

**City of Lakewood
Grant No. G1000045**

DRAFT REPORT

Shoreline Restoration Plan Component of the Shoreline Master Program for the City of Lakewood

Prepared by:



1200 6th Avenue, Suite 1620
Seattle, WA 98101-3123



10230 NE Points Drive, Suite 400
Kirkland, WA 98033

Prepared for:

City of Lakewood
Community Development Department
6000 Main Street SW
Lakewood, Washington 98499



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

October 2011

Table of Contents

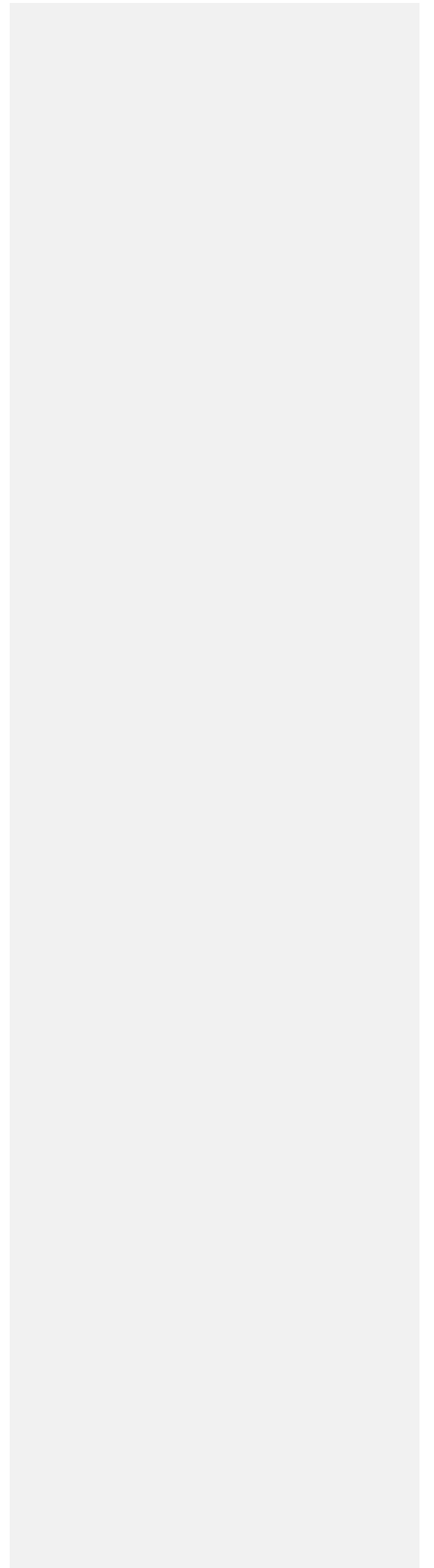
<u>Section</u>	<u>Page</u>
1. Introduction	1
2. Shoreline analysis and characterization Summary.....	2
2.1 Watershed Context and Shoreline Boundary	2
2.2 Biological Resources and Critical Areas.....	2
2.3 Summary of Ecological Functions	3
2.4 Summary of Degraded Shoreline Areas.....	5
3. Restoration Goals and Objectives	6
3.1 Comprehensive Plan.....	6
3.2 Restoration Policy Development	6
4. List of Existing and Ongoing Projects and Programs	8
4.1 Chambers-Clover Creek Watershed Planning Participation and Ongoing Efforts	8
4.2 Comprehensive Plan Policies	12
4.3 Environmentally Sensitive Areas Regulations	12
4.4 Stormwater Management and Planning	12
4.5 Public Education	12
4.6 Other Lakewood Programs and Projects.....	13
5. List of Additional Projects and Programs to Achieve Local Restoration Goals	15
5.1 Recommended Projects.....	15
6. Proposed Implementation Targets and Monitoring Methods.....	18
7. Restoration constraints and Priorