

FINAL

**CITY OF MILTON
GRANT NO. G1000047**

CUMULATIVE IMPACTS ANALYSIS
**for City of Milton Shorelines: Surprise Lake and Hylebos
Creek**

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This report was
funded in part
through a grant from
the Washington
Department of
Ecology.

November 2011

**The Watershed Company
Reference Number:
100108**

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Cite this document as:

The Watershed Company and Makers. November 2011. Cumulative Impacts Analysis for the City of Lake Milton Shorelines: Surprise Lake and Hylebos Creek. Prepared for the City of Milton Planning and Community Development Department, Milton, WA.

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CUMULATIVE IMPACTS ANALYSIS

CITY OF MILTON SHORELINES: SURPRISE LAKE AND HYLEBOS CREEK

1 INTRODUCTION

1.1 Shoreline Management Act Requirements

The Shoreline Management Act guidelines (Guidelines) require local shoreline master programs (SMPs) to regulate new development to “achieve no net loss of ecological function.” The Guidelines (WAC 173-26-186(8)(d)) state that, “To ensure no net loss of ecological functions and protection of other shoreline functions and/or uses, master programs shall contain policies, programs, and regulations that address adverse cumulative impacts and fairly allocate the burden of addressing cumulative impacts.”

The Guidelines further elaborate on the concept of net loss as follows:

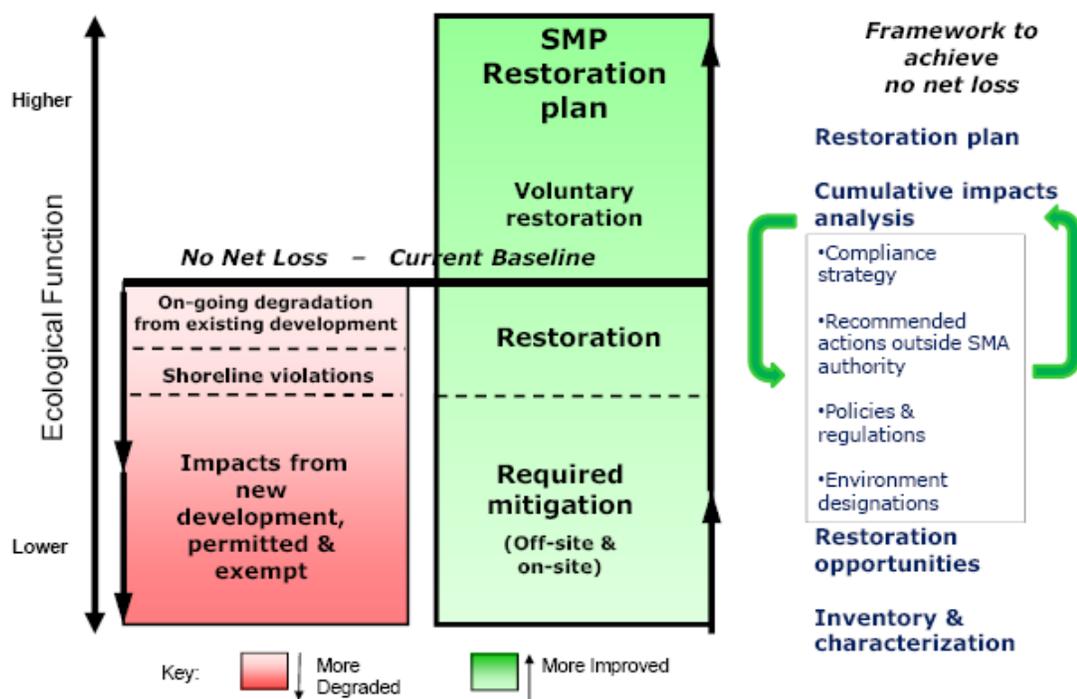
When based on the inventory and analysis requirements and completed consistent with the specific provisions of these guidelines, the master program should ensure that development will be protective of ecological functions necessary to sustain existing shoreline natural resources and meet the standard. The concept of “net” as used herein, recognizes that any development has potential or actual, short-term or long-term impacts and that through application of appropriate development standards and employment of mitigation measures in accordance with the mitigation sequence, those impacts will be addressed in a manner necessary to assure that the end result will not diminish the shoreline resources and values as they currently exist. Where uses or development that impact ecological functions are necessary to achieve other objectives of RCW 90.58.020, master program provisions shall, to the greatest extent feasible, protect existing ecological functions and avoid new impacts to habitat and ecological functions before implementing other measures designed to achieve no net loss of ecological functions. [WAC 173-206-201(2)(c)]

In short, updated SMPs shall contain goals, policies, and regulations that prevent degradation of ecological functions relative to the existing conditions as documented in that jurisdiction’s characterization and analysis report. For those projects that result in degradation of ecological functions, the required mitigation must return the resultant ecological function back to the baseline. This is illustrated in Figure 1 below. The jurisdiction must be able to demonstrate that it has accomplished that goal through an

analysis of cumulative impacts that might occur through implementation of the updated SMP. WAC 173-26-186(8)(d) states “[e]valuation of such cumulative impacts should consider:

- (i) current circumstances affecting the shorelines and relevant natural processes;
- (ii) reasonably foreseeable future development and use of the shoreline; and
- (iii) beneficial effects of any established regulatory programs under other local, state, and federal laws.”

Figure 1. Framework to achieve no net loss.



Source: Department of Ecology

As outlined in the *Shoreline Restoration Plan* prepared as part of this SMP update, the SMA also seeks to restore ecological functions in degraded shorelines. This cannot be required by the SMP at a project level, but Section 173-26-201(2)(f) of the Guidelines says: “master programs shall include goals and policies that provide for restoration of such impaired ecological functions.” See the *Shoreline Restoration Plan* for additional discussion of SMP policies and other programs and activities in the City that contribute to the long-term restoration of ecological functions relative to the baseline condition.

1.2 Methodology

Using the textual, numerical and graphical information developed and presented in the *Shoreline Analysis Report*, this cumulative impacts analysis was prepared consistent with

direction provided in the Guidelines as described above. To the extent that existing information was sufficiently detailed and assumptions about possible new or re-development could be made with reasonable certainty, the following analysis is quantitative. However, in many cases information about existing conditions and/or redevelopment potential was not available at a level that could be assessed quantitatively or the analysis would be unnecessarily complex to reach a conclusion that could be derived more simply. Further, ecological function does not have an easy metric. For these reasons, much of the following analysis is more qualitative.

2 EXISTING CONDITIONS

The following summary of existing conditions is based on the *Shoreline Analysis Report*. This discussion has been divided by waterbody and includes a discussion of the proposed shoreline environment designations (see Appendix A of the SMP for a map of environment designations). Environment designations include Urban Conservancy, Residential and Aquatic.

For an in-depth look at existing conditions, please consult the *Shoreline Analysis Report*. The report includes a detailed review of a variety of topics, including ecosystem-wide processes, land use, and ecological function, among others. A summary of information is provided below. Table 1 below is reproduced directly from the *Shoreline Analysis Report* (Table 2).

Table 1. Summary of inventory information.

Inventory Element	Shoreline	
	Surprise Lake	Hylebos Creek
Shoreline Dimensions	<ul style="list-style-type: none"> • 5,510 linear feet of shoreline frontage • 26.7 acres 	<ul style="list-style-type: none"> • 2,561 linear feet of shoreline frontage • 21.1 acres
Land Use/Parcels	<ul style="list-style-type: none"> • 40 total waterfront lots • 28 of which are single-family residential • 2 greenbelt common areas • 3 vacant lots • Other large lots consist of multi-family (e.g. Surprise Lake Village) or private recreational lots (Camp Edgewood) 	<ul style="list-style-type: none"> • 12 single-family residential parcels (all adjacent to associated wetlands) located upstream of 20 cfs point. • Industrial land uses downstream of 20 cfs point.
Zoning	<ul style="list-style-type: none"> • Residential Multi-Family District (RM) – 61.9% • Residential Single Family District (RS) – 38.1% 	<ul style="list-style-type: none"> • Light Manufacturing District (M-1) – 81.5% • Residential Single Family District (RS) – 16.7% • Business District (B) – 1.8%

Inventory Element	Shoreline	
	Surprise Lake	Hylebos Creek
Existing Setbacks	The median setback for residential structures is ~80 feet. Two lots have structures which are greater than 200 feet from the OHWM. The closest structure is 12 feet from shore, ¹	Per the City's CAO, a buffer of 165 applies to Hylebos Creek. Most structures along Hylebos Creek are setback from the OHWM. However, along the industrial corridor, the proximity of impervious surfaces (i.e. parking areas) averages 18 feet from the creek.
Build-out Potential	<ul style="list-style-type: none"> • RS Zone: 8,000 s.f. minimum lot size • RM Zone: 8,000 s.f. minimum lot size • Standard density: 12 dwelling units/acre • Adult Retirement Community: 18 dwelling units/acre <p>Potential for subdivision: Not including existing multi-family development or Camp Edgewood, approximately 20 lots surrounding Surprise Lake could be subdivided. However, due to minimum lot width requirements, only 3 lots could be divided to result in additional shoreline property frontage for new residences.</p>	<ul style="list-style-type: none"> • M-1 Zone: 12,000 s.f. minimum lot size • RS Zone: 8,000 s.f. minimum lot size • Maximum net density 5.45 dwelling units/acre <p>The Light Manufacturing zoning designation is not likely to result in lot subdivision in the future.</p>
Utilities	<p>Surface waters: stormwater drainage directed to Surprise Lake at nine discharge locations.</p> <p>Wastewater is maintained by Pierce County and directed to the City of Tacoma Wastewater Treatment Facility for treatment. County pump stations and sewer lines occur within or immediately adjacent to all shoreline segments.</p>	<p>Surface waters: stormwater drainage directed to Hylebos Creek at two discharge locations.</p> <p>Wastewater is maintained by Pierce County and directed to the City of Tacoma Wastewater Treatment Facility for treatment. County pump stations and sewer lines occur within or immediately adjacent to all shoreline segments.</p>
Impervious Surface	29.6%	47.8%
Terrestrial Vegetation	<ul style="list-style-type: none"> • Developed, Low Intensity – 57.6% • Developed, Open Space – 19.8% • Developed, Medium Intensity – 10.5% • Evergreen Forest – 4.1% • Mixed Forest – 3.7% • Deciduous Forest – 1.8% • Unconsolidated Shore – 1.1% • Developed, High Intensity - <1% 	<ul style="list-style-type: none"> • Developed, Medium Intensity – 34.7% • Developed, Low Intensity – 28.2% • Developed, High Intensity – 16.4% • Developed, Open Space – 13.8% • Palustrine Emergent Wetland – 5.9% • Deciduous Forest - <1%

