines south of Chuckanut Bay and the  
12 shoreline north of Mount Baker Plywood also known as Fort Bellingham and around to  
13 the southern end of Lummi Shore. (Please see Section 4.2.3 of the County's  
14 Restoration Plan.)  
15

16 Implementation strategies are mostly dependent upon available funding and individuals  
17 and/or groups to perform the work. The three groups with the strongest funding sources  
18 and most commonly performing restoration work city-wide are; the Washington  
19 Conservation Crew, Greenways and the Nooksack Salmon Enhancement Association.  
20 The City of Bellingham and Whatcom County are also involved in seeking funding and  
21 resources and in some cases overlap with one another and the non-profit groups  
22 specified above. (There are many other smaller groups and organizations that perform  
23 important restoration work city-wide) Given this, there are other determining factors for  
24 implementation of restoration projects. These implementation strategies listed above do  
25 not account for the many other Federal, State and local agencies that have either  
26 developed or are creating new comprehensive restoration plans and programs for local  
27 accessibility and utilization. These agencies include but are not limited to;  
28

29 Puget Sound Action Team  
30 Puget Sound Nearshore Restoration Partnership  
31 Department of Ecology  
32 Department of Natural Resources  
33 Department of Fish and Wildlife  
34 Marine Resources Committee  
35 Nooksack Salmon Enhancement Association  
36 Lummi and Nooksack Tribes  
37 Nooksack Recovery Team  
38 Northwest Indian College  
39 Public Utility District #1  
40

41 Restoration opportunities are abundant in every habitat type, whether within freshwater,  
42 within the marine nearshore or within an estuarine environment. Examples at various  
43 scales include; marine and tidal freshwater marshes; freshwater river and stream  
44 corridors; unvegetated tidal flats; pocket estuaries; pocket beaches; forested and  
45 unforested wetlands; eelgrass meadows; kelp beds; shellfish beds; and rocky and  
46 gravel shorelines. (Diedenderer 2003)

# Restoration Plan

1  
2 Innumerable local projects exist. Several large-scale restoration projects, each of which  
3 encompasses multiple habitats, have also been initiated in Bellingham in recent years.  
4 For example: Whatcom Creek estuary/Holly Street Landfill, Post Point Lagoon, GP Log  
5 Pond and various reaches of our urban stream corridors.  
6

7 It is becoming increasingly clear that the estuaries and nearshore areas of the Pacific  
8 Northwest provide critical feeding and rearing habitat for salmon populations.  
9 (Simenstad and Cordell 2000; Williams *et al.* 2001) Salmon restoration efforts, once  
10 highly focused in the watersheds where salmon spawn, are now emphasizing the  
11 estuary and nearshore. (Diedenderer 2003).  
12

13 Sustainable development necessitates that restoration projects be considered in a  
14 landscape context. External influences may affect the performance of restored coastal  
15 ecosystems, even as changes brought about by restoration affect surrounding areas.  
16

17 Site-specific evaluation of the landscape in the planning phase of a restoration project is  
18 critical. Attributes such as size, shape, configuration, and connectedness dramatically  
19 affect the net functional habitat provided by a restoration project.  
20

21 For sustainable development to succeed, the goal today must not be simple  
22 maintenance of the status quo, but a net improvement of the ecosystem. Urban  
23 ecosystems are shrinking or experiencing diminished functionality (Field 1998; Fonseca  
24 *et al.* 1998; Thayer 1992; Turgeon *et al.* 2002). The NRC (2001) has shown that the no  
25 net loss policy for wetlands is not working. Simply put, we have failed to constrain  
26 development to minimize damage; we do not compensate for damages immediately so  
27 as to offset any losses; and we do not have a high degree of predictability in the  
28 outcome of restoration efforts. This means that the size, quality, location, and viability of  
29 a restoration project meant to compensate for development must overwhelmingly and  
30 obviously compensate for the expected losses. This approach provides a cushion to  
31 account for uncertainties in the ability of combined conservation and restoration efforts  
32 to meet their goals. As the level of experience, body of knowledge, and record of  
33 success increases, the level of uncertainty decreases along with the magnitude of effort  
34 required to compensate for uncertainty (Diedenderer 2003).  
35

36 Below are examples from Fidalgo Bay, Washington for ecological evaluation criteria for  
37 use in selecting restoration sites (Borde et al., 2004).  
38

- 39 - Feasibility
- 40 - Opportunity to improve ecosystem function
- 41 - Site protection
- 42 - Potential for sediment deposition/transport processes to support sustained
- 43 function
- 44 - Potential to benefit threatened and endangered species
- 45 - Probability of success
- 46 - Habitat connectivity

# Restoration Plan

- 1           - Restore or replace limited habitat
- 2           - Sustainability of habitat functions
- 3           - Type of habitat replacement
- 4           - Timing of implementation

5

6 Table 2 identifies opportunities for each shoreline segment that have been identified in  
7 the 2004 City of Bellingham Shoreline Characterization and through other shoreline  
8 planning processes. These are opportunities for restoration that correspond to the RP  
9 goals and objectives.

10

11 This is an extensive list that likely exceeds near term funding opportunities, and yet, is  
12 not exhaustive. Additional restoration opportunities may continue to be identified  
13 through local and regional shoreline monitoring and planning actions. The City may  
14 periodically identify additional restoration opportunities that are consistent with the  
15 objectives of this restoration chapter.

16

17 Restoration projects are most viable when they occur on publicly owned properties or  
18 properties that are dedicated to the City specifically for restoration purposes.  
19 Restoration projects on publicly owned properties allow for more extensive and  
20 complete projects to be designed and implemented.

21

22 Restoration projects on private property where access for said restoration has been  
23 granted via an access or conservation easement is becoming more common as those  
24 properties become more economically feasible to develop. Conservation easements are  
25 typically granted by private landowners across required buffer areas as a result of a  
26 development project. Access easements for restoration projects are typically granted by  
27 cooperative private landowners at the request of the City.

