APPENDIX A

DRAFT 2006 City of Bellingham
Shoreline Master Program
Restoration Plan
~~(largely adapted from the Port Townsend 2005 Draft Shoreline Restoration Plan)~~

Contents:

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1. Introduction

Thi~~s~~*e Restoration Plan (RP)* ~~restoration chapter~~ 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.* ~~*(Guidelines)*~~ *Ultimately, a RP should provide a vision for ecological restoration, includes 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 objectives, the specific implementation measures, budgets, schedules, and individual monitoring programs will be needed for individual restoration projects as they occur.*

The 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 ~~p~~*P*lan~~ning~~ 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 period when compared to the status of the shorelines upon adoption of an updated SMP.*~~that include inventorying shoreline conditions and management of shoreline development.~~ *It must be noted that despite the intent of the RP to achieve overall improvements to shoreline ecological function over time it cannot be assumed that improvements to impaired systems is in and of itself adequate. The overarching goal of Restoration Plans is to return shorelines to functionally sustainable levels or, properly functioning conditions.*

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

The restoration plan builds on the 2004 City of Bellingham Shoreline Inventory and the Characterization Report (Northwest Ecological Services, LLC) which provide a comprehensive inventory and analysis of shoreline conditions in Bellingham. *The input of the Technical Advisory Committee (TAC) and the comments received from various agencies and special interest groups that reviewed this RP has also been added in terms of a baseline condition.*

~~This~~ *The intent of this* restoration plan *is to provide the local governments, special interest groups, private property owners or non-profit agencies with the information and guidance necessary to implement a restoration project that will improve shoreline ecological function within a particular shoreline reach and is consistent with community restoration goals.*

~~provides a vision for ecological restoration, includes goals, objectives and opportunities. It also establishes city strategies for implementation, including recognition of existing and ongoing programs,~~ and it ~~provides a framework for long-term monitoring of shoreline restoration and shoreline conditions. While this restoration plan includes broad objectives, the specific implementation measures, budgets, schedules, and individual monitoring programs will be needed for individual restoration projects as they occur.~~

To ensure that restoration goals are being achieved, it is important for the city to evaluate the performance effectiveness of this plan and to adapt to changing conditions. At a minimum, this restoration plan (as well as the entire Shoreline Master Program) will be evaluated by the Department of Ecology for its ability to improve the overall ecological function of shorelines. The actual improvements to ecological function will be reevaluated again in seven years when the 2005 SMP is updated again.

2. SMP Restoration Planning Regulatory Requirements

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

> (i) Identify degraded areas, impaired ecological functions, and sites with potential for restoration.
>
> (ii) Establish overall goals and priorities for restoration of degraded areas and impaired ecological functions.
>
> (iii) Identify existing and ongoing projects and programs that are currently being implemented, or are reasonably assured of being implemented (based on an evaluation of funding likely in the foreseeable future), which are designed to contribute to local restoration goals.
>
> (iv) Identify additional projects and programs needed to achieve local restoration goals, and implementation strategies including identifying prospective funding sources for those projects and programs.

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

(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 ~~and~~ *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 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 in urban areas presents the following challenges:

- *Multiple inputs water-shed wide that are outside of a restoration site.*
- limited sites available for restoration
- limited reference sites
- confounding factors, such as poor water quality, chemical contamination, and altered hydrology
- fragmented habitat
- high costs due to land acquisition expenses and the amount of work required to reverse habitat modifications
- differing needs for coastal resources (e.g., economic, cultural, social, recreational, environmental) (Brammeier 2003)
- differing values of local citizens (Ehrenfeld 2000).

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

- the restored habitat provides pockets of habitat where otherwise there would be none
- restored habitat can provide a connectivity to adjacent, more functional habitats (TAC)
- additional natural landscapes for urban residents (Ehrenfeld 2000)
- a heightened public awareness of coastal ecosystems (Milano 1999)
- educational opportunities
- public involvement in the restoration process of highly visible projects, resulting in community project stewardship

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

4. Restoration *Priority* Goals~~, Priorities~~ and Objectives

The *priority* goals and objectives *below* ~~included here are~~ *were* developed for the City of Bellingham ~~DRAFT 2005 SMP~~ *2006 DRAFT SMP* ~~and~~ *in order to implement the following Bellingham Comprehensive Plan goals and visions:*

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

Parks, Recreation and Open Space Plan; Chapter 8:

8.1 Resource conservancies

Incorporate unique ecological features and resources into the park system to protect threatened species, preserve habitat, and retain migration corridors that

are unique and important to local wildlife.