Inventory Element	Shoreline	
	Surprise Lake	Hylebos Creek
Overwater Cover²	<ul style="list-style-type: none"> • 16,117 SF (0.37 acres) • 2.9 SF/linear foot of shoreline <p>21 docks, including 2 docks on semi-private properties and 1 dock on a greenbelt common area. 11 single-family residential parcels do not have docks.</p>	<ul style="list-style-type: none"> • 1,307 SF (0.03 acres) • 0.5 SF/linear foot of shoreline <p>Overwater cover along Hylebos Creek consists of the Porter Way bridge crossing and a small local access bridge just downstream of Porter Way.</p>
Shoreline Armoring¹	<ul style="list-style-type: none"> • Bulkhead - 28% 	<ul style="list-style-type: none"> • N/A
Public Access	<p>No designated public access available although private community shoreline access is available at Surprise Lake Village.</p>	<p>No designated public access available in shoreline jurisdiction although public access is available upstream at the following locations:</p> <ul style="list-style-type: none"> • Hylebos Creek/Inter-Urban Trail • West Milton Nature Preserve • Hylebos Overlook • West Hylebos Osaka Property <p>The shoreline area along Hylebos Creek is bordered on one side by Interstate 5 and on the other side by existing industrial development, again all under private ownership.</p>
Critical Areas	<ul style="list-style-type: none"> • Floodplain – 11.6% • Priority Habitats: bald eagle buffer - 100% • Priority Species – waterfowl concentrations/wetlands – 5.7% • Wetlands – 4.5% • Erosion Hazard Area – 83.5% • Seismic Hazard Area – 8.9% 	<ul style="list-style-type: none"> • Floodplain – 37.4% • Floodway – 9.5% • Wetlands – 35.1% • Landslide Hazard Area – 3.3% • Volcanic Hazard Area – 100% • Seismic Hazard Area – 87.2%
Listed Species	<p>None</p>	<ul style="list-style-type: none"> • Chinook salmon (potential but unlikely) • Steelhead (potential but unlikely) <p>Other salmonids known to use or potentially use Hylebos Creek include coho, chum and pink salmon.</p>
Impaired Waters (303d/305b)	<p>None</p>	<ul style="list-style-type: none"> • Copper • Fecal coliform • Bioassessment • Dissolved oxygen

¹The City of Milton currently does not have a standard shoreline setback or buffer for Surprise Lake per the City's critical areas regulations or shoreline master program.

² Overwater cover and shoreline armoring information derived from aerial photo interpretation by The Watershed Company

2.1 Surprise Lake

Surprise Lake is privately owned and land use is almost exclusively residential (both single-family and multi-family). A private recreational lot (Camp Edgewood) is also located in the northeast corner of the lake. There are no public access opportunities on the lake. The Surprise Lake shoreline unit includes approximately 5,510 linear feet of shoreline and 26.7 acres of total shoreline jurisdiction (not including aquatic area). The *Shoreline Analysis Report* rates the overall shoreline ecological function as “LOW-MODERATE.” Table 2 provides a recap of the functional analysis from the *Shoreline Analysis Report* (Table 3).

The uplands around the lake are all designated Residential.

Table 2. Function Summary of Surprise Lake Shoreline.

Surprise Lake	
Shoreline Processes and Functions	Alterations and Assessment of Functions
Hydrologic	
Storing water and sediment	LOW-MODERATE: The lake of course provides excellent water and sediment storage functions. However, the uplands surrounding the lake within shoreline jurisdiction have low water and sediment storage functions. Impervious surfaces and compact managed lawns interfere with infiltration of precipitation and rapidly send water “downstream.” Wetlands and other natural water and sediment storage features are generally lacking.
Attenuating wave energy	MODERATE: Wind and wave driven erosion is generally not a problem on the lake. However, bulkheading (primarily along the western shoreline) and other shoreline modifications have replaced native vegetation and natural woody debris as the features most likely to attenuate wave energy. Shoreline erosion is not known to be a serious problem on the lake.
Removing excess nutrients and toxic compounds	LOW-MODERATE: The lake is surrounded by intensively landscaped lakefront development. These types of upland shoreline areas are more often a source of nutrients and toxic compounds, via lawn treatment runoff (pesticides, fertilizers, herbicides), pet wastes, road and construction site runoff (hydrocarbons, metals, sediment), and septic systems.
Recruitment of LWD and other organic material	MODERATE: Residential development and other upland modifications surrounding Surprise Lake restrict the ability of the lake to recruit significant LWD and organic material. The addition of increased vegetation along the lakeshore would allow for improved function in the future.
Vegetation	
Temperature regulation	MODERATE: Lack of dense shoreline vegetation along Surprise Lake nearly eliminates potential for some shading of the shallow-water nearshore area. Vegetation along the lake is less effective at shading west- and south-facing shoreline areas due to afternoon sun from the southwest. Additional mature tree and shrub cover near shore will help improve temperature regulation functions in the future.

Surprise Lake	
Shoreline Processes and Functions	Alterations and Assessment of Functions
Water quality improvement	LOW-MODERATE: Residential areas surround the lake and in most cases are dominated by lawn and landscaping rather than dense buffers of native lakeside vegetation. These residential landscapes can be sources of water quality contaminants such as fertilizers, herbicides and pesticides. In addition to the typical residential landscaping pollutants, runoff from surrounding urban areas carries hydrocarbons, metals, sediments, and other pollutants to the lake from roads, parking lots, and other developed areas. Improvements to water quality vegetative functions can be made in the future through the addition of a vegetative shoreline buffer as well as improved stormwater management from upland runoff.
Attenuating wave energy	MODERATE: In its pre-development condition, the lake was ringed with emergent wetlands and mature mixed-forest communities. Those communities are now almost entirely absent around the lakeshore, so currently vegetation provides limited wave attenuation function. As mentioned above, bulkheading and other shoreline modifications have replaced native vegetation and natural woody debris as the features in places (primarily the western shoreline) to reduce the effects of what limited wave energy there is on uplands.
Sediment removal and bank stabilization	LOW-MODERATE: Under natural conditions, there would be an ongoing, underlying rate of shoreline erosion, which would contribute to maintaining substrate conditions. This rate would be partially determined and moderated by the presence of shoreline vegetation whose root systems would tend to hold bank material in place. Instead, the lake shore now has little shoreline vegetation and a large portion of it is armored. While this “stabilizes” the banks, it limits natural recruitment of lakebed materials. Future improvement of this function would result from reduction in hard shoreline stabilization.
LWD and organic matter recruitment	LOW-MODERATE: Again, the loss of natural, forested shoreline vegetation and its replacement primarily with lawn and other types of landscaping has nearly eliminated LWD and organic matter recruitment potential along the lake shore. Any trees or LWD that enter the lake are likely to be quickly removed out of concern for safety or to reduce the risk of property damage. The vegetated shoreline on the Camp Edgewood property is a notable exception. The addition of increased vegetation along the lakeshore would allow for improved function in the future.
Habitat	
Physical space and conditions for life history	LOW-MODERATE: Under natural (i.e. unarmored and unmodified) conditions, the lake bottom would gradually rise in a shallow wedge such that any incoming waves would roll up the bottom and onto the shore, losing energy. This reduced energy environment would be more hospitable to emergent vegetation, which further attenuates wave energy and provides a refuge for small fish and amphibians. Shallow nearshore areas in lakes typically provide rearing and foraging habitat for fish. Shoreline armoring (present along most of the western shoreline of Surprise Lake), however, generally reduces this low-energy shallow-water environment, creating a deeper, more turbulent nearshore area that is less hospitable to small fish and amphibians, as well as to emergent vegetation. The deeper water may also allow larger fish predators to prey on small fish. Reduction in shoreline armoring and corresponding restoration of shoreline gradient to a more natural slope would help improve nearshore aquatic habitat function.

Surprise Lake	
Shoreline Processes and Functions	Alterations and Assessment of Functions
	The absence of dense terrestrial shoreline vegetation along Surprise Lake is a limiting factor in terrestrial species' (birds, mammals, amphibians) use of the shoreline, since cover, food, nesting sites, travel corridors, etc. are limited or largely absent. The addition of native tree and shrub vegetation within shoreline jurisdiction and especially along the lake edge would increase available habitat for a variety of terrestrial species.
Food production and delivery	LOW-MODERATE: Food production from the uplands surrounding Surprise Lake is limited by the lack of native seed- and fruit-bearing vegetation. This may be made up for, in part, by fruit trees and other non-native vegetation in yards which supplies some food for wildlife. Not only does native upland vegetation provide food directly for terrestrial wildlife, but it is a source of insects and other organic matter that drop into the water to provide food for fish and other aquatic life. The historical emergent wetland areas that are now reduced or absent also provided productive foraging areas for small mammals, wading birds and waterfowl.
Summary	Accounting for the existing hydrologic, vegetative, and habitat conditions within the shoreline surrounding Surprise Lake, the overall shoreline ecological function is considered LOW-MODERATE.