28

29

30

## Restoration Plan

**Table 2 : Restoration Opportunities and Objectives**

Restoration Opportunity	Restoration Objective	Restoration Activity	Monitoring Activities
<b>Lake Whatcom</b>			
<p>1. Improve water quality                  2. Restore and re-establish natural shoreline processes                  3. Promote activities that support priority species and species of local significance.</p>	<p>Manage and treat stormwater, decrease peak flow events and increase implementation of LID practices. Restore habitat forming processes. Remove nearshore fill, bulkheads, dilapidated pilings and debris.</p>	<p>1. Implementation of the TMDL Response Plan as well as the Interjurisdictional Coordinating Team recommendations; 2010-2014 Lake Whatcom work plan tasks.                  2. 1992 Adopted Goals and Policies Joint Resolution Whatcom County 92-73, City of Bellingham No. 92-69 , Lake Whatcom Water and Sewer District No. 560                  3. Single family home stormwater retrofit program. (upcoming)</p>	<p>Ongoing monitoring conducted in a variety of ways by; City of Bellingham Public Works and Environmental Resources Departments, Whatcom County Public Works Department, Water District 10, WRIA 1 Team, DOE via the TMDL Study, other non-profits, home owners and residents within the watershed and the City and Whatcom County Councils.</p>
<b>Marine Shorelines</b>	.	.	



## Restoration Plan

1. Treat stormwater entering Bellingham Bay from developed areas	Manage and treat stormwater to improve water quality.	Ongoing implementation of the 2005 Stormwater Management Manual for Puget Sound and LID site development practices	No ongoing monitoring identified
		Stormwater system improvements as street improvements are constructed	
2. Remove or replace creosote piles whenever possible to eliminate bioaccumulation of contaminants in marine ecosystem, including old ferry dock pilings and within boat marinas.	Remove intertidal fill, creosote contaminated logs, pilings and debris.	Some Creosote removal completed on beaches only. No other ongoing activity identified.	No ongoing monitoring identified
3. Restore eel grass beds where possible	Protect and/or restore native vegetation and native species.	Marine Park and Post Point Lagoon projects (Port and GP site?)	Long-term monitoring is associated with the specific project
4. Nourishment of pocket beaches	Protect and/or restore habitat forming processes.	No ongoing activity identified	No ongoing monitoring identified
5. Remove and reduce shoreline armoring along marine shoreline. Remove existing shoreline armoring as opportunities allow.	Remove intertidal fill & restore beach deposits and processes.	No ongoing activity identified	create GIS map of existing conditions

## Restoration Plan

6. Remove/reduce impact of artificial night-lighting effects to intertidal habitat	Protect and restore wildlife corridors.	No ongoing activity identified	No ongoing monitoring identified
7. Provide fixed anchor buoys to avoid transient boat anchorage damage to eelgrass	Protect and/or restore native vegetation and native species.	No ongoing activity identified	No ongoing monitoring identified
8. Restore native marine riparian vegetation where possible	Protect and/or restore habitat forming processes AND protect / restore native vegetation and species.	Post point Lagoon restoration	aerial photographs and 2005 Post Point Lagoon assessment
9. Remove or restore derelict and unused in or over-water structures	Remove intertidal fill, creosote contaminated logs, pilings and debris.	No ongoing activity identified	No ongoing monitoring identified
10. Increase forage fish habitat in Bellingham Bay nearshore	Remove intertidal fill, creosote contaminated logs, pilings and debris.	No ongoing activity identified	No ongoing monitoring identified
11. Remove wood waste debris along shoreline at foot of Cliffside Drive.	Removal intertidal fill/restore beach deposits and processes.	Identified by PILOT team but has not yet been funded.	No ongoing monitoring identified
12. Protect and/or restore marine wetlands and salt marsh habitat	Protect and/or restore estuary habitat, wildlife corridors and habitat forming processes.	Post Point Lagoon restoration	annual monitoring of salt marsh area

## Restoration Plan

13. Remove riprap along the Eastern shoreline of Padden Creek lagoon	Protect and/or restore estuary habitat, wildlife corridors and habitat forming processes.	No ongoing activity identified	No ongoing monitoring identified
14. Consider opening marina breakwaters to allow juvenile salmon passage along the shallow nearshore habitats of the boat basin areas and allow increased tidal flushing	Protect and/or restore freshwater, nearshore and estuarine habitat forming processes and removal of fish passage barriers.	No ongoing activity identified	No ongoing monitoring identified
15. Protection or acquisition of marine nearshore property	Protect and/or restore estuary habitat, wildlife corridors and habitat forming processes	No ongoing activity identified	No ongoing monitoring identified
16. Increase wildlife habitat and ecological function in the seven pocket estuaries and lagoons in Bellingham Bay	Protect and/or restore estuary habitat, wildlife corridors and habitat forming processes	Post point Lagoon and Whatcom Creek Estuary restoration (COB), Squalicum Cr estuary (POB currently planning).	.
17. Restore and increase estuary habitat in Squalicum Creek estuary	Protect and/or restore estuary habitat, wildlife corridors and habitat forming processes	Removal creosote pilings, plant native vegetation, increase salt marsh habitat. (DNR)	No ongoing monitoring identified
18. Soften BNRR shoreline riprap, gabions, and ecoblocks	Remove intertidal fill/restore beach deposits and processes, sand spits and accretion	Discussions with BN Railroad	No ongoing monitoring identified

## Restoration Plan

	land forms		
19. Removal of invasive species	Protect and restore native species	Implemented on an as needed basis	No ongoing monitoring identified
20. Remediation of contaminated in-water sediments and subsequent habitat creation and restoration.	Create and restore habitat forming processes.	RI/FS released in October 2006. Final cleanup decision to be issued by DOE in 2007. Design - permit - implement 2008-?	Ongoing monitoring required by DOE
<b>All Creeks</b>			
<b>Restoration Opportunity</b>	<b>Restoration Objective</b>	<b>Restoration Activity</b>	<b>Monitoring Activities</b>
21. Provide incentives to encourage tree planting and retention along shorelines.	Protect /restore habitat and habitat forming processes and increase LWD availability and recruitment.	Washington Conservation Crew - managed by City's Environmental Resources Department is currently working on these types of restoration projects.	Regular maintenance is conducted until vegetation is established.
22. Encourage redevelopment to meet increased setbacks and restore site and shoreline vegetation.	Protect /restore habitat and habitat forming processes and increase LWD availability and recruitment.	No ongoing activity identified.	Aerial photographs.