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

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

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

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

8.2 Open spaces and preserves

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

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

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

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

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

Parks, Recreation and Open Space Plan; Chapter 9, Plan Elements; Resource Conservancies;

Vision
As described herein, wildlife habitat/resource conservancies may be realized through:
• acquisition of title and/or development rights of habitat lands - that would otherwise be developed for other land uses;
• 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.*

(Bellingham Comprehensive Plan. Chapter 7, Parks, Recreation and Open Space)
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 or development regulations – at the time the next SMP Update is conducted.

In order to capture the specific goals above into three basic priority goals for restoration city-wide the result would be:

~~goals for restoring Bellingham shorelines are to:~~

- Improve water quality,
- Re-establish *and restore* natural shoreline processes, restore degraded *and lost* habitat, ~~habitat forming processes,~~ 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.* ~~in terms of both space and over time.~~

~~These goals identify the direction of needed improvement.~~
Objectives identify specific actions, ideally measurable, that can be taken to achieve the stated goals. For example, to meet the goal of improving water quality, an objective would be to remove creosote pilings. By translating the restoration goals into objectives, **the objectives for Bellingham restoration are:**

a. **Protect and/or restore freshwater, nearshore, and estuary habitat and habitat forming processes.**
b. **Protect and restore wildlife corridors.**
c. **Remove intertidal fill and /restore beach deposits and processes.**
d. **Manage and treat stormwater to improve water quality, decrease peak flow events, and increase implementation of LID practices.**
e. **Remove/replace creosote contaminated logs, pilings and debris.**
f. **Protect and restore native vegetation and native species.**
g. **Remove or improve fish passage barriers.**
h. **Protect and restore wetlands and restore salt marsh habitat.**
i. **Increase Large Woody debris availability and recruitment opportunities.**
j. **Remediation of contaminated sediments.**

These objectives assist with defining actions or projects to restore the natural processes and ecological functions identified in the Characterization Report as 'not properly functioning.'

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

In accordance with the *DOE shoreline* ~~state~~ guidelines, it is also valuable to establish general priorities. Controlling environmental factors (such as hydrology, sediment type, etc.) provide the

foundation for habitat structures (i.e., species and their abundance), and the structure supports habitat functions (i.e., production, food support, rearing, etc.). (Thom. 2003) That is, restoration of habitat functions may be ineffective if habitat structures and controlling factors are not also restored. While Thom states, "There is no universally accepted method for setting priorities for nearshore sites for restoration or for determining what strategies are best applied to each site. We have found that restoration of controlling factors is the key to successful and long-term restoration." ~~g~~General priorities for shoreline management could follow mitigation sequencing, *specified in the DRAFT SMP; Section 22.08.100*. That is, conservation and preservation should be the highest priority, followed by avoidance, followed by restoration, then enhancement and monitoring.

Overall priority should be given to protection and restoration of natural processes that are needed to support ecosystem and habitat functions.

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

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

Table 1 shows the relationship of the goals, objectives, natural processes and ecological functions. *Table 1 is not meant to be an exhaustive list and does not prohibit other meaningful objectives from being pursued.* The first column shows the goals, the second column shows the objectives associated with those goals and the third column shows the natural process and ecological function that will be enhanced by completing the objectives. Objectives are found under multiple goals affecting different natural processes and ecological functions. Potential metrics for monitoring each objective are listed in the right hand column. Opportunities for implementation are listed in Table 2 in the next section.

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Table 1: Restoration *Priority* Goals and Objectives

Restoration Goal	Objective	Natural Process / Ecological Function	Potential Metrics (How to measure the improvement over time)
Improve water quality	Remove/replace creosote contaminated logs, pilings and debris	**Sediment Transport**	# creosote pilings
		Toxic Compound Removal, Support Vegetation	water quality measurements
	Protect and restore wetlands and salt marsh habitat	**Hydrologic Processes, Sediment Transport, Nutrients**	wetland acreage
		Water Storage	wetland functions
		Sediment Storage	wetland ratings
		Toxic Compound Removal	water quality measurements
		Nutrient Removal	
	Manage and treat stormwater to improve water quality, decrease peak flow events, increase implementation of LID practices	**Hydrologic Processes, Sediment Transport, Nutrients**	
		Water Storage	water quality measurements
		Sediment Storage	storm flows
		Toxic Compound Removal	
		Nutrient Removal	
	Protect and restore native vegetation and native species	**Hydrologic Processes, Nutrients**	
		Water Storage	% impervious surface in basin
		Sediment Storage	acreage of vegetation
		Toxic Compound Removal	water quality

			measurements
		Nutrient Removal	
Improve water quality	Remove intertidal fill/restore beach deposits and processes	**Sediment Transport**	
		Water Storage	acreage or number of restored/remaining impaired areas
		Sediment Storage	
	IMPLEMENT TMDL STUDY: Identifies which pollutants (temperature and bacteria) are degrading water quality below a certain threshold standard and target actions to combat those inputs.	Nutrient Removal	Current
Re-*establish and restore natural shoreline processes, restore* degraded and lost habitat and corridors	Protect and restore native vegetation and native species	**Sediment Transport**	
		Vegetation	
		Nutrients	
		Habitat	acreage of vegetation
		Woody Debris Recruitment	degree of diversity
		Organic Material Availability	species supported
		Rearing Habitat	connectivity/areas of isolation
		Resting Habitat	extent of tree canopy
		Predation Avoidance Habitat	
		Migration Corridors	
		Food Production	
		Food Delivery	