2.2 Hylebos Creek

Within the City, the Hylebos Creek shoreline includes two separate segments within shoreline jurisdiction (separated by an area of UGA), totaling approximately 0.5-mile in length. Shoreline jurisdiction also includes wetlands associated with portions of East Hylebos Creek and West Hylebos Creek, just north of their confluence. A second, separate associated wetland area is located south of Porter Way, approximately 600 feet east of Hylebos Creek. This small mapped wetland is within the creek's 100-year floodplain and thus considered associated with the shoreline. Single-family land uses characterize land use upstream of the 20 cfs point, while industrial uses are found below the 20 cfs point. No designated public access opportunities exist in shoreline jurisdiction, though public access is available upstream at several locations. The total shoreline area for the Hylebos Creek assessment unit, including associated wetlands, is 21.1 acres. The *Shoreline Analysis Report* rates the overall shoreline ecological function as "MODERATE." Table 3 provides a recap of the functional analysis from the *Shoreline Analysis Report* (Table 4).

The entire jurisdictional area along Hylebos Creek has been designated as Urban Conservancy.

Table 3. Function Summary of Hylebos Creek.

Hylebos Creek	
Shoreline Processes and Functions	Alterations and Assessment of Functions
Hydrologic	
Storage of water and sediment	LOW/MODERATE: Adjoining floodplain and riparian wetland areas contribute to this creek's ability to store water and sediment during high flow events. However, downstream sections of the stream along the industrial areas south of Porter Way are quite narrow and constrained by development.
Transport of water and sediment	MODERATE: The stream has been channelized through portions of this reach. Paired with increased development in the basin, the flow regime and the sediment transport capacity have likely been altered. However, the creek within the City's shoreline area may be less sensitive to such alterations, given the large areas of adjacent wetlands that tend to provide a buffer from surrounding development.
Attenuating flow energy	MODERATE: As mentioned above, some sections of broad floodplain remain in this reach. These are effective at attenuating streamflow energy during flood events. However, the recruitment of woody debris, especially LWD, is impaired due to clearing and the small size of the streambank trees remaining. To its benefit, the basin includes associated wetland areas which serve to dampen and moderate stream flow fluctuations. Still, the decrease in channel roughness brought on by a reduction in accumulated woody debris and bank vegetation has reduced the stream channel's ability to absorb and dissipate stream flow energy.
Developing pools, riffles, and gravel bars	LOW/MODERATE: Reduction in roughness elements, via channelization and removal of LWD, has resulted in a simpler channel form which is less conducive to the formation and maintenance of the basic habitat elements, including pools, riffles, and gravel point bars. Future improvements to this function may be achieved over time through increased shoreline and bank vegetation which may then improve channel complexity.
Removing excess nutrients and toxic compounds	MODERATE: Remaining broad floodplain and wetland areas along Hylebos Creek provide a competent biofiltration function. However, other areas located further upland or in areas of more intense development adjacent to the creek (i.e. the industrial uses downstream of Porter Way) are more often a source of nutrients and toxic compounds than a sink, due to impervious surface runoff (hydrocarbons, metals). Improvements in stormwater management and adherence to best management practices will reduce those impacts over time.
Recruitment and transport of LWD and other organic material	LOW: Streambank forest vegetation, particularly large trees, has been reduced along most of this stretch of Hylebos Creek, reducing the recruitment of large logs and some other vegetative material as well. Remaining trees along the creek are typically small in size, so opportunities for recruiting large wood are reduced. Furthermore, channel migration has been curtailed by channelization. Laterally migrating channels recruit the forest materials in their paths and also recruit and recycle riverbank gravels laid down along previous channel alignments. Revegetation along Hylebos Creek streambank will improve this function.
Vegetation	

Hylebos Creek	
Shoreline Processes and Functions	Alterations and Assessment of Functions
Temperature regulation	LOW/MODERATE: Well-vegetated banks and buffers are known to improve shading conditions, in turn benefiting both temperature and dissolved oxygen. Along Hylebos Creek within the City's shoreline, the vegetation is typified by low density and small size of shoreline vegetation (primarily reed canarygrass). The lack of dense tree and shrub cover greatly reduces the level of shading afforded this portion of Hylebos Creek. It is noted that smaller vegetation is needed to provide shade to a narrower creek (such as Hylebos) as opposed to a wider river.
Water quality improvement	MODERATE: Where wide floodplain areas remain and are densely vegetated with willows, grasses, emergent vegetation, and other riparian vegetation types, an effective level of biofiltration can still occur. However, urbanizing areas in the Hylebos basin are dominated by roads, parking areas and landscaping, and lack densely vegetated buffers of sufficient width. These urban areas are sources, rather than sinks, of water quality contaminants such as fertilizers, herbicides, pesticides, hydrocarbons, metals, and eroded soils. Water quality improvement functions can be enhanced via improved stormwater management and adherence to best management practices in conjunction with providing a dense buffer of native vegetation.
Slowing riverbank erosion; bank stabilization	MODERATE: The dense grasses and shrubby vegetation that line much of Hylebos Creek are fairly effective at stabilizing soils and slowing the rate of erosion. However, the function of slowing the rate of bank erosion formerly provided by bank vegetation has now been taken over by artificial armoring in some areas, such as at the road crossings. Prior to settlement and clearing, the creek would have been lined with mature, mixed-forest communities.
Attenuation of flow energy	LOW/MODERATE: (As stated above), the decrease in channel roughness due to a reduction in accumulated woody debris, channel straightening, and reduction in bank vegetation has reduced the channel's ability to absorb and dissipate stream flow energy.
Sediment removal	MODERATE: As stated above, remaining densely vegetated floodplain areas are effective filters for the filtering and retention of fine sediments. Conversely, the more developed, industrial areas lining the portions of Hylebos Creek south of Porter Way, are not as effective at removing sediments due to their narrow existing buffers.
Provision of LWD and organic matter	LOW: Streambank vegetation now consists primarily of grasses along much of this reach, and includes only smaller tree sizes in the remaining areas, so there is little opportunity for the recruitment of LWD. Revegetation of native trees and shrubs immediately adjacent to the creek will help improve this function over time.
Hyporheic	
Removing excess nutrients and toxic compounds	MODERATE: The soils in this portion of the stream are largely fine-grained and not as conducive to hyporheic flow as a coarser substrate would be, limiting the natural potential for hyporheic removal of excess nutrients and toxic compounds.
Water storage and maintenance of base flows	MODERATE: As above, the existing soils are not likely conducive to significant hyporheic flow, limiting the potential for water storage and base-flow maintenance.
Support of vegetation	MODERATE: Though hyporheic flow is limited, the vegetation supported by such flow has been altered significantly in much of this reach.
Habitat	
Physical space and conditions for	LOW/MODERATE: Habitat in and along Hylebos Creek has been reduced in quality, quantity, and complexity compared to its original condition. The vegetative

Hylebos Creek	
Shoreline Processes and Functions	Alterations and Assessment of Functions
life history	<p>community is now much sparser and with a much lower level of accumulated downed wood and snags, resulting in fewer places for various wildlife species to find cover or suitable nesting and rearing sites. The diminishment of dense shoreline vegetation is a limiting factor for terrestrial species' (birds, mammals, amphibians) use of the shoreline, since cover, food, nesting sites, travel corridors, etc. are absent.</p> <p>Within the channel itself, less wood overall similarly results in less available protective cover, and diminishes the creation of pool/riffle sequences as well. A reduction in side channels backwaters and sinuosity has reduced the amount of valuable edge habitat available, and further reduced overall complexity.</p>
Food production and delivery	<p>MODERATE: Food production from developed floodplain and upland areas surrounding Hylebos Creek is limited by a reduction in native seed- and fruit-bearing vegetation. Not only does such vegetation provide food directly for terrestrial wildlife, but it is a source of insects and other organic matter that drop into the water and provide food, either directly or indirectly, for fish and other aquatic life. The historic, but now reduced, emergent wetland areas also provided productive foraging areas for juvenile fish, small mammals, wading birds, and waterfowl.</p>
Summary	<p>Accounting for the existing hydrologic, vegetative, hyporheic, and habitat conditions within Hylebos Creek, the overall shoreline ecological function is considered MODERATE.</p>

3 DEVELOPMENT AND USE POTENTIAL

This section summarizes the development and use potential within the City's shoreline jurisdiction, including potential use conflicts. For each shoreline waterbody, a summary of likely changes in land use is provided, organized according to the applicable zoning designations.

3.1 Surprise Lake

The following table (Table 4) is a summary of material included in the *Shoreline Analysis Report*.

Table 4. Potential development and land use changes along the Surprise Lake shoreline.