## Restoration Plan

23. Homeowner education and encourage bulkhead and bank hardening removal where possible.	Protect /restore habitat and habitat forming processes and removal of in-water structure.	No ongoing activity identified.	Aerial photographs.
24. Homeowner education on benefits of vegetation retention.	Protect /restore habitat and habitat forming processes and increase in LWD availability and recruitment.	Backyard Sanctuary program, promotion of LID.	No ongoing monitoring identified.
25. Replant shoreline with native vegetation.	Protect and restore native vegetation	No ongoing activity identified.	No ongoing monitoring identified.
26. Removal of invasive species	Protect and restore native species	No ongoing activity identified.	No ongoing monitoring identified.
27. Protect and restore riverine wetlands and hydrologic connectivity.	Protect /restore habitat and habitat forming processes.	Discussions with BN Railroad.	No ongoing monitoring identified.
28. Treat and detain stormwater entering into shoreline areas from developed areas.	Manage and treat stormwater and wastewater to improve water quality, decrease peak flows and increase use of LID.	Ongoing implementation of the 2005 Stormwater Management Manual for Puget Sound and LID site development practices.	No ongoing monitoring identified.
		Stormwater system improvements as street improvements are constructed.	

## Restoration Plan

29. Remove/reduce impact of artificial night-lighting effects to aquatic habitat	Protect and/or restore aquatic habitat and wildlife corridors	No ongoing activity identified.	No ongoing monitoring identified.
<b>Squalicum Creek</b>			
<b>Restoration Opportunity</b>	<b>Restoration Objective</b>	<b>Restoration Activity</b>	<b>Monitoring Activities</b>
30. Minimize bank erosion and down-cutting in Squalicum Cr from Meridian St. to the mouth.	Increase LWD placement and recruitment opportunities, restore native riparian vegetation, decrease peak flow events, improve stormwater detention, and increase use of LID in development in Squalicum watershed.	Ongoing riparian restoration, implementation of 2005 stormwater manual and LID techniques; Lower Squalicum log jam project, Squalicum Spring Creek project, Bug Lake and Sunset Pond reroutes, preserve and increase side channel connectivity.	Ongoing vegetation monitoring and photo monitoring.
31. Minimize predation on salmonids by introduced warm water fish in Bug lake and Sunset Pond.	Protect and restore habitat corridors including aquatic corridors.	Create side channels around Bug Lake and Sunset Pond.	Monitor fish use. (Surveys and counts)
32. Improve upstream passage for returning salmon, especially in the upper reaches of Squalicum Creek.	Remove or improve existing fish passage barriers. Ensure all new stream crossings are fish passable	Culvert retrofit through Stormwater Utility.	2002 City wide Culvert Survey.

## Restoration Plan

<p>33. Improve quantity and quality of rearing and spawning habitat.</p>	<p>Increase LWD placement and recruitment opportunities, restore native riparian vegetation, decrease peak flow events, improve stormwater detention, and increase use of LID in development in Squalicum watershed.</p>	<p>Ongoing riparian restoration, implementation of 2005 stormwater manual and LID techniques; Lower Squalicum log jam project, Squalicum Spring Creek project, Bug Lake and Sunset Pond reroutes, preserve and increase side channel connectivity, preserve and restore stream buffer width.</p>	<p>Ongoing vegetation monitoring and photo monitoring smolt traps and spawner surveys.</p>
<p>34. Work with homeowners from West St to Meridian St. to restore native riparian vegetation and increase salmon habitat.</p>	<p>Protect /restore habitat and habitat forming processes.</p>	<p>Centennial Clean Water Fund (CCWF) 2005 grant to work with homeowners.</p>	<p>Ongoing vegetation monitoring and photo monitoring.</p>
<p>35. Protect and improve natural hydrologic regimes throughout Squalicum Creek</p>	<p>Improve water quality, protect /restore habitat and habitat forming processes.</p>	<p>Ongoing riparian restoration, implementation of the 2005 Stormwater Management Manual for Puget Sound and LID site development practices.</p>	<p>Squalicum Creek discharge gauge @ West Street.</p>

## Restoration Plan

36. Improve water quality, remove Squalicum Creek from 303(d) list	Improve water quality, Protect /restore habitat and habitat forming processes.	Ongoing riparian restoration, implementation of the 2005 Stormwater Management Manual for Puget Sound and LID site development practices.	Urban Streams Monitoring program, ongoing and conducted by Public Works facilities/plants. (Water treatment plants - Post Point and Whatcom Creek.)
<b>Whatcom Creek</b>			
Restoration Opportunity	Restoration Objective	Restoration Activity	Monitoring Activities
37. Decrease fecal coliform bacteria levels, decrease high temperature levels; remove Whatcom Creek from 303(d) list.	Improve water quality, Protect /restore habitat and habitat forming processes.	Ongoing riparian restoration, implementation of the 2005 Stormwater Management Manual for Puget Sound and LID site development practices, watershed education campaign.	Whatcom Creek Fecal Coliform and Temperature TMDL - ongoing - draft plans are presently under review by DOE.
38. Restore native shoreline vegetation between Electric Ave. and the Derby Pond within Whatcom Falls Park.	Improve water quality, Protect /restore habitat and habitat forming processes.		Whatcom Creek Fecal Coliform and Temperature TMDL, ongoing vegetation monitoring.
39. Preserve and restore Cemetery Creek wetland complex, especially hydrologic connectivity.	Improve water quality, Protect /restore habitat and habitat forming processes.	No ongoing activity identified.	No ongoing monitoring identified.