		Support Vegetation	
	Protect and restore wetlands salt marsh habitat, and estuarine and lagoon functions	**Hydrologic Processes**	
		Sediment Transport	
		Vegetation	
		Nutrients	wetland acreage
		Habitat	wetland functions
		Support Vegetation	wetland ratings
		Organic Material Availability	
		Rearing Habitat	
		Resting Habitat	
		Predation Avoidance Habitat	
		Migration Corridors	
		Food Production	
		Food Delivery	
Re-*establish and restore natural shoreline processes, restore* degraded and lost habitat and corridors	Manage and treat stormwater to improve water quality, decrease peak flow events, increase implementation of LID practices	**Sediment Transport**	
		Vegetation	
		Nutrients	
		Habitat	
		Support Vegetation	
		Woody Debris Recruitment	acreage or number of restored/remaining impaired areas
		Organic Material Availability	
		Rearing Habitat	linear feet of bulkhead
		Resting Habitat	
		Predation Avoidance Habitat	
		Migration Corridors	
		Food Production	

		Food Delivery	
	Manage and treat stormwater to improve water quality, decrease peak flow events, increase implementation of LID practices	**Hydrologic Processes**	water quality measurements
		Sediment Transport	
		Nutrients	
		Water Storage	
		Sediment Storage	
		Toxic compound removal	
		Nutrient Removal	

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Improve connectivity of the shoreline environments *to one another and to adjacent habitat corridors and /or blocks that support priority species or species of local significance.* ~~in terms of area and over time~~	Protect and restore native vegetation and native species	**Hydrologic Processes**	
		Sediment Transport	
		Vegetation	
		Nutrients	
		Habitat	acreage of vegetation
		Woody Debris Recruitment	connectivity/areas of isolation
		Organic Material Availability	extent of tree canopy
		Rearing Habitat	linear feet of bulkhead
		Resting Habitat	
		Predation Avoidance Habitat	
		Migration Corridors	
		Food Production	
		Food Delivery	
	Protect and restore wetlands, salt marsh habitat and estuarine and lagoon functions	**Hydrologic Processes**	
		Sediment Transport	
		Vegetation	
		Nutrients	
		Habitat	wetland acreage
		Support Vegetation	wetland functions
		Woody Debris Recruitment	wetland ratings
		Organic Material	connectivity/areas of

		Availability	isolation
		Rearing Habitat	
		Resting Habitat	
		Predation Avoidance Habitat	
		Migration Corridors	
		Food Production	
		Food Delivery	

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Improve connectivity of the shoreline environments *to one another and to adjacent habitat corridors and /or blocks that support priority species or species of local significance.* ~~in terms of area and over time~~	Remove intertidal fill/ restore beach deposits and processes	**Hydrologic Processes**	
		Sediment Transport	
		Vegetation	
		Nutrients	
		Habitat	acreage of restored remaining impaired acres
		Support Vegetation	
		Woody Debris Recruitment	Shoreline connectivity/areas of interruption
		Organic Material Availability	
		Rearing Habitat	
		Resting Habitat	
		Predation Avoidance Habitat	
		Migration Corridors	
		Food Production	
		Food Delivery	
Re*-establish and restore natural shoreline processes, restore* degraded habitat, habitat forming processes, and wildlife	Protect and or restore freshwater, nearshore, and estuary habitat and habitat forming processes		

corridors,		
	Protect and restore wildlife corridors	
improve water quality,	Remove/replace creosote contaminated logs, pilings and debris	
Improve connectivity of the shoreline environments *to one another and to adjacent habitat corridors and /or blocks that support priority species or species of local significance.* ~~in terms of both space and time.~~	Remove or improve fish passage barriers	
	Increase Large Woody debris availability and recruitment opportunities	

5. Shoreline Restoration Opportunities – *Implementation Strategies*

Restoration opportunities are abundant in every habitat type, whether *within* freshwater, *within the marine* nearshore or *within an* estuarine *environment*. Examples at various scales, include marine and tidal freshwater marshes; freshwater river and stream corridors; unvegetated tidal flats; pocket estuaries; pocket beaches; forested and unforested wetlands; eelgrass meadows; kelp beds; shellfish beds; and rocky and gravel shorelines. (Diedenderer 2003). Innumerable local projects exist. Several large-scale restoration projects, each of which encompasses multiple habitats, have also

been initiated in Bellingham in recent years for example: Whatcom Creek estuary/Holly Street Landfill, Post Point Lagoon and many of the urban stream corridors.