Zoning	Potential development and land use changes
Single-Family Residential Zoning	<p>This area, located along the west side of the lake, is currently zoned Residential Single Family District, which allows up to 5.45 dwelling units per acre. Most of these parcels are built out and are not likely to change use. Approximately 3 vacant lots exist around the lakeshore, but these may be owned by adjacent properties or are owned and used as community access lots which are unlikely to develop in the near future.</p> <p>As noted in Table 1, there is potential for subdivision along the single family zoned shoreline. Approximately 20 lots surrounding Surprise Lake could be subdivided. However, due to minimum lot width requirements, only 3 lots could be divided to result in additional shoreline property frontage for new residences.</p> <p>Some redevelopment of existing housing stock may occur.</p> <p>No potential use conflicts are evident.</p>
Multi Family Residential Zoning	<p>This area, located along the north and east side of the lake, is currently zoned Residential Multi-Family District, which allows between 4 and 12 dwelling units per acre. This area includes a mixture of single-family residences, the Surprise Lake Village Apartments and Camp Edgewood. All of these parcels, except for Camp Edgewood, are built out and are not likely to change use. However, some redevelopment of existing structures may occur. Camp Edgewood is a long-standing religious retreat center, with permanent residents, that does not fit with the multi-family residential zoning. However, this use is unlikely to change in the near future.</p>

3.2 Hylebos Creek

The following table (Table 5) is an excerpt of material included in Chapter 5 of the *Shoreline Analysis Report*.

Table 5. Potential development and land use changes along the Hylebos Creek shoreline.

Zoning	Potential development and land use changes
Single-Family Residential Zoning	<p>This area is zoned Single Family Residential, which allows up to 5.45 dwelling units per acre. The area is almost entirely developed with single-family residences, although not at the maximum densities allowed. New development and/or subdivision of property is possible in the future. However, the area of shoreline jurisdiction is entirely contained within the identified associated wetland. Thus, substantial new development is unlikely to occur within shoreline jurisdiction. Redevelopment of existing structures is the more likely scenario – but will still occur outside of shoreline jurisdiction.</p>
Manufacturing – East of I-5	<p>This area is zoned Light Manufacturing and includes the Milton Industrial Park. This area might see new industrial uses or redevelopment of existing uses. No apparent use conflicts are evident.</p>

Zoning	Potential development and land use changes
Manufacturing – West of I-5	This area is designated and zoned Light Manufacturing, and is entirely built out, primarily with vehicle and equipment sale lots. This area is unlikely to see new development, but is more likely to see redevelopment of existing uses. No apparent use conflicts are evident.

4 PROTECTIVE SMP PROVISIONS

4.1 Environment Designations

The first line of protection of the City’s shorelines is the environment designation assignments (see Appendix A of the SMP for a map of environment designations). Tables 6 and 7 below identify the prohibited and allowed modifications and uses in each of the shoreline environments, and show a hierarchy of higher-impacting uses and modifications being allowed in the already highly altered shoreline environments, with uses more limited in the less developed areas. This strategy helps to minimize cumulative impacts by concentrating development activity in lower functioning areas that are not likely to experience function degradation with incremental increases in new development.

The Urban Conservancy environment is the most flexible of the environment designations, allowing a variety of uses, including commercial, residential, and recreation, and modifications. The Residential environment is arguably more restrictive than the Urban Conservancy environment, as the Urban Conservancy environment allows a few intensive uses that are not allowed in the Residential environment, particularly industrial uses and non-water-oriented commercial development.

Table 6. Shoreline modification table (from Table 2 of the SMP).

P = Permitted	<table border="1"> <thead> <tr> <th></th> <th>Urban Conservancy</th> <th>Residential</th> <th>Aquatic</th> </tr> </thead> <tbody> <tr> <td>Environmental restoration/enhancement</td> <td>P</td> <td>P</td> <td>P</td> </tr> <tr> <td>Shoreline stabilization:</td> <td></td> <td></td> <td></td> </tr> <tr> <td> Bioengineering</td> <td>C</td> <td>P</td> <td>C</td> </tr> <tr> <td> Revetments</td> <td>X</td> <td>P</td> <td>C</td> </tr> </tbody> </table>		Urban Conservancy	Residential	Aquatic	Environmental restoration/enhancement	P	P	P	Shoreline stabilization:				Bioengineering	C	P	C	Revetments	X	P	C
		Urban Conservancy	Residential	Aquatic																	
Environmental restoration/enhancement		P	P	P																	
Shoreline stabilization:																					
Bioengineering	C	P	C																		
Revetments	X	P	C																		
C = May be permitted as a conditional use only																					
X = Prohibited; the use is not eligible for a Shoreline Variance or Shoreline Conditional Use Permit																					

Bulkheads	X	P	C
Breakwaters/jetties/rock weirs/groins	X	X	X
Dikes, levees	X	X	X
Clearing and Grading	X	P	P
Dredging	N/A	N/A	C
Hazardous waste cleanup	P	P	P
Fill ^{1,4}	X	P ³	C ²
Piers, docks	X	P	P
Moorage piles and mooring buoys	X	X	X

Shoreline Modification Table Notes:

1. Fill in the floodplain must meet all federal, state, and local flood hazard reduction regulations.
2. Fill in aquatic areas for the purposes of shoreline ecological restoration may be allowed as a permitted use if the Shoreline Administrator determines that there will be an increase in desired ecological functions.
3. Disposal of dredge material within a channel migration zone shall require a Shoreline Conditional Use Permit.
4. Fill material shall not contain organic or inorganic material that would be detrimental to water quality or existing habitat, or create any other adverse impacts to the environment.

Table 7. Shoreline use table (from Table 4 of the SMP).

P = Permitted

C = May be permitted as a conditional use only

X = Prohibited; the use is not eligible for a Shoreline Variance or Conditional Use Permit¹

N/A = Not applicable

SHORELINE USE

	Urban Conservancy ²	Residential	Aquatic ³
Agriculture	X	P	X
Aquaculture	X	X	X
Boating facilities	X	X	X
Commercial:			
Water-dependent	P	P ⁴	X
Water-related, water-enjoyment	P	P ⁴	X
Nonwater-oriented	P	X	X
Forest practices	X	X	X
Industrial:			

P = Permitted

C = May be permitted as a conditional use only

X = Prohibited; the use is not eligible for a Shoreline Variance or Conditional Use Permit¹

N/A = Not applicable

SHORELINE USE

	Urban Conservancy ²	Residential	Aquatic ³
Water-dependent	P	X	X
Water-related, water-enjoyment	P	X	X
Nonwater-oriented	P	X	X
In-stream structures	C	C	C
Mining	X	X	X
Parking (accessory)	P ⁵	P ⁵	X
Parking (primary, including paid)	X	X	X
Recreation:			
Water-dependent	P	P ⁶	P
Water-enjoyment	P ⁶	P ⁶	X
Nonwater-oriented	P ⁶	X	X
Residential			
Single-family residential	X	P	X
Duplex	X	P	X
Accessory Dwelling Unit	X	P	X
Multi-family residential	X	P	X
Land subdivision	P	P	P
Signs:			
On premise	P	X	X
Off premise	X	X	X
Public, highway	P	X	X
Solid waste disposal	X	X	X
Transportation:			
Water-dependent	NA	X	X
Nonwater-dependent ⁷	C	C	C
Roads, railroads ⁷	P	P	C
Utilities (primary) ⁷	P	P	C

Use Table Notes:

1. For the treatment of existing nonconforming development, see Chapter 7 Section E.

2. *Development in channel migration zones is allowed only by Shoreline Conditional Use Permit where it can be shown that such development would not prevent natural channel migration.*
3. *Uses noted as allowed in the Aquatic environment are allowed only if allowed in the adjacent upland environment.*
4. *The only commercial uses allowed in residential zones are those allowed in the underlying zone.*
5. *Accessory parking is allowed in Shoreline Jurisdiction only if there is no other feasible option, as determined by the Shoreline Administrator.*
6. *Passive activities, such as nature watching and trails, that require little development with no adverse impacts may be allowed.*
7. *Roadways and public utilities are allowed if there is no other feasible alternative, as determined by the Shoreline Administrator, and adverse impacts are mitigated.*

4.2 General Policies and Regulations

The SMP contains numerous general policies, with supporting regulations (see SMP), intended to protect the ecological functions of the shoreline and prevent adverse cumulative impacts. Key policies are listed below.

- **Policy 3.B.1.b.1.** The City should periodically review conditions on the shoreline and conduct appropriate analysis to determine whether or not other actions are necessary to protect and restore the ecology to ensure no net loss of ecological functions, protect human health and safety, upgrade the visual qualities, and enhance residential and recreational uses on the City's shorelines. Specific issues to address in such evaluations include, but are not limited to:
 - a. Water quality.
 - b. Conservation of aquatic vegetation (control of noxious weeds and enhancement of vegetation that supports more desirable ecological and recreational conditions).
 - c. Upland vegetation.
 - d. Changing visual character as a result of new residential development, including additions, and individual vegetation conservation practices.
 - e. Shoreline stabilization and modifications.
- **Policy 3.B.4.b.2.** All significant adverse impacts to the shoreline should be avoided or, if that is not possible, minimized to the extent feasible and provide mitigation to ensure no net loss of ecological function.
- **Policy 3.B.10.b.1.** Vegetation within the City shoreline areas should be enhanced over time to provide a greater level of ecological functions, human safety, and property protection. To this end, shoreline management activities, including the

provisions and implementation of this SMP, should be based on a comprehensive approach that considers the current and potential ecological functions provided by vegetation on different sections of the shoreline, as described in Chapter 5 of the September 2010 City of Milton Draft Shoreline Inventory and Analysis Report.

- **Policy 3.B.11.b.2.** The City should require reasonable setbacks, buffers, and stormwater storage basins and encourage low-impact development techniques and materials to achieve the objective of lessening negative impacts on water quality.

To implement this policy and others, the SMP (in Table 5) prescribes the development standards shown below in Table 8.

Table 8. Shoreline development standards table (from Table 5 of the SMP).

	Urban Conservancy	Residential	Aquatic
DEVELOPMENT STANDARDS^{3, 4, 5} (See also section cited in parentheses)			
Commercial Development (Ch. 5 Sec. C.4)			
Water-dependent setback ⁵	0'	0'	N/A
Water-related, water-enjoyment setback ⁵	180' ⁵	100'	N/A
Nonwater-oriented setback ⁵	180' ⁵	N/A	N/A
Industrial Development (Ch. 5 Sec. C.5)			
Water-dependent setback ⁵	0'	N/A	N/A
Water-related and water-enjoyment setback ⁵	180' ⁵	N/A	N/A
Nonwater-oriented setback ⁵	180' ⁵	N/A	N/A
Accessory Parking (Ch. 3 Sec. B.6)			
Setbacks ⁶	180'	100' ²	N/A
Recreational Development			
Water-dependent park structures setback ⁵	0'	0'	N/A
Water-related, water enjoyment park structures setback ⁵	180' ⁵	40'	N/A
Nonwater-oriented park structures setback ⁵ (Ch. 5 Sec. C.7.c.4)	180' ⁵	80'	N/A
Miscellaneous			
New agricultural activities setback ⁵ (Ch. 5 Sec. C.2.c.4)	N/A	N/A	N/A

DEVELOPMENT STANDARDS^{3, 4, 5} (See also section cited in parentheses)	Urban Conservancy	Residential	Aquatic
Residential Development²			

Development Standards Table Notes:

1. *The Shoreline Administrator may reduce this dimension if it determines that the type of development allowed within this SMP and other municipal, state, and federal codes cannot be accommodated within the allowed site development area by reconfiguring, relocating, or resizing the proposed development. Where the Shoreline Administrator reduces a requirement, compensatory mitigation, such as vegetation enhancement or shoreline armoring removal, must be provided by the applicant.*
2. *See regulation 5.C.7.c for residential development standards.*
3. *The maximum height of structures in Shoreline Jurisdiction 40' above grade in Urban Conservancy environment and 35' above grade in the Shoreline Residential.*
4. *Setbacks from the shoreline do not apply to development separated from the shoreline by a public roadway.*
5. *See exceptions to setback requirements in the UC environment for commercial and industrial redevelopment (sections 5.C.3.c.10 and 5.C.4.c.10.6. Setbacks are measured from the Ordinary High Water Mark (OHWM) and perpendicular to the shoreline.*

Residential development standards listed in SMP section 5.C.7.c include the following setbacks on lakes:

Table 9. Shoreline Regulations for Residential Properties on Lake (from Table 6 of the SMP).

	Single-Family Regulation (including duplexes)	Multi-Family Regulation
Minimum Building Setback from OHWM	80 feet ¹	100 feet ¹
Minimum Deck Setback from OHWM	65 feet ²	85 feet ²
Maximum Impervious Surface of Lot Area	35% ³	40% ³

1. *The averaging of the setbacks of adjacent dwelling units with a minimum setback of 80 feet for single-family and 100 feet for multi-family development.*
2. *Decks can extend a maximum of 15 feet into the building setback, with a minimum setback of 65 feet for single-family and 85 feet for multi-family development.*
3. *For those lots that are partially in Shoreline Jurisdiction, the impervious surface limits shall apply to the entire lot.*

- **Policy 3.B.11.b.4.** As a general policy, the City should seek to improve water quality, quantity (the amount of water in a given system, with the objective of providing for ecological functions and human use), and flow characteristics in order to protect and restore ecological functions and ecosystem-wide processes of shorelines within Shoreline Jurisdiction. The City should implement this policy through the regulation of development and activities, through the design of new public works, such as roads, drainage, and water treatment facilities, and through coordination with other local, state, and federal water quality regulations and programs. The City should implement the locally adopted stormwater management regulations, Chapter 13.26 MMC.

4.3 Shoreline Restoration Plan

As discussed above, one of the key objectives that the SMP must address is “no net loss of ecological shoreline functions necessary to sustain shoreline natural resources” (Ecology 2004). However, SMP updates seek not only to maintain conditions, but to improve them:

“...[shoreline master programs] include planning elements that when implemented, serve to improve the overall condition of habitat and resources within the shoreline area of each city and county (WAC 173-26-201(c)).”

The Guidelines state that “master programs shall include goals, policies and actions for restoration of impaired shoreline ecological functions. These master program provisions should be designed to achieve overall improvements in shoreline ecological functions over time, when compared to the status upon adoption of the master program” (WAC 173-26-201(2)(f)). Pursuant to that direction, the City has prepared a *Shoreline Restoration Plan*, which is a non-regulatory part of the SMP.

Practically, it is not always feasible for shoreline developments and redevelopments to achieve no net loss at the site scale, particularly for those developments on currently undeveloped properties, or a new dock or bulkhead. The *Shoreline Restoration Plan*, therefore, can be an important component in making up that difference in ecological function that would otherwise result just from implementation of the SMP. The *Shoreline Restoration Plan* represents a long-term vision for restoration that will be implemented over time, resulting in incremental improvement over the existing conditions.

The *Shoreline Restoration Plan* identifies opportunities for restoration, ongoing programs and activities, and other recommended actions consistent with a variety of watershed-level efforts.

Current City programs and policies addressing restoration are:

1. Milton Critical Areas Regulations

2. The City of Milton Comprehensive Plan
3. City of Milton NPDES Phase II Stormwater Management Program

Other programs and entities involved or potentially involved in shoreline restoration in Milton are:

1. Washington State Conservation Commission
2. Washington State Department of Ecology
3. Shared Strategy for Puget Sound
4. Puget Sound Partnership
5. Pierce County
6. Pierce Conservation District
7. South Puget Sound Salmon Enhancement Group
8. The Puyallup Tribe
9. Friends of the Hylebos (Earth Corps)
10. National Fish and Wildlife Foundation Community Salmon Fund

4.4 General Cumulative Impacts Assessment

The following table (Table 10) summarizes for each environment designation and corresponding waterbody the existing land use and development conditions, anticipated development and potential functions and processes impacted, relevant Shoreline Master Program (SMP) and other regulatory provisions, and the expected net impact on ecological function. Existing ecological functions, discussed in Section 2 of this document, are not differentiated by Environment Designation due to the relatively small size of jurisdictional area and uniformity of functions across the waterbodies. Certain special topics (i.e. residential setbacks, overwater structures, and shoreline stabilization) are discussed and analyzed in greater detail in Section 5 of this document. The discussion of existing conditions is based on the *Shoreline Analysis Report*, and additional analysis needed to perform this assessment.

In addition to the environment designations discussed in the following tables, the Aquatic designation will be assigned to shoreline areas waterward of the ordinary high-water mark. The purpose of the Aquatic designation is to protect, restore, and manage the unique characteristics and resources of the areas waterward of the ordinary high water mark.

Table 10. General cumulative impacts assessment.

Shoreline Segment	Existing Conditions	Likely Development / Functions or Processes Potentially Impacted	Effect of SMP Provisions	Effect of Other Development and Restoration Activities / Programs	Net Effect
Urban Conservancy					
Hylebos Creek	<p>Two separate areas of shoreline jurisdiction (separated by UGA) are characterized by industrial land uses, with one area on the west side of I-5, and the other area on the east side of I-5.</p> <p>Upstream of the industrial zone, the areas of the Hylebos Creek shoreline primarily consist of a wetland area located upstream of the 20 cfs point. The land adjacent to this wetland area is characterized by single-family residential development. Additionally, a smaller wetland area within the 100-year floodplain of Hylebos Creek is located on an industrial parcel.</p>	<p>Future Development: The industrial area of shoreline jurisdiction to the west of I-5 is entirely built out, primarily with vehicle and equipment sales lots. The area of shoreline jurisdiction to the east of I-5 may see new industrial uses or the redevelopment of existing uses. Further subdivision of land is not expected in these areas.</p> <p>Upstream of the industrial zone, the single-family residential parcels may experience some subdivision and more intensive redevelopment could occur since they are not developed to the maximum allowed density. However, because shoreline jurisdiction consists of the wetlands themselves, such activity would be most likely to occur on the portions of the parcels outside of shoreline jurisdiction.</p> <p>Functions/Processes Potentially Impacted: Water Quantity: Increased impervious surface area could increase water quantity. Increased development around wetlands could increase water quantity Water Quality: Increased industrial activities and residential density could have adverse impacts on water quality. Vegetation and Habitat: Increased industrial development could reduce available vegetation and habitat. Future development of residential uses around wetlands may impact water quality by decreasing vegetative cover and increasing the likely application of chemicals, fertilizers and pesticides.</p>	<p>SMP management policies for the Urban Conservancy environment (SMP Section 2.C.1.c) that address ecological functions include:</p> <ol style="list-style-type: none"> 1. Any use that would substantially degrade the ecological functions or natural character of the designated wetland area should be prohibited. 2. New land division, development or shoreline modification that would reduce the capability of the wetlands to perform normal ecological functions should not be allowed. 3. Uses that are consumptive of physical, visual, and biological resources should be prohibited. 4. Existing commercial and industrial uses should be allowed to remain and expand provided that there is no further intrusion toward the shoreline and that there are no unmitigated adverse impacts to the ecology. <p>SMP regulations intended for the protection and enhancement of Water Quality and Quantity (SMP Section 3.B.11.c) include:</p> <ol style="list-style-type: none"> 1. All shoreline development, both during and after construction, shall avoid or minimize adverse impacts, including any increase in surface runoff, through control, treatment, and release of surface water runoff so that water quality and quantity are not adversely affected. Control measures include, but are not limited to, low impact development techniques, catch basins or settling ponds, oil interceptor drains, grassy swales, planted buffers, and fugitive dust controls. <p>In order to protect Hylebos Creek from potential future impacts related to new development, Commercial and Industrial development shall be setback 180 feet from Hylebos Creek (SMP Section 5.B), except where a setback reduction to 50 feet is allowed by following the following provisions in Sections 5.C.3.c.10 and 5.C.4.c.10, including:</p> <ol style="list-style-type: none"> a) All flood control and shoreline stabilization measures are removed, except for those necessary for the streambed restoration b) The streambed and channel are restored to a natural condition with sinuosity, off-channel 	<p>Recommended and existing restoration activities on Hylebos Creek focus on enhancement and improvement of degraded riparian habitat, restoration of associated wetlands and floodplains, removal of channel hardening, and restoration of a meandering stream channel. The overall effect of these actions is to improve ecological function in the stream and adjacent shoreline.</p> <p>The property located at the confluence West and East Hylebos Creeks has been identified in the City's <i>Shoreline Restoration Plan</i> for protection and enhancement. The site was proposed for acquisition in the City's 1995 Comprehensive Plan. The area is primarily reed canarygrass-dominated wetland and has the potential to provide valuable flood storage, as well as perform water quality and habitat functions if restored.</p> <p>More natural areas of the creek are subject to pressures of surrounding development and would benefit from restoration and enhancement activities, particularly in the floodplain and adjacent wetlands. Improvement to these critical areas would increase water storage capacity, reduce downstream flooding, attenuate high stormwater flows, provide habitat area and complexity, and improve water quality.</p>	<p>SMP provisions are, at a minimum, expected to result in no net loss of ecological functions. However, particularly due to revegetation requirements, ecological function could increase over the long term.</p>