## Restoration Plan

40. Protect and improve natural hydrologic regimes throughout Whatcom Creek.	Improve water quality, Protect /restore habitat and habitat forming processes	Ongoing riparian restoration, implementation of the 2005 Stormwater Management Manual for Puget Sound and LID site development practices and the City of Bellingham Habitat Conservation Plan. (HCP)	Whatcom Creek discharge gauges @ Derby Pond and Dupont Street.
41. Decrease social trails and damage to bank vegetation in Whatcom Falls park especially near whirlpool and swimming areas.	Improve water quality, Protect /restore habitat and habitat forming processes, wildlife corridors.	No ongoing activity identified.	No ongoing monitoring identified.
42. Increase juvenile rearing and over-wintering habitat from Middle Falls to mouth.		Implement Cemetery Creek, Salmon Park and Red Tail reach restoration projects	vegetation monitoring, fish usage, photo points
43. Remove rock gabions and soften stream banks from I-5 to the mouth as redevelopment occurs	Protect /restore habitat and habitat forming processes.	No ongoing activity identified.	No ongoing monitoring identified.
44. Restore canopy cover to pre 1999 levels (Pre-Whatcom Creek Fire) from Middle Falls to I-5.	Improve water quality, Protect /restore habitat and habitat forming processes.	Ongoing riparian restoration.	Vegetation monitoring ongoing.

## Restoration Plan

45. Decrease water temperatures, remove Whatcom Creek from 303(d) list for the temperature parameter.	Improve water quality, Protect /restore habitat and habitat forming processes.	Ongoing riparian restoration, implementation of the 2005 Stormwater Management Manual for Puget Sound and LID site development practices, watershed education campaign.	Whatcom Creek Temperature TMDL.
46. Improve upstream passage for returning salmon.	Remove or improve existing fish passage barriers.	Culvert retrofit through City's Stormwater Utility.	2002 City wide Culvert Survey.
<b>Chuckanut Creek</b>			
<b>Restoration Opportunity</b>	<b>Restoration Objective</b>	<b>Restoration Activity</b>	<b>Monitoring Activities</b>
47. Protect and improve natural hydrologic regimes throughout Chuckanut Creek.	Improve water quality, Protect /restore habitat and habitat forming processes.	Ongoing riparian restoration, implementation of the 2005 Stormwater Management Manual for Puget Sound and LID site development practices.	Chuckanut Cr discharge gauge @ Arroyo Park.
48. Improve upstream passage for returning salmon especially into tributaries.	Remove or improve existing fish passage barriers. Ensure all new stream crossings are fish passable.	culvert retrofit through Stormwater Utility.	2002 City wide Culvert Survey.

## Restoration Plan

50. Protect and restore native vegetation along Chuckanut creek.	Improve water quality, Protect /restore habitat and habitat forming processes.	Ongoing riparian restoration, implementation of the 2005 Stormwater Management Manual for Puget Sound and LID site development practices.	No ongoing monitoring identified.
--	--	---	-----------------------------------

# Restoration Plan

## 6. Specific Restoration Projects

Table 3, next page, is a Restoration Planning matrix that was developed to show more specific restoration projects and opportunities within the City that have been identified from prior planning activities.

**TABLE 3, BELOW, WOULD NOT BE APPROVED BY DOE AS A PART OF THE SMP. TABLE 3 INCLUDES SPECIFIC RECOMMENDATIONS FOR ACTIONS AND LOCATIONS THAT MAY CHANGE OVER TIME. THIS TABLE WILL BE ABLE TO BE ALTERED OR REVISED AS NECESSARY WITHOUT HAVING TO GO THROUGH AN AMENDMENT PROCESS AS SPECIFIED IN SECTION 22.07.20. OF THE SMP.**

**THIS WOULD ALLOW THE CITY TO INTEGRATE OTHER RESTORATION PROJECTS INTO THIS TABLE AS THEY ARE IDENTIFIED.**

# Restoration Plan

**TABLE 3:**

<b>RESTORATION PLANNING</b>			
<p>The portion of the table addressing restoration planning in Bellingham Bay has been modified to reflect the order of priority specified in Chapters 3 and 4 of the - Bellingham Bay Habitat Restoration Documentation Report issued in 1999.</p>	<p>Include background from HAB report including 7 goals; 1.1; 2.1; rest principles; APPENDIX D; Oct 2006 SUP-EIS</p>		
<b>Project</b>	<b>Details</b>		<b>Project Status Funding Source Agency/group/person</b>
<b>Bellingham Bay</b>			
<p>One of the fundamental elements of the Bellingham Bay Demonstration Pilot Project is habitat restoration. In 1996, a Habitat Subcommittee group team was created to implement this component. In 1999, the Habitat Subcommittee developed a Habitat Restoration Document Report that examined historic conditions in Bellingham Bay and identified potential habitat restoration and protection objectives and opportunities. These are listed below.</p>			
<b>HIGH PRIORITY</b>			
<p><b>1. Mt. Baker Plywood - Northwest. BBDP #3. Marine reach #4</b></p>	<p>A portion of the shoreline appears to be fill. The fill could be removed and the area graded to support marine buffer, possibly salt marsh and sand/mud flat.</p>		<p>Work will begin when funding is available</p>