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

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

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

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

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

- Feasibility
- Opportunity to improve ecosystem function
- Site protection
- Potential for sediment deposition/transport processes to support sustained function
- Potential to benefit threatened and endangered species
- Probability of success
- Habitat connectivity
- Restore or replace limited habitat
- Sustainability of habitat functions
- Type of habitat replacement

- Timing of implementation

Table 2 identifies opportunities for each shoreline segment that have been identified in the 2004 City of Bellingham Shoreline ~~Inventory,~~ Characterization ~~Report,~~ and through other shoreline planning processes. These are opportunities for restoration that correspond to the ~~state~~ restoration goals and objectives. Restoration ~~objectives~~ opportunities by water-body type (marine and freshwater/creeks) are in the left-hand column. The second column lists the related restoration objective. Identified restoration activities and monitoring activities, where known, are listed in the two right hand columns.

This is an extensive list that likely exceeds near term funding opportunities, and yet, is not exhaustive. Additional restoration opportunities may continue to be identified through local and regional shoreline monitoring and planning actions. Further discussion of ongoing programs, implementation strategies, and project evaluation to determine appropriate priority and selection is provided in the sections following the table. As such, Table 2 is based on a point of time and it is expected that actual restoration opportunities and priorities will evolve over time as restoration projects are completed and new information becomes available. The City may periodically identify additional restoration opportunities that are consistent with the objectives of this restoration chapter. (Adapted from Port Townsend's DRAFT SMP Restoration Plan)

Implementation strategies are dependent mostly upon available funding and individuals and/or groups to perform the work. The three groups with the strongest funding sources and most commonly performing restoration work city-wide are; the Washington Conservation Crew, Greenways volunteers and the Nooksack Salmon Enhancement Association. (There are many other smaller groups and organizations that perform important restoration work city-wide) Given this, there are other determining factors for implementation of restoration projects.

For the City's Washington Conservation Crew, restoration projects that were developed as a result of the damage accrued by the Olympic Pipeline fire within the Whatcom Creek riparian area are a priority.

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

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

The most common implementation strategy is also referred to 'low hanging fruit.' These are restoration projects that can be implemented quickly because they are not time or funding intensive.

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

Table 2 (DRAFT): COB Shoreline Restoration Opportunities

Restoration Opportunity	Restoration Objective	Restoration Activity (Ongoing)	Monitoring Activities
Marine Shorelines	.	.	.
1. Treat stormwater entering Bellingham Bay from developed areas	Manage and treat stormwater and wastewater properly	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 contaminates in marine ecosystem, including old ferry dock pilings and in boat marinas.	Remove unused creosote pilings	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 nearshore habitat, wildlife corridors	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 nearshore habitat, wildlife	No ongoing activity identified	no ongoing monitoring identified

	corridors		
5. Remove and reduce shoreline armoring along marine shoreline. Remove existing shoreline amoring as opportunities allow.	Remove intertidal fill/restore beach deposits and processes	No ongoing activity identified	create GIS map of existing conditions
6. Remove/reduce impact of artificial night-lighting effects to intertidal habitat	Protect and/or restore nearshore habitat and 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 nearshore habitat and corridors	no ongoing activity identified	no ongoing monitoring identified
8. Restore native marine riparian vegetation where possible	Protect and/or restore nearshore habitat, wildlife corridors and habitat forming processes	Post point Lagoon restoration	aerial photographs and 2005 Post Point Lagoon assessment
9. Remove or restore derelict and unused structures	Protect and/or restore nearshore habitat and corridors	no ongoing activity identified	no ongoing monitoring identified
10. Increase forage fish habitat in Bellingham Bay nearshore	Remove intertidal fill / restore beach deposits and processes	no ongoing activity identified	no ongoing monitoring identified
11. Remove wood waste debris along shoreline at foot of Cliffside Drive. (TAC)	Protect and/or restore nearshore habitat, wildlife corridors. (TAC)	Identified as an action item but has not been funded. (TAC)	No formal monitoring at this time. (TAC)