Shoreline Segment	Existing Conditions	Likely Development / Functions or Processes Potentially Impacted	Effect of SMP Provisions	Effect of Other Development and Restoration Activities / Programs	Net Effect
			<p>habitats and other features typical of natural streams with a similar context.</p> <ul style="list-style-type: none"> c) The uplands are planted with native plants as approved by the Shoreline Administrator. Planting shall include shrubs and ground cover to provide habitat and shade to the creek, as well trees that will provide adequate canopy cover upon maturity. d) The entire setback area landward of the OHWM shall be planted. e) A program for monitoring of the effectiveness of shoreline restoration measures is provided in compliance with the Mitigation Requirements identified in the Critical Areas section of this SMP. Namely section 18.16.160 of ordinance 1671 adopted by this SMP. <p>The setback reduction provisions above are intended to provide improved ecological functions within 50 feet of the ordinary high water mark of Hylebos Creek, especially in areas which are already heavily impacted by existing uses and modifications (i.e. parking lots and storage areas).</p> <p>Further regulations for Commercial Development (SMP Section 5.C.3.c) which address potential impacted functions and protection measures include:</p> <ul style="list-style-type: none"> 5. All new commercial use proposals shall be conditioned with the requirement for ecological restoration unless it is demonstrated to not be feasible. 7. All commercial loading and service areas shall be located or screened to minimize adverse impacts to the shoreline environment. 9. Low Impact Development (LID) techniques shall be incorporated where appropriate. <p>Further regulations for Industrial Development (SMP Section 5.C.4.c) which address potential impacted functions and protection measures include:</p> <ul style="list-style-type: none"> 1. All industrial development shall be conditioned with the requirement for ecological restoration and public access unless those activities are demonstrated to not be feasible. (See definition of "feasible."). 		

Shoreline Segment	Existing Conditions	Likely Development / Functions or Processes Potentially Impacted	Effect of SMP Provisions	Effect of Other Development and Restoration Activities / Programs	Net Effect
			<p>2. All new industrial development shall provide 165 feet of native vegetation measured from the OHWM for the length of the shoreline. Native vegetation shall consist of a mixture of trees, shrubs and groundcover and be designed to improve habitat functions (see Appendix B for an appropriate list of native vegetation). Property owners must prepare, and agree to adhere to, a shoreline vegetation plan approved by the Shoreline Administrator, as described in Chapter 3 Section B.10.c.5.</p> <p>3. The amount of impervious surface shall be the minimum necessary to provide for the intended use.</p> <p>6. At new or expanded industrial developments, the best available facilities practices and procedures shall be employed for the safe handling of fuels and toxic or hazardous materials to prevent them from entering the water, and optimum means shall be employed for prompt and effective cleanup of those spills that do occur. The City's Shoreline Administrator may require specific facilities to support those activities as well as demonstration of a cleanup/spill prevention program</p> <p>9. Low Impact Development (LID) techniques shall be incorporated where appropriate.</p> <p>SMP regulations for Critical Areas (SMP Section 3.B.3) include:</p> <p>Critical areas in Shoreline Jurisdiction are regulated by the City's critical areas regulations codified under Chapter 18.16 MMC, which is herein incorporated into this SMP. If provisions of the critical area regulations and other parts of the SMP conflict, the provisions most protective of the ecological resource shall apply, as determined by the City.</p>		

Residential					
Surprise Lake	<p>Surprise Lake shorelines are privately owned and land use is almost exclusively residential (both single-family and multi-family). Median setback for lake structures is approximately 80 feet. Twenty-one docks are located on the lakeshore.</p>	<p>Future Development: In the area zoned Residential Single Family District (generally on the west side of the lake), most parcels are built out and are not expected to change use, though some redevelopment may occur. Those parcels that are not built out are owned by adjacent properties or are community access lots and are not expected to develop in the near future. There is potential for subdivision along the single family zoned shoreline. Approximately 20 lots surrounding Surprise Lake could be subdivided. However, due to minimum lot width requirements, only 3 lots could be divided to result in additional shoreline property frontage for new residences.</p> <p>In the area zoned Residential Multi-Family District (generally on the east side of the lake), all parcels are built out and are not expected to change use, though some redevelopment may occur.</p> <p>A more detailed discussion related to residential uses and shoreline modifications around Surprise Lake are provided in Section 5 of this report.</p> <p>Functions/Processes Potentially Impacted: Water Quantity: Redevelopment of lots could lead to increases in water quantity being discharged to the lake, particularly where single-family dwellings are converted to multi-family dwellings and subsequently increases in impervious surface area occur.</p> <p>Water Quality: Future development of residential uses may impact water quality by decreasing vegetative cover and increasing the likely application of chemicals, fertilizers and pesticides.</p> <p>Vegetation and Habitat: Increased residential development could reduce available vegetation and habitat. Increased numbers of dock could adversely impact aquatic vegetation by increasing shade over beds of aquatic vegetation.</p>	<p>SMP management policies for the Residential environment (SMP Section 2.C.2.c) include:</p> <ol style="list-style-type: none"> Land division and development should be permitted only 1) when adequate setbacks or buffers are provided to protect ecological functions and 2) where there is adequate access, water, sewage disposal, utilities systems, and public services available and 3) where the environment can support the proposed use in a manner which protects or restores the ecological functions. Development standards for setbacks, shoreline stabilization, vegetation conservation, critical area protection, and water quality should be established to protect and, where significant ecological degradation has occurred, restore ecological functions over time. New residential development should be located and designed so that future shoreline stabilization is not needed. <p>Single-family residential development shall provide 15 feet of shoreline vegetation; multi-family development shall provide 30 feet. (SMP Section 3.B.10.c).</p> <p>SMP regulations for Water Quality and Quantity (SMP Section 3.B.11.c) include:</p> <ol style="list-style-type: none"> All shoreline development, both during and after construction, shall avoid or minimize significant ecological impacts, including any increase in surface runoff, through control, treatment, and release of surface water runoff so that water quality and quantity are not adversely affected. Control measures include, but are not limited to, low impact development techniques, dikes, catch basins or settling ponds, oil interceptor drains, grassy swales, planted buffers, and fugitive dust controls. <p>SMP regulations for Over-Water Structures (SMP Section 4.C.3.c) include:</p> <p><u>General Regulations for Private and Public Over Water Structures</u></p> <ol style="list-style-type: none"> Only piers and ramps are permitted in the first 30 feet of the OHWM. All floats, ells and fingers must be at least 30 feet waterward of the 	<p>Any in- or over-water proposals would require review not only by the City of Milton, but also by the Washington Department of Fish and Wildlife (WDFW). A project that includes in-water fill would require review and permitting from the U.S. Army Corps of Engineers (Corps), and the Washington Department of Ecology. Each of these agencies is charged with regulating and/or protecting shorelines and the waters of the City of Milton, and would impose certain design or mitigation requirements on applicants.</p> <p>Restoration on the Surprise Lake shoreline would most effectively serve to improve water quality, both in shoreline jurisdiction and in the sub-basin as a whole. Opportunities exist in voluntary enhancement efforts by shoreline landowners, and incorporation of water quality facilities and controls in implementation of road, structure, and infrastructure development in the sub-basin.</p> <p>As identified in the City's <i>Shoreline Restoration Plan</i>, specific actions that can be voluntarily implemented within shoreline jurisdiction are:</p> <ul style="list-style-type: none"> Planting native species along shorelines in residential yards. Reducing lawn fertilizers and pesticides in the care and treatment of residential landscapes. Reducing construction of residential docks and piers through sharing these structures with neighboring landowners. Softening or removing shoreline armoring. <p>In the areas of the sub-basin surrounding the lake and lakeside residences, water quality function can be addressed in a number of ways. Specific recommended actions include:</p> <ul style="list-style-type: none"> Improving stormwater treatment facilities for existing facilities in the sub-basin. Implementing stormwater treatment and controls with new road construction or road projects in the sub-basin. Improving treatment when improving or remodeling existing structures in the sub-basin. Monitoring water quality in stormwater runoff during construction and other development project implementation. <p>A storm drain marker program for the Surprise Lake watershed is supported by the City. The City has proposed moving forward with this project as part of</p>	<p>SMP provisions, including setbacks, revegetation standards, and Restoration Plan implementation should ensure that environmental conditions in this environment will not be degraded relative to existing baseline over the long term.</p> <p>Impacts from new development are potentially offset by the use of setbacks (SMP Section 5.B), shoreline vegetation requirements (SMP Section 3.B.10.c), impervious surface limitations (SMP Section 5.B), and water quality controls through stormwater management (SMP Section 5.C.7.c).</p>