## Restoration Plan

<p><b>2. Mt. Baker Plywood - South. BBDP #4. Marine reach #3.</b></p>	<p>The fill could be removed and the site graded to provide habitat suitable for sand/mudflat and salt marsh habitat with a marine buffer fringe.</p>	<p>Work will begin when funding is available</p>
<p><b>3. Squalicum Creek Waterway - A. BBDP #5. Marine reach #3.</b></p>	<p>Removal of treated wooden piles, a pier, log rafting structures, and log rafts.</p>	<p>Work will begin when funding is available</p>
<p><b>4. Squalicum Creek Waterway - B. BBDP #6. Marine reach #3.</b></p>	<p>The elevations of the creek estuary could be raised to provide intertidal and shallow water habitat such as eelgrass, kelp or salt marsh and associated functions. Shoreline buffer could also be established.</p>	<p>Work will begin when funding is available</p>
<p><b>5. Bellingham Cold Storage. BBDP #7. Marine reach #3.</b></p>	<p>The fill could be removed and the site graded to provide estuary habitat suitable for marine buffer, salt marsh and/or intertidal mud/sand flat.</p>	<p>Work will begin when funding is available</p>
<p><b>6. Squalicum Harbor Breakwater</b></p>	<p>Elevations off portions of the breakwater could be raised from about -18 ft MLLW to provide gently sloping intertidal and shallow subtidal habitat and functions. Side slopes on the seaward edge of the breakwater could be modified to incorporate finer grained material to provide intertidal/shallow water functions.</p>	<p>Completed</p>

## Restoration Plan

<p><b>7. Port-Hilton Harbor. BBDP #10. Marine reach # 5.</b></p>	<p>Shallow water habitat could be established by raising the elevation next to the Aerated Stabilization Basin (part of the Whatcom Waterway site). Marine buffer fringe habitat could be established at high elevations and/or site elevations could be modified to meet the elevations of the existing eelgrass bed. Allow for natural eelgrass colonization or do limited eelgrass transplanting.</p>	<p>Work will begin when funding is available</p>
<p><b>8. Georgia-Pacific Log Pond - East. BBDP #11. Marine reach 5.</b></p>	<p>Shallow water habitat could be established by raising the elevation next to the ASB. Marine buffer fringe habitat could be established at high elevations and the site could support either marsh plants or eelgrass at lower elevations.</p>	<p>Work will begin when funding is available</p>
<p><b>9. Georgia-Pacific ASB - South. BBDP #12. Marine reach # 5.</b></p>	<p>Elevations could be raised or modified to expand the existing eelgrass bed on the west side of the ASB. About 200, 000 cubic yards would be required to create habitat at elevations suitable for eelgrass.</p>	<p>Work will begin when funding is available</p>
<p><b>10. Sash and Door (Holly Street Landfill) BBDP #14. Whatcom Creek reach #1.</b></p>	<p>This action involved removing fill from the Sash and Door site and establishing estuarine riparian buffer, marsh, and mudflat banks.</p>	<p>Completed</p>

## Restoration Plan

<p><b>11. Head of Whatcom Waterway. BBDP #17. Marine reach #5 &amp; 6.</b></p>	<p>The concept would be to modify elevations and substrates in the head of the waterway to establish estuarine riparian buffer, mudflat benches, and marsh. Perhaps introduce rootwads or other structure to the head of the waterway.</p>	<p>Work will begin when funding is available</p>
<p><b>12. Georgia-Pacific Log Pond. BBDP #18. Marine reach #6.</b></p>	<p>In 2001, Georgia-Pacific completed construction of a combined sediment cleanup/habitat restoration action in their former log pond. The project converted subtidal mudflat/debris and low intertidal riprap into 2.7 acres of shallow subtidal and 2.9 acres of low clean silt and sand habitat.</p>	<p>Completed. In addition, funding has become available to seed pond area with eelgrass starts for additional habitat feeding and migration areas.</p>
<p><b>13. Cornwall Avenue Landfill. BBDP# 20. Marine reach #7.</b></p>	<p>Remove garbage from the in-water portion of the landfill. Cut back bank along shoreline and remove garbage. Re-grade upland to intercept an appropriate shallow water elevation. Establish intertidal habitat, marine buffer fringe, possibly a saltmarsh, and potentially expand the sparse eelgrass patches (0.25 acre) just offshore of the seaward extent of the garbage.</p>	<p>Work will begin when funding is available</p>



## Restoration Plan

<p><b>14. Boulevard Park. BBDP #21. Marine reach #9.</b></p>	<p>Two actions could occur along the shoreline and offshore from about 600 to 800 ft north of Boulevard Park to the south end of the Park. The first action is shoreline substrate modification. Substrates consist of riprap and large rock and concrete debris. These substrates could possibly be removed and replaced with coarser grain sand and gravel to provide surf smelt and sand lance spawning areas. Alternatively, finer grained substrates could be placed in the interstices to provide some epibenthic habitat. The second action would occur offshore and consist of potentially restoring eelgrass or providing substrates to support kelp.</p>	<p>Work will begin when funding is available</p>
<p><b>15. Padden Creek - North Shoreline. BBDP #23. Marine reach #11.</b></p>	<p>Remove shoreline fill and create mudflat and/or saltmarsh</p>	<p>Work will begin when funding is available</p>
<p><b>16. Padden Creek - North - In-water. BBDP #24. Marine reach #11.</b></p>	<p>Remove treated wooden pier to remove creosote from the environment. This may provide an opportunity for existing eelgrass beds to expand. Remove a small filled area that protrudes waterward of the OHW line at the landward end of the pier structure.</p>	<p>Work will begin when funding is available</p>