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12. Use beach nourishment to replace eroded sediments, if possible	Removal intertidal fill/restore beach deposits and processes	no ongoing activity identified	no ongoing monitoring identified
13. 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
14. 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
15. Consider opening marina breakwaters to allow juvenile salmon passage along the shallow nearshore habitats of the boat basin areas	Protect and/or restore nearshore habitat wildlife corridors, habitat forming processes and increased tidal flushing	no ongoing activity identified	no ongoing monitoring identified
16. 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
17. Increase wildlife habitat and ecological function in the seven pocket estuaries and lagoons in Bellingham Bay	.	Post point Lagoon restoration, Whatcom Creek Estuary restoration, Squalicum Cr estuary	.
18. 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	no ongoing monitoring identified
19. Soften BNRR shoreline riprap, gabions, and eco-blocks	Remove intertidal fill/restore beach deposits and processes, sand spits and accretion land forms	discussions with BN Railroad	no ongoing monitoring identified
20. Removal of	Protect and restore	implemented on an as	no ongoing

invasive species	native species	needed basis	monitoring identified
All Creeks		**Restoration Activity (Ongoing)**	
21. Provide incentives to encourage tree planting and retention along shorelines	Protect /restore habitat and habitat forming processes	no ongoing activity identified	Aerial photographs
22. Encourage redevelopment to meet increased setbacks and restore site and shoreline vegetation	Protect /restore habitat and habitat forming processes	no ongoing activity identified	Aerial photographs
23. Homeowner education and encourage bulkhead and bank hardening removal where possible	Protect /restore habitat and habitat forming processes	no ongoing activity identified	Aerial photographs

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24. Homeowner education on benefits of vegetation retention	Protect /restore habitat and habitat forming processes	Backyard Sanctuary program, promotion of LID	no ongoing monitoring identified
25. Replant shoreline with native vegetation	Protect and restore native vegetation	.	.
26. Removal of invasive species	Protect and restore native species	.	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 properly	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	
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
Squalicum Creek	.	**Restoration Activity (Ongoing)**	.
30. Minimize bank erosion and downcutting 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, 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	ongoing vegetation monitoring and photo monitoring
31. Minimize predation on salmonids by introduced warm water fish in Bug lake and Sunset Pond		Create sides channels around Bug Lake and Sunset Pond	Monitor fish use.
32. Improve upstream passage for returning salmon, especially in	Remove or improve existing fish passage barriers. Ensure all	culvert retrofit through Stormwater Utility.	2002 City wide Culvert Survey,

the upper reaches of Squalicum Creek	new stream crossings are fish passable		
33. Improve quantity and quality of rearing and spawning habitat	Increase LWD placement and recruitment opportunities, restore native riparian vegetation, decrease peak flow events, improve stormwater detention, 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, preserve and restore stream buffer width.	ongoing vegetation monitoring and photo monitoring smolt traps and spawner surveys

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34. Work with homeowners from West St to Meridian St. to restore native riparian vegetation and increase salmon habitat	Protect /restore habitat and habitat forming processes	CCWF 2005 grant to work with homeowners	ongoing vegetation monitoring and photo monitoring
35. Protect and improve natural hydrologic regimes throughout Squalicum 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	Squalicum Cr discharge gauge @ West St.
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
Whatcom Creek		**Restoration Activity (Ongoing)**	
37. Decrease fecal coliform bacteria 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 TMDL
38. Restore native shoreline vegetation between Electric Ave. and the Derby Pond on City owned property	Improve water quality, Protect /restore habitat and habitat forming processes		Whatcom Creek Fecal Coliform 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

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, COB Habitat Conservation Plan (HCP)	Whatcom Cr discharge gauges @ Derby Pond and Dupont St.
41. Decrease social trails and damage to bank vegetation in Whatcom Falls park (whirlpool and swimming areas)	Improve water quality, Protect /restore habitat and habitat forming processes	no ongoing activity identified	no ongoing monitoring identified
42. Increase juvenile rearing and overwintering habitat from Middle falls to mouth		Implement Cemetery Creek, Salmon Park and Red Tail reach restoration projects	vegetation monitoring, fish usage, photo points

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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
45. Decrease water temperatures, 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 Temperature TMDL
46. Improve upstream passage for returning salmon	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,
Chuckanut Creek		**Restoration Activity (Ongoing)**	
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,
49. Protect and restore native vegetation along	Improve water quality, Protect /restore habitat and	Ongoing riparian restoration, implementation of the	no ongoing monitoring identified

Chuckanut creek	habitat forming processes	2005 Stormwater Management Manual for Puget Sound and LID site development practices	
Lake Whatcom		**Restoration Activity (Ongoing)**	
~~TBA~~ *50. Improve water quality.*		*The management recommendations developed by the Lake Whatcom Inter-jurisdictional Coordination Team.*	

6. Existing and Ongoing Programs

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

~~The majority of these are taken from the Bellingham Bay Demonstration Pilot Project Habitat Documentation Report. Attached at the end of Appendix #2 is Table 4 from the Habitat Documentation Report, page 4-18. This table scores the 36 habitat restoration opportunities in terms of their ability to protect and restore ecosystems (Goal #3 in section 3-1 of the report) which include the following objectives:~~

- ~~Environmental preservation/minimize environmental harm~~
- ~~Maintain and protect physical integrity of habitats including shoreline erosion/accretion and other attributes such as sediment transport and detritus and nutrient transport and storage.~~
- ~~Habitat improvement.~~
- ~~Avoid/minimize loss of in-water habitats and compensatory mitigation.~~
- ~~Protect/restore aquatic life and resources.~~
- ~~Maintain/enhance ecosystem diversity, productivity and stability and biological function.~~
- ~~Restore threatened and endangered species.~~

~~Each project was scored against 12 criterion (specified in chapter 4, pages 4-1 through 4-3 of the report) under the overall goal of protect and restore ecosystems.~~

~~(Please reference the Final Habitat Restoration Documentation Report, February 1999 for more details)~~

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 SHOULD 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.