Shoreline Segment	Existing Conditions	Likely Development / Functions or Processes Potentially Impacted	Effect of SMP Provisions	Effect of Other Development and Restoration Activities / Programs	Net Effect
			<p>OHWM.</p> <p>9. All pier and dock dimensions shall be minimized to the maximum extent feasible. The proposed length must be the minimum necessary to support the intended use.</p> <p><u>New Private, Non-Commercial Docks</u></p> <p>19. A new private dock may be permitted on lots owned for residential or for private recreational use, provided:</p> <p>a. The applicant has demonstrated a need for moorage. Single-family residences are not required to demonstrate a need for moorage.</p> <p>b. The applicant has demonstrated to the satisfaction of the Shoreline Administrator that a shared or joint-use pier is not feasible.</p> <p>i. On lots with less than fifty (50) feet of waterfront, joint-use piers shall be required, except when both lots abutting the subject lot have legal pre-existing piers or docks and the applicant provides written verification from the owners of the adjacent lots that they will not consent to a shared use agreement. Only in this case may the lot with less than fifty (50) feet of waterfront be permitted an individual pier.</p> <p>ii. On waterfront lots subdivided to create additional waterfront lots, upland lots with waterfront access rights, or lots with waterfront multifamily development, joint-use piers shall be required. One joint-use pier is allowed per 60 feet of shoreline frontage.</p> <p>c. No more than one (1) pier for each single-family residence or private recreational lot is permitted.</p> <p>22. Development Standards for New Docks. All piers and docks shall be minimized to the maximum extent feasible and comply with regulations as stipulated by State and Federal agencies, local Tribes, or others that have jurisdiction.</p>	<p>their partnership with the Stream Team.</p>	

Shoreline Segment	Existing Conditions	Likely Development / Functions or Processes Potentially Impacted	Effect of SMP Provisions	Effect of Other Development and Restoration Activities / Programs	Net Effect
			<p>a. Length.</p> <ul style="list-style-type: none"> i. For single family residences the maximum length of a dock shall be that distance necessary to provide 4 feet of water depth measured on August 31 (generally the low water date for the year) at the end of the dock, to a maximum length of 50'. ii. For a joint use dock serving more than one residence or for docks serving multiple units of a multi-family property, the dock may extend to achieve 6' of water depth measured on August 31 (generally the low water date for the year) up to a maximum length of 100'. iii. No "ell"s (dock extensions running generally parallel to the shoreline) or finger piers are permitted. <p>b. Width. For all private non-commercial docks, the maximum width is 6 feet.</p> <p>Single-family residential development shall be set back 80 feet from Surprise Lake; multi-family shall be set back 100 feet (SMP Section 5.B).</p> <p>Single-family residential development shall have a maximum impervious surface of 35%; multi-family shall have a maximum of 40% (SMP Section 5.B).</p> <p>SMP regulations for Residential Development (SMP Section 5.C.7.c) include:</p> <ul style="list-style-type: none"> 2. The stormwater runoff for all new or expanded pavements or other impervious surfaces shall be in accordance with the City's storm water regulations, Chapter 13.26 MMC. 		

5 DEVELOPMENT IMPLICATIONS

In addition to the general cumulative impacts analysis presented in the table in Section 4, this section will expand on several key areas of functions and impacts associated with development in the Residential environment that encompasses Surprise Lake.

5.1 Residential Setbacks on Surprise Lake

Based on current zoning, land use around Surprise Lake is expected to remain primarily a mix of single- and multi-family residential. While the potential for new development on vacant lots is minimal, redevelopment of existing lots is expected.

Land developed or redeveloped for residential uses frequently results in the replacement of pervious, vegetated areas with impervious surfaces. Additionally, landscape management practices that include the chemical treatment of lawn and landscaping are often associated with residential uses. These actions can have multiple effects on shoreline ecological functions, including:

- Reduction in ability of site to improve quality of waters passing through the untreated vegetation and healthy soils.
- Potential contamination of surface water from chemical and nutrient applications.
- Increase in surface water runoff due to reduced infiltration area and increased impervious surfaces, which can lead to excessive soil erosion and subsequent in-water sediment deposition.
- Elimination of upland habitat occupied by wildlife that use riparian areas.

Shoreline setbacks, impervious surface limits, and vegetation planting requirements are excellent mechanisms to protect or improve overall shoreline ecological functions in residential areas.

The City currently does not have a standard shoreline setback or buffer for Surprise Lake (considering both shoreline and critical areas regulations). Based on existing information, the median setback for residential structures is approximately 80 feet. Two lots have structures greater than 200 feet from

OHWL, while the closest structure is 12 feet from OHWM (located in the multi-family zoned area).

Under the proposed SMP, all new covered or enclosed structures must be set back the average of the setbacks of existing houses on adjacent lots on both sides of the subject parcel, provided that the minimum shoreline setbacks shown below in Table 11 are adhered to.

Table 11. Shoreline setbacks for residential properties on lakes (based on Table 6 of the SMP).

	Single-Family Regulation	Multi-Family Regulation
Minimum Building Setback from OHWM	80 feet ¹	100 feet ¹
Minimum Deck Setback from OHWM	65 feet ²	85 feet ²

1. The averaging of the setbacks of adjacent dwelling units with a minimum setback of 80 feet for single-family and 100 feet for multi-family development.

2. Decks can extend a maximum of 15 feet into the building setback, with a minimum setback of 65 feet for single-family and 85 feet for multi-family development.

Accessory uses and structures also need to be setback from the OHWM under **Section 5.C.7.c.6**. Uncovered patios or decks that are no higher than 2 feet above grade and auxiliary structures such as storage sheds and gazebos may extend a maximum of 15 feet into the building setback, up to within 65 feet of the OHWM. The auxiliary structure may not be more than 200 square feet in building footprint or more than 10 feet in height. Garages and pavements for motorized vehicles (driveways and parking areas) shall be set back at least 100 feet from the OHWM. Fences that run parallel to the shoreline shall be set back at least 25 feet from the OHWM and shall be wildlife passable.

Although it would be possible, in some instances, for residences to be relocated closer to the shoreline than their existing condition, they would not be allowed to be closer than 80 feet from OHWM, unless incentives for shoreline vegetation are invoked. Revegetation incentives are provided in **Section 5.C.7.c.8.a** which stipulates that a residential building setback can be reduced by 5 feet for every 300 square feet of shoreline vegetation provided along the shoreline. Therefore, over time, it is expected that the existing median setback of 80 feet will be maintained, and that the number of structures deviating from the minimum setbacks (80 or 100 feet) will decrease. Those structures that are rebuilt closer than 80 feet from shore will provide a substantial improvement to the vegetative community of the shoreline.

Regarding impervious surfaces, roofs over single-family or multi-family homes, sidewalks, and driveways (whether 50 square feet or 5,000 square feet), are typically pollution-generating surfaces only to the extent that pollutants are deposited on them. Most single-family homes have between two and four vehicles, regardless of the driveway area, and thus the correlation between driveway area and amount of pollution is not strong. The degree of impervious surface coverage within typical shoreline residential environments has more correlation to water quantity and surface water runoff (i.e. potential impacts from rapid increases in stream flows) and loss of nearshore vegetation (through land clearing associated with residential uses). Under the proposed SMP, garages and pavement for motorized vehicles are to be set back at least 100 feet from the lake. An impervious surface standard has been set at 35% for single-family residential development, and 40% for multi-family residential development. It is important that the impervious surfaces be separated from the waterbody to the extent that those surfaces replace vegetation, which can have a variety of ecological benefits. The setback provisions described above continue to maintain separation between the homes and the water, leaving the nearshore area available for vegetation. Increases in impervious surfaces would be allowed above the maximum if native vegetation is included along the shoreline (**Section 5.C.7.c.8.b**). For every five feet of vegetation depth (measured perpendicular to the shoreline) added along the OHWM, the percentage of total impervious surface area can increase by 2 percent, up to a maximum increase of 10 percent.

For vegetation planting requirements, new residential development on lots that do not contain intact native vegetation must plant native vegetation along the shoreline. For single-family development, a 15-foot wide band of vegetation must be provided the entire length of the shoreline; for multi-family development, a 30-foot wide band of vegetation must be provided the entire length of the shoreline.

In summary, the redevelopment of lots around Surprise Lake is expected over the next 20 years. However, the protective setbacks, impervious surface limits, shoreline vegetation planting requirements discussed above will maintain, or, more likely, improve the ecological functions of the shoreline over the long term, thereby resulting in no net loss of shoreline ecological function within the environment.

5.2 Overwater Structures on Surprise Lake

Under the proposed SMP, over-water structures are not allowed on Hylebos Creek. Therefore, this discussion is limited to overwater structures on Surprise Lake. Types of overwater cover on Surprise Lake that are addressed by the

proposed SMP include the following: docks, boatlifts and boatlift canopies, and recreational floats/swim platforms.

Overwater structures can adversely affect ecological functions and habitat in the following ways:

- Alter patterns of light transmission to the water column, affecting macrophyte growth and altering habitat for and behavior of fish.
- Interfere with long-shore movement of sediments, altering substrate composition and development.
- Contribute to contamination of surface water from chemical treatments of structural materials.