## Restoration Plan

<p><b>17. Padden Creek - Upland. BBDP #25. Padden Creek reach #1.</b></p>	<p>Remove fill and establish connection to Padden Creek. Excavate fill to create tidally influenced brackish marsh. Provide habitat buffer.</p>	<p>Work will begin when funding is available</p>
<p><b>18. Post Point - Upland. BBDP #26. Marine reach #13.</b></p>	<p>Excavate upland next to small open water embayment containing eelgrass. Grade excavated area to provide saltmarsh and mudflat bench.</p>	<p>Vegetation has been installed. Excavation and large woody debris placement is currently being proposed for permits.</p>
<p><b>19. Padden Creek - East Shore. BBDP #36. Marine reach #12.</b></p>	<p>Remove fill, asphalt and rock along the east shore and modify elevations to provide estuarine riparian buffer, mudflat benches and marsh.</p>	<p>Work will begin when funding is available</p>
<p><b>MEDIUM PRIORITY</b></p>		
<p><b>20. Cement Company Dock. BBDP #1. Marine reach #2.</b></p>	<p>This dock is a relatively wooden structure near Little Squalicum Creek that extends through intertidal and shallow subtidal water. The primary action would be removal of the treated wooden piles to remove creosote from the aquatic environment and restore substrates.</p>	<p>Work will begin when funding is available</p>

## Restoration Plan

<p><b>21. Mt. Baker Plywood - West. BBDP habitat opportunity #2.</b></p>	<p>The beach area west of Mt. Baker Plywood consists of large boulders and rocks. Opportunities at this site include either removing the large boulders and rocks to expose underlying sediments and supplement with finer mixed coarse gravel and sand, or placing finer mixed coarse gravel and sand over the large boulders and rocks to fill interstices.</p>	<p>Work will begin when funding is available</p>
<p><b>22. Squalicum Marina. BBDP #9. Marine reach #4.</b></p>	<p>The substrate along the marina margins modified to incorporate finer grained rocks to provide intertidal/shallow water functions.</p>	<p>Work will begin when funding is available</p>
<p><b>23. G – P ASB</b></p>	<p>Removal of contaminated sediments / materials from the historic wastewater treatment facility. Replace contaminated materials with clean sediments and materials in order to create a variety of new in-water habitat features (including upland public access amenities and a new marina / boat basin.</p>	<p>A Draft RI/FS was released for public comment in October, 2006 that included eight cleanup alternatives.  A formal decision on the preferred alternative (#6) has not yet been issued by DOE.</p>
<p><b>24. Citizens Dock. BBDP #15. Marine reach #6.</b></p>	<p>This dilapidated dock was removed in 1999</p>	<p>Completed</p>
<p><b>25. Lower Whatcom Creek. BBDP #16. Marine reach #5.</b></p>	<p>The action would involve removing wooden structures, derelict floats, etc. in the vicinity.</p>	<p>Work will begin when funding is available</p>
<p><b>26. Port Log Rafting Area. BBDP #19. Marine reach # 6 &amp; 7.</b></p>	<p>Remove wood/bark debris, and sunken logs. Modify the shoreline edge and modify elevations to support intertidal and shallow subtidal habitat (sloped or terraced bench). The site may provide an opportunity to provide substrates suitable for macroalgae attachment establish and/or an eelgrass bed</p>	<p>Work will begin when funding is available</p>

## Restoration Plan

<p><b>27. Taylor Street Dock. BBDP #22. Marine Reach #9.</b></p>	<p>Removed the treated wooden structure and associated pilings and pier structures to remove creosote from the aquatic environment. Either allow eelgrass to naturally recolonize or conduct eelgrass transplant.</p>	<p>Completed. Post construction sampling has been conducted and shows no additional impacts from construction of the dock. Eelgrass has successfully established within the project area.</p>
<p><b>28. Post Point - Shoreline. BBDP #27. Marine reach #11.</b></p>	<p>Modify existing structure under railroad crossing to open it up and replace existing concrete debris that has been used to armor the shoreline with rock.</p>	<p>Work will begin when funding is available</p>
<p><b>29. Post Point - South. BBDP #28. Marine reach #14-16.</b></p>	<p>Modify existing structure under railroad crossing to open it up.</p>	<p>Work will begin when funding is available</p>
<p><b>30. Chuckanut Spit. BBDP #29. Marine reach 17.</b></p>	<p>There is apparently a closed culvert under the rail trestle. The action would involve either opening the culvert or replacing the culvert with a new culvert that was bigger and more open.</p>	<p>Work will begin when funding is available</p>
<p><b>31. Chuckanut Breach. BBDP #30. Marine reach #19.</b></p>	<p>There is one rail trestle allowing exchange between Bellingham Bay and the embayment in the north end of Chuckanut Bay. The action would consist of either installing a large open culvert under the rail line or building another trestle along the eastern end of the rail bed.</p>	<p>Work will begin when funding is available</p>

## Restoration Plan

<p><b>32. Lummi Peninsula. BBDP #33.</b></p>	<p>Portions of the shoreline along this area are armored with rip rap and large boulders. The action that could be implemented here would consist of restoring upper intertidal substrates to coarse sand and gravel suitable to support surf smelt and sand lance spawning habitat.</p>	<p>Work will begin when funding is available</p>
<p><b>33. Nooksack Delta - East. BBDP #35.</b></p>	<p>Decaying wood deposits have apparently blanketed much of the higher intertidal area. The action would be to remove the wood deposits and if necessary import appropriately sized gravel to support surf smelt and sand lance spawning habitat.</p>	<p>Work will begin when funding is available</p>
<p><b>LOW PRIORITY</b></p>		
<p><b>34. Post Point to Chuckanut Protection. BBDP #31. Marine reach #14-18.</b></p>	<p>Set this area aside as a preservation area because habitats within the area re difficult to replace, the area provides multiple functions (as documented through maps showing use of the area by multiple resources), and it is thought to represent a unique habitat in Bellingham Bay.</p>	<p>Work will begin when funding is available</p>