TABLE 3:

RESTORATION PLANNING			
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.			
Project	**Details**	**~~Who~~**	**Status *(timeline and funding)***
Bellingham Bay			
One of the fundamental elements of the Bellingham Bay Demonstration Pilot Project is habitat restoration. In 1996, a Habitat Action team was created to implement this component. In 1998, the Team developed a Habitat Restoration Document Report that examined historic conditions in Bellingham Bay and identified potential habitat restoration and protection opportunities. **~~These projects below are listed in order of priority~~**~~, with those completed or ongoing listed first. Projects will be completed if or when funding is obtained.~~			
HIGH PRIORITY			
1. Mt. Baker Plywood - Northwest. BBDP #3. Marine reach #4	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.		Work will begin when funding is available

2. Mt. Baker Plywood - South. BBDP #4. Marine reach #3.	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.	Work will begin when funding is available
3. Squalicum Creek Waterway - A. BBDP #5. Marine reach #3.	Removal of treated wooden piles, a pier, log rafting structures, and log rafts.	Work will begin when funding is available
4. Squalicum Creek Waterway - B. BBDP #6. Marine reach #3.	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.	Work will begin when funding is available
5. Bellingham Cold Storage. BBDP #7. Marine reach #3.	The fill could be removed and the site graded to provide estuary habitat suitable for marine buffer, ~~saltmarsh~~salt marsh and/or intertidal mud/~~sandflat~~sand flat.	Work will begin when funding is available

6. Squalicum Harbor Breakwater	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.	Completed
7. Port-Hilton Harbor. BBDP #10. Marine reach # 5.	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 me modified to meet the elevations of the existing eelgrass bed. Allow for natural eelgrass colonization or do limited eelgrass transplanting.	Work will begin when funding is available
8. Georgia-Pacific Log Pond - East. BBDP #11. Marine reach 5.	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.	Work will begin when funding is available
9. Georgia-Pacific ASB - South. BBDP #12. Marine reach # 5.	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.	Work will begin when funding is available

10. Sash and Door (Holly Street Landfill) BBDP #14. Whatcom Creek reach #1.	This action involved removing fill from the Sash and Door site and establishing estuarine riparian buffer, marsh, and mudflat banks.	Completed
11. Head of Whatcom Waterway. BBDP #17. Marine reach #5 & 6.	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.	Work will begin when funding is available
12. Georgia-Pacific Log Pond. BBDP #18. Marine reach #6.	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.	Completed**.** In addition, funding has become available to seed pond area with eelgrass starts for additional habitat feeding and migration areas.
13. Cornwall Avenue Landfill. BBDP# 20. Marine reach #7.	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.	Work will begin when funding is available

14. Boulevard Park. BBDP #21. Marine reach #9.	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.	Work will begin when funding is available
15. Padden Creek - North Shoreline. BBDP #23. Marine reach #11.	Remove shoreline fill and create mudflat and/or saltmarsh	Work will begin when funding is available
16. Padden Creek - North - In-water. BBDP #24. Marine reach #11.	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.	Work will begin when funding is available

17. Padden Creek - Upland. BBDP #25. Padden creek reach #1.	Remove fill and establish connection to Padden Creek. Excavate fill to create tidally influenced brackish marsh. Provide habitat buffer.	Work will begin when funding is available
18. Post Point - Upland. BBDP #26. Marine reach #13.	Excavate upland next ~~to small~~to small open water embayment containing eelgrass. Grade excavated area to provide saltmarsh and mudflat bench.	Vegetation has been installed. Excavation and large woody debris placement is currently being proposed for permits.
19. Padden Creek - East Shore. BBDP #36. Marine reach #12.	Remove fill, asphalt and rock along the east shore and modify elevations to provide estuarine riparian buffer, mudflat benches and marsh.	Work will begin when funding is available
MEDIUM PRIORITY		
20. Cement Company Dock. BBDP #1. Marine reach #2.	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.	Work will begin when funding is available