On Surprise Lake there are currently 21 docks, including 2 on semi-private properties and 1 dock in a greenbelt common area. Eleven single-family residential parcels do not have docks.

Under the proposed SMP, dimensional criteria for new and expanded structures are included (**Section 4.C.3.c**) in order to reduce potential impacts. These dimensional criteria are shown below in Table 12. Replacement of structures existing at the date of SMP adoption may be replaced or repaired within the same footprint as the existing dock.

Table 12. Dock dimension table (from Table 3 of the SMP).

Regulation	Single-Use Dock Dimension	Joint-Use Dock Dimension
Maximum length	Length necessary to reach 4' of water depth (at low water). Max. 50'	Length necessary to reach 6' of water depth (at low water). Max. 100'
Maximum width of any portion	6'	6'
Ells and fingers	Prohibited	

The above dimensional criteria, in conjunction with other related SMP provisions as well as other factors, should ensure that ecological functions associated with overwater structures are not further degraded relative to their baseline condition.

Few new overwater structures are expected due to a lack of demand for watercraft moorage on Surprise Lake. Surprise Lake is for non-motorized recreation only, and a dock is not required for recreational access to the lake. Therefore, only a small number (perhaps 3 or 4 of the 11 single-family residential parcels without docks) might be expected to develop a dock in the 20-year

planning period of this SMP. Each of these is expected to be less than 300 square feet in size (maximum length of 50 feet and maximum width of 6 feet).

Also, some reduction in overwater coverage may occur as a result of the SMP. The SMP includes a provision that requires single-family residences with two or more existing docks to remove one dock should another require replacement or repair. This is the case for at least one parcel on the lake.

Finally, the SMP includes provisions promoting, and in some cases requiring, joint use of docks. All new private, non-commercial docks must demonstrate to the satisfaction of the Shoreline Administrator that a joint-use pier is not feasible. On lots with less than fifty (50) feet of waterfront, joint-use piers are required (except when both lots abutting the subject lot have legal pre-existing piers or docks and the applicant provides written verification from the owners of the adjacent lots that they will not consent to a shared use agreement). Joint use is also required on waterfront lots subdivided to create additional waterfront lots, upland lots with waterfront access rights, or lots with waterfront multifamily development.

5.3 Shoreline Stabilization on Surprise Lake

Approximately 28 percent of the shoreline of Surprise Lake is armored. The majority of these armored shorelines occur along the western shoreline containing the highest density of single-family residences.

New shoreline armoring typically has the following effects on ecological functions:

- Reduction in nearshore habitat quality for both aquatic and terrestrial species. Specifically, shoreline complexity and native emergent vegetation that provide forage and cover may be reduced or eliminated.
- Reduction of natural sediment recruitment from the shoreline. This recruitment is necessary to replenish substrate and preserve shallow water conditions.
- Increase in wave energy at the shoreline if shallow water is eliminated, resulting in increased nearshore turbulence that can be disruptive to aquatic resources.

The proposed SMP contains several provisions that address armoring (Section 4.C.2).

New shoreline stabilization (using hard or soft methods) would only be allowed “to protect or support an existing or approved primary structure, as necessary for human safety, for the restoration of ecological functions, or for hazardous substance remediation pursuant to Chapter 70.105D RCW.” It must be demonstrated in a geotechnical analysis that the proposed stabilization is the least harmful method to the environment and the project will mitigate adverse impacts.

Proposals for hard stabilization methods (e.g. bulkheads) must first demonstrate that softer methods using natural materials and non-structural solutions, including relocation or reconstruction of existing structures, are not feasible.

Replacement bulkheads shall not be replaced with a similar structure unless there is need to protect primary structures from erosion caused by currents or waves and a nonstructural measure is not feasible. Proposed replacement structures must not encroach further waterward of the OHWM (with limited exceptions) and must minimize harm to ecological functions.

The proposed SMP also includes incentives for the removal of existing bulkheads (e.g. setback reduction).

Independent of regulations by other regulatory agencies, the proposed SMP ensures that shoreline stabilization projects will not degrade the baseline condition. However, the regulations of other agencies further limit the potential for adverse effects related to shoreline stabilization.

The Army Corps of Engineers (if fill is proposed within the lake) and the Washington Department of Fish and Wildlife have jurisdiction over new shoreline stabilization projects, and repairs or modifications to existing shoreline stabilization. As part of their efforts to minimize and compensate for shoreline stabilization-related impacts, both agencies encourage implementation of native shoreline enhancement for new shoreline stabilization projects. Further, they also strongly promote shoreline restoration and additional impact compensation measures for many shoreline armoring modification projects, including placement of gravel at the toe of the armoring to create shallow-water habitat, angling the armored face landward to reduce wave turbulence, and shifting the armoring as far landward as feasible.

Over time, the combined effects of the City’s proposed SMP, and permit approvals from the WDFW and possibly the Corps will likely result in a reduction of the net amount of hardened shoreline at the ordinary high water mark, an increase in shallow-water habitat, and an increase in shoreline vegetation along the Surprise Lake shoreline.

6 NET EFFECT ON ECOLOGICAL FUNCTION

As described above in Sections 4 and 5 of this document, the proposed SMP provides a substantially increased level of protection to shoreline ecological functions relative to the existing SMP. On its own, the proposed SMP, which includes the *Shoreline Restoration Plan*, is expected to protect and improve shorelines within the City of Milton while accommodating reasonably foreseeable future shoreline development, resulting in no net loss of shoreline ecological function. State and federal regulations, acting in concert with this SMP, will provide further assurances of improved shoreline ecological functions over time.

As discussed above, the major elements of the SMP that ensure no net loss of ecological functions fall into generally five categories: 1) environment designations (Chapter 2), 2) general provisions (Chapter 3), 3) shoreline modification provisions (Chapter 4), 4) shoreline use provisions (Chapter 5), and 5) the *Shoreline Restoration Plan*.

Environment designations: The *Shoreline Analysis Report* provided the information necessary to assign environment designations for the City's shorelines. Shoreline uses and modifications were then individually determined to be either permitted (as substantial developments or conditional uses) or prohibited in each of those environment designations. The most uses and modifications are allowed, in descending order of potential impact, in the Urban Conservancy and then Residential environments

General provisions: **Chapter 3** contains a number of regulations on a variety of topics that contribute to protection and restoration of ecological functions. Examples of these regulations include: ensuring mitigation sequencing is followed (**Section 3.B.4.c.5**); ensuring no net loss of shoreline ecological functions occur as a result of public access development or improvement (**Section 3.B.7.c**); requiring replanting of cleared shoreline areas, monitoring of planted vegetation, and recording as a covenant with the Assessor's Office (**Section 3.B.10.c**); and prohibiting the application of non-approved pesticides, herbicides, fertilizers, and other chemicals that could adversely affect water quality (**Section 3.B.11.c**).

Shoreline use provisions: Regulations in **Chapter 5** focus on exclusion of uses that are incompatible with the existing land use and ecological conditions, and emphasize appropriate location and design of the various uses. These

regulations also emphasize avoidance and minimization of ecological impacts via appropriate setbacks, protection and enhancement of vegetation, reduction of impervious surfaces, and use of innovative designs (such as LID techniques) that do not degrade, and may even enhance, shoreline functions. These factors are balanced with uses that are essential to the City's waterfront use and development. While allowing water-dependent uses and preferred uses as well as other developments to continue along the shoreline, the proposed SMP emphasizes protection and enhancement of shoreline resources such that no net loss of ecological functions will be achieved over time.

Shoreline modification provisions: **Chapter 4** contains a number of regulations on a variety of topics that contribute to protection and restoration of ecological functions, including **Section 4.C.3** (Over-Water Structures), **Section 4.C.6** (Shoreline Restoration and Ecological Enhancement), and **Section 4.C.2** (Shoreline Stabilization). All of these shoreline modification regulations emphasize minimization of size of structures, and use of designs that do not degrade and may even enhance shoreline functions.

Shoreline Restoration Plan: The Land Use Element of the City's comprehensive plan includes a number of goals and policies intended to protect natural areas and prevent a net loss of critical area function. Protection of wildlife species is addressed independently of critical areas. Both regulatory and non-regulatory approaches are supported in the comprehensive plan. The City's critical areas regulations provide for long-term protection, including compensatory mitigation when impacts are unavoidable. Mitigation may include restoration of aquatic resources. A number of restoration projects and programs already in place are outlined in the *Shoreline Restoration Plan*. General opportunities and/or implementation strategies for restoration on both public and private properties inside and outside of shoreline jurisdiction are proposed by various groups, and specific actions are recommended in some cases. These efforts are summarized in the *Shoreline Restoration Plan* and include involvement by the Milton Public Works Department, often working in partnership with other groups, such as the Washington State Conservation Commission, Washington Department of Ecology, Pierce County, the Pierce County Conservation District and Stream Team, Pierce County, the Puyallup Tribe, Friends of the Hylebos, and others.

All of these programs and organizations share restoration goals of protecting and restoring ecological function and value within the watershed.

Summary: The following are some of the key features identified in the proposed SMP and this evaluation which protect and enhance shoreline ecological functions.

- The establishment of a standard setback on Surprise Lake that encroaches no further than the existing median setback.
- Retention and revegetation along shorelines as part of future development.
- Reductions or softening of hard shorelines through regulatory provisions and development incentives.
- Protection of associated wetlands through critical areas regulations
- Emphasis on achieving no net loss of shoreline ecological functions throughout shoreline jurisdiction.

Given the above provisions of the SMP, including the *Shoreline Restoration Plan* and the key features listed above, implementation of the proposed SMP is anticipated to achieve **no net loss of ecological functions in the City of Milton's shorelines.**