## Restoration Plan

<b>35. Portage Island Protection Area. BBDP #32.</b>	Set this area aside as a preservation area because habitats within the area re difficult to replace, the area provides multiple functions (as documented through maps showing use of the area by multiple resources), and it is thought to represent a unique habitat in Bellingham Bay.	Work will begin when funding is available	
<b>36. Nooksack Delta Protection Area. BBDP #34.</b>	Set this area aside as a preservation area because habitats within the area re difficult to replace, the area provides multiple functions (as documented through maps showing use of the area by multiple resources), and it is thought to represent a unique habitat in Bellingham Bay.	Work will begin when funding is available	
<b>37. Bellingham Bay rogue creosote log removal.</b>  <b>WATERFRONT FUTURES GROUP HABITAT AND RESTORATION OPPORTUNITIES FOR BELLINGHAM BAY</b>	Remove from nearshore and upland areas rogue logs that wash into shore that are treated with creosote.  MULTIPLE PROJECTS BAYWIDE THAT COINCIDES WITH THE WFG FRAMEWORK PLAN	C.O.B., D.O.E and W.C.C  REPS FROM AGENCIES	Completed but ongoing.
<b>Squalicum Creek</b>			
<b>38. Segment from West Street to Meridian Street. (two segments: Roeder to West AND West to Meridian Street. Squal. reaches 1-3.</b>	Stream restoration on lower nine acres of Squalicum (From West St. to Meridian Street) – removal of ivy, clematis, knotweed and other noxious weeds and replacement with native vegetation at a minimum. Purpose is to improve salmon habitat on 15 private properties along Squalicum Creek.	COB	Project funded by FY 2005 Centennial Clean Water Grant. COB / NSEA joint effort and fully completed by December of 2010.

## Restoration Plan

<p><b>39. Pacific Concrete. New spring channel. Squalicum reach #2.</b></p>	<p>The City recently acquired 35 acres adjacent to Squalicum Creek. The purchase included a water right for a natural ground water fed spring. The spring is currently piped underground towards Squalicum Creek. The spring will be daylit and a site plan including proposed locations of woody debris structures and meander bends will be designed and constructed. This will create 1/3 mile of new salmon habitat. The project will also improve degraded riparian function by replacing invasive plant species with native vegetation on over two acres of riparian area along both stream banks. Woody debris structures will be placed to direct flow, create salmon habitat, provide bank protection and regulate channel migration activity.</p>	<p>City of Bellingham: Environmental Resources</p>	<p>Project funded by FY 2005 Centennial Clean Water Grant. Project will be completed by City of Bellingham, Environmental Resources Division and fully completed by December of 2010.</p>
<p><b>40. Squalicum Parkway culvert &amp; fish passage improvements. Reaches 2 and 3.</b></p>	<p>4 total most downstream ones.</p>		<p>Current and to be completed by COB in 2005.</p>
<p><b>41. Baker Creek culvert and fish passage improvements. Not in SMA jurisdiction.</b></p>	<p>restoration of riparian/floodplain area between Shurgard Storage and mobile home park. Objective is to install native vegetation, stabilize banks - soft techniques and provide refuge for salmonids via LWD and back channels.</p>		<p>Current and to be completed by COB in 2005.</p>

## Restoration Plan

<b>42. Birchwood Avenue culvert and fish passage improvements. Squal reach boundary between 5 and 6.</b>	bug lake outlet		Current and to be completed by COB in 2005.
<b>43. Lower Squalicum bank stabilization. Squalicum reach #2.</b>	Crib walls and LWD installed to prevent further erosion and bank cutting of properties with steep slopes, banks.		Current and to be completed by COB in 2005.
<b>44. Bug Lake. Squal reach #6.</b>	City recently purchased the lake for future habitat improvement.	City of Bellingham: Environmental Resources	Work will begin when funding is available.
<b>45. James Street Segment. Squal reach #6.</b>	Maintenance and repair of an existing culvert to extend the service life of the structure and prevent damage to adjacent roadways.	City of Bellingham: Public Works	Completed Summer of 2004.
<b>Whatcom Creek</b>			
<b>46. Horton Towing Segment. Whatcom Creek reach #4.</b>	Increase riparian area by rolling back fence - graveled parking area - removal of noxious and install new native mix of conifers, under story and shrubs.	potential for WCC or via private devel.	Work will begin as funding is available or project proposal warrants.



## Restoration Plan

<p><b>47. Red Tail Reach/Bay City Supply. Whatcom Creek reach #4.</b></p>	<p>The City is in the process of acquiring .73 acres on land on the north side of Whatcom Creek directly across the creek from a large City-owned property on the south side of the creek. Project includes meander bends, side channels, woody debris installations throughout the reach, and replacement of invasive plant species with native vegetation. This reach provides the best spawning habitat in Whatcom Creek for Chinook, Coho, pinks and steelhead despite the degraded channel conditions (straightened with no complexity) and lack of significant native vegetation or canopy cover. The woody debris structures will be placed to redirect flow, improve habitat conditions, provide bank protection and regulate channel migration activity, improving the degraded riparian function of the area.</p>	<p>City of Bellingham: Environmental Resources</p>	<p>Project funded by FY 2005 Centennial Clean Water Grant. Project will be completed by City of Bellingham, Environmental resources Division and fully completed by December of 2010.</p>
---	---	--	---