21. Mt. Baker Plywood - West. BBDP habitat opportunity #2.	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.	Work will begin when funding is available
22. Squalicum Marina. BBDP #9. Marine reach #4.	The substrate along the marina margins modified to incorporate finer grained rocks to provide intertidal/shallow water functions.	Work will begin when funding is available
23. G – P ASB		
24. Citizens Dock. BBDP #15. Marine reach #6.	This dilapidated dock was removed in 1999	Completed
25. Lower Whatcom Creek. BBDP #16. Marine reach #5.	The action would involve removing wooden structures, derelict floats, etc. in the vicinity.	Work will begin when funding is available
26. Port Log Rafting Area. BBDP #19. Marine reach # 6 & 7.	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	Work will begin when funding is available

27. Taylor Street Dock. BBDP #22. Marine Reach #9.	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.	Completed. Post construction sampling has been conducted. Final report due during first week of September, 2005 to determine if the construction of the dock / trestle has not adversely impacted the area or exposed any additional contaminated sediments.
~~**Sash and Door (Holly Street Landfill) BBDP #14. Whatcom Creek reach #1.**~~	~~This action involved removing fill from the Sash and Door site and establishing estuarine riparian buffer, marsh, and mudflat banks.~~	~~Completed~~
~~**Squalicum Harbor Breakwater**~~	~~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.~~	~~Completed~~
~~**Mt. Baker Plywood - West. BBDP habitat opportunity #2.**~~	~~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.~~	~~Work will begin when funding is available~~
~~**Mt. Baker Plywood - Northwest. BBDP #3. Marine reach #4**~~	~~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.~~	~~Work will begin when funding is available~~

~~Mt. Baker Plywood - South. BBDP #4. Marine reach #3.~~	~~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.~~	~~Work will begin when funding is available~~
~~Squalicum Creek Waterway - A. BBDP #5. Marine reach #3.~~	~~Removal of treated wooden piles, a pier, log rafting structures, and log rafts.~~	~~Work will begin when funding is available~~
~~Squalicum Creek Waterway - B. BBDP #6. Marine reach #3.~~	~~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.~~	~~Work will begin when funding is available~~
~~Padden Creek - North Shoreline. BBDP #23. Marine reach #11.~~	~~Remove shoreline fill and create mudflat and/or saltmarsh~~	~~Work will begin when funding is available~~
~~Padden Creek - Upland. BBDP #25. Padden creek reach #1.~~	~~Remove fill and establish connection to Padden Creek. Excavate fill to create tidally influenced brackish marsh. Provide habitat buffer.~~	~~Work will begin when funding is available~~
~~Post Point - Upland. BBDP #26. Marine reach #13.~~	~~Excavate upland next to small open water embayment containing eelgrass. Grade excavated area to provide saltmarsh and mudflat bench.~~	~~Vegetation has been installed. Excavation and large woody debris placement is currently being proposed for permits.~~
~~Port Hilton Harbor. BBDP #10. Marine reach # 5.~~	~~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 me modified to meet the elevations of the existing eelgrass bed. Allow for natural eelgrass colonization or do limited eelgrass transplanting.~~	~~Work will begin when funding is available~~

~~**Head of Whatcom Waterway. BBDP #17. Marine reach #5 & 6.**~~	~~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.~~	~~Work will begin when funding is available~~
~~**Bellingham Cold Storage. BBDP #7. Marine reach #3.**~~	~~The fill could be removed and the site graded to provide estuary habitat suitable for marine buffer, saltmarsh and/or intertidal mud/sandflat.~~	~~Work will begin when funding is available~~
~~**Cornwall Avenue Landfill. BBDP# 20. Marine reach #7.**~~	~~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.~~	~~Work will begin when funding is available~~
~~**Padden Creek - East Shore. BBDP #36. Marine reach #12.**~~	~~Remove fill, asphalt and rock along the east shore and modify elevations to provide estuarine riparian buffer, mudflat benches and marsh.~~	~~Work will begin when funding is available~~
~~**Georgia-Pacific Log Pond - East. BBDP #11. Marine reach 5.**~~	~~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.~~	~~Work will begin when funding is available~~

~~Georgia-Pacific ASB - South. BBDP #12. Marine reach # 5.~~	~~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.~~	~~Work will begin when funding is available~~
~~Boulevard Park. BBDP #21. Marine reach #9.~~	~~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.~~	~~Work will begin when funding is available~~
~~Padden Creek - North - In-water. BBDP #24. Marine reach #11.~~	~~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.~~	~~Work will begin when funding is available~~

~~**Port Log Rafting Area. BBDP #19. Marine reach # 6 & 7.**~~	~~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~~	~~Work will begin when funding is available~~
~~**Squalicum Marina. BBDP #9. Marine reach #4.**~~	~~The substrate along the marina margins modified to incorporate finer grained rocks to provide intertidal/shallow water functions.~~	~~Work will begin when funding is available~~
~~**Citizens Dock. BBDP #15. Marine reach #6.**~~	~~This dilapidated dock was removed in 1999~~	~~Completed~~
~~**Cement Company Dock. BBDP #1. Marine reach #2.**~~	~~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.~~	~~Work will begin when funding is available~~
~~**Lower Whatcom Creek. BBDP #16. Marine reach #5.**~~	~~The action would involve removing wooden structures, derelict floats, etc. in the vicinity.~~	~~Work will begin when funding is available~~
28. Post Point - Shoreline. BBDP #27. Marine reach #11.	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.	Work will begin when funding is available
29. Post Point - South. BBDP #28. Marine reach #14-16.	Modify existing structure under railroad crossing to open it up.	Work will begin when funding is available