## Restoration Plan

<p><b>48. Detailed Implementation Plan (DIP), Bacteria and Temperature TMDL. Whatcom Creek drainage analysis: ECO FUNCT: water quality.</b></p>	<p>Creek exceeds TMDL standards for temperature and bacteria. The DIP will take major steps at removing Whatcom Creek from the 303(d) list. Using a combination of source monitoring and land use analysis fecal conform sources will be identified. Information generated from these activities will guide the development of source controls and BMPs used to reduce or eliminate fecal coliform loading in the Whatcom Creek watershed. Temperature problems will be handled by the Dept. of Ecology.</p>	<p>City of Bellingham: Environmental Resources</p>	<p>Status: Project funded by FY 2005 Centennial Clean Water Grant. Project will be completed by City of Bellingham, Environmental resources Division and fully completed by December of 2010.</p>
<p><b>49. Salmon Park. Whatcom Creek reach #4 and 5.</b></p>	<p>Extensive habitat enhancement project that increases wetland areas hydro connected to Cemetery Creek, installs LWD for back channeling and refuge. (Salmon and habitat improvement project)</p>	<p>City of Bellingham</p>	<p>Scheduled to being in 2005.</p>
<p><b>50. Cemetery Creek. Whatcom Creek reach #5.</b></p>	<p>Extensive habitat enhancement project that increases wetland areas hydro connected to Cemetery Creek, installs LWD for back channeling and refuge. (Salmon and habitat improvement project)</p>	<p>City of Bellingham</p>	<p>Scheduled to begin in 2006.</p>
<p><b>51. Mouth to Cornwall. Reaches #1 and 2.</b></p>	<p>Invasive species removal and new native vegetation installation.</p>	<p>City of Bellingham, WCC</p>	<p>ongoing since 2001.</p>
<p><b>52. State Street to Meador. Reach #3.</b></p>	<p>Invasive species removal and new native vegetation installation.</p>	<p>City of Bellingham, WCC</p>	<p>2003 - present</p>

## Restoration Plan

<b>53. Interstate 5 to middle falls - Whatcom Falls Park. Reaches 4-7.</b>	Invasive species removal and new native vegetation installation.	City of Bellingham, WCC	ongoing since 2001.
<b>Chuckanut Creek</b>			
<b>54. Chuckanut Creek - reach #1.</b>	Periodic maintenance dredging for flow capacities.		Ongoing.
<b>Lake Whatcom</b>			
<p>The following, ongoing projects and plans help to protect the lake as a drinking water and recreation source for City residents as well as preserve the natural environment of watershed:</p>			
<p>In 2005, the City and County Councils and the Lake Whatcom Water &amp; Sewer Dist. Commissioners (known as the Joint Councils and Commissioners) approved the "2005-2009 Lake Whatcom Work Plan". This represents the second five-year work plan developed for the management of Lake Whatcom as a drinking water reservoir. Both plans were developed from a list of goals and policies adopted by the Joint Councils and Commissioners in a 1992 Joint Resolution. In addition, the plans are based on priorities established by the Joint Councils and Commissioners in 2004.</p> <p>The work plans are written by the Lake Whatcom Interjurisdictional Committee Team (ICT) which is comprised of staff from the three jurisdictions. The ICT writes the plans, implements the plan tasks, and reports on task progress to the Joint Councils and Commissioners biannually. The ICT also responds to the respective jurisdictions as new issues and priorities arise.</p> <p>The "2005-2009 Lake Whatcom Work Plan: Priority Tasks for 2006" can be found on the Lake Whatcom website at: <a href="http://www.lakewhatcom.wsu.edu/">http://www.lakewhatcom.wsu.edu/</a>.</p>			
<p>The "WRIA 1 Watershed Management Program brings together citizens, local governments, tribes, and state and federal agencies to develop plans for allocating water, protecting water quality, and restoring fish habitat." Water Resource Inventory Area No. 1 (WRIA 1) includes Lake Whatcom, encompassing "the surface and ground water in the Nooksack River basin and certain adjacent watersheds."</p>			
<p>Continuous temperature monitoring (Total Maximum Daily Load Monitoring (TMDL)), under the Clean Water Act determines the source of pollution in the watershed and tries to reduce pollutants. The study will be completed in January 2005. Once the study is completed, there will be a deliberation with the city to determine the best strategies to reduce the pollution allocation.</p>			

# Restoration Plan

Stormwater Pollution effects the water quality of the lake. A Seasonal Land Disturbance Restriction is in affect as well as a Priority Inspection area that monitors areas three to four times a month.

Beginning in 1981, a monitoring program was initiated by the city and the Institute for Watershed Studies at Western Washington University that was designed to perform long-term water quality data for the lake. Annual reports have been issued since 1990. In addition to long-term water quality data, the program also evaluates annually, the effectiveness of storm water treatment in the lake's watershed, and to monitor the hydrology of the lake.

The Silver Beach Ordinance was passed in 2001, reducing development impacts by prohibiting certain non-compatible land uses, limiting impervious area, placing seasonal limits on earthwork, minimizing the use of harmful materials and other best management practices.

The city performs Recreational Beach Monitoring at Bloedel-Donovan Park to check bacteria levels and DNA source tracking. Results from 2002 show that some prominent sources of E-coli bacteria in the lake come from geese.

Owning land is one of the best ways at controlling land use and development. The City of Bellingham's Lake Whatcom Watershed Property Acquisition Program, financed by water-usage fees, aims at preserving and improving our drinking water quality by purchasing land within the+A56 Lake Whatcom Watershed. The City actively seeks properties within the watershed, particularly ones that adjoin lands already owned by the City. Or property owners and realtors familiar with the program bring information to the City regarding potential properties.

As part of a larger package of tools and techniques to help protect the Lake Whatcom Watershed, the Whatcom County Council adopted in December of 1999 amendments to the county zoning ordinance and maps to enable a Transferable Development Rights (TDR) program. This program allows a landowner to transfer their residential development rights to another owner or to another piece of property, outside of the Lake Whatcom Watershed. The effectiveness of the current program guidelines is being reviewed and will be modified.

Identified restoration projects within the "OPPORTUNITIES AND IDEAS FOR HABITAT RESTORATION AND WATER ACCESS ON URBAN BELLINGHAM BAY" (including APPENDIX A and B) from the Interagency Workshop held on January 22, 2004, prepared for the Waterfront Futures Project, by Anchor Environmental, LLC, February 20, 2004.