30. Chuckanut Spit. BBDP #29. Marine reach 17.	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.	Work will begin when funding is available
31. Chuckanut Breach. BBDP #30. Marine reach #19.	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.	Work will begin when funding is available
32. Lummi Peninsula. BBDP #33.	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.	Work will begin when funding is available
33. Nooksack Delta - East. BBDP #35.	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.	Work will begin when funding is available
LOW PRIORITY		

34. Post Point to Chuckanut Protection. BBDP #31. Marine reach #14-18.	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
35. Portage Island Protection Area. BBDP #32.	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
~~**Lummi Peninsula. BBDP #33.**~~	~~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.~~	~~Work will begin when funding is available~~
36. Nooksack Delta Protection Area. BBDP #34.	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

~~**Nooksack Delta – East. BBDP #35.**~~	~~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.~~		~~Work will begin when funding is available~~
37. Bellingham Bay rogue creosote log removal.	Remove from nearshore and upland areas rogue logs that wash into shore that are treated with creosote.	C.O.B., D.O.E and W.C.C	Completed but ongoing.
Squalicum Creek			
38. Segment from West Street to Meridian Street. (two segments: Roeder to West AND West to Meridian Street. Squal. reaches 1-3.	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.

39. Pacific Concrete. New spring channel. Squalicum reach #2.	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.	City of Bellingham: Environmental Resources	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.
40. Squalicum Parkway culvert & fish passage improvements. Reaches 2 and 3.	4 total most downstream ones.		Current and to be completed by COB in 2005.
41. Baker Creek culvert and fish passage improvements. Not in SMA jurisdiction.	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.		Current and to be completed by COB in 2005.

42. Birchwood Avenue culvert and fish passage improvements. Squal reach boundary between 5 and 6.	bug lake outlet		Current and to be completed by COB in 2005.
43. Lower Squalicum bank stabilization. Squalicum reach #2.	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.
44. Bug Lake. Squal reach #6.	City recently purchased the lake for future habitat improvement.	City of Bellingham: Environmental Resources	Work will begin when funding is available.
45. James Street Segment. Squal reach #6.	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.
Whatcom Creek			
46. Horton Towing Segment. Whatcom Cr reach #4.	Increase riparian area by rolling back fence - graveled parking area - removal of noxious and install new native mix of conifers, understory and shrubs.	potential for WCC or via private devel.	Work will begin as funding is available or project proposal warrants.

47. Red Tail Reach/Bay City Supply. Whatcom Creek reach #4.	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.	City of Bellingham: Environmental Resources	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.

48. Detailed Implementation Plan (DIP), Bacteria and Temperature TMDL. Whatcom Creek drainage analysis: ECO FUNCT: water quality.	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.	City of Bellingham: Environmental Resources	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.
49. Salmon Park. Whatcom Creek reach #4 and 5.	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)	City of Bellingham	Scheduled to being in 2005.
50. Cemetery Creek. Whatcom Creek reach #5.	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)	City of Bellingham	Scheduled to begin in 2006.
51. Mouth to Cornwall. Reaches #1 and 2.	Invasive species removal and new native vegetation installation.	City of Bellingham, WCC	ongoing since 2001.
52. State Street to Meador. Reach #3.	Invasive species removal and new native vegetation installation.	City of Bellingham, WCC	2003 - present

53. Interstate 5 to middle falls - Whatcom Falls Park. Reaches 4-7.	Invasive species removal and new native vegetation installation.	City of Bellingham, WCC	ongoing since 2001.
Chuckanut Creek			
54. Chuckanut Creek - reach #1.	Periodic maintenance dredging for flow capacities.		Ongoing.
Lake Whatcom			

~~There are no new restoration projects planned for Lake Whatcom.~~ 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:

~~The Lake Whatcom Management Program is a joint effort between the City, Whatcom County and Water District #10 to protect, preserve and enhance water quality and mange water quantity of the lake as the drinking water source for City residents.~~

In 2005, the City and County Councils and the Lake Whatcom Water & 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.

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.

The "2005-2009 Lake Whatcom Work Plan: Priority Tasks for 2006" can be found on the Lake Whatcom website at: http://www.lakewhatcom.wsu.edu/.

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."

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 competed, there will be a deliberation with the city to determine the best strategies to reduce the pollution allocation.
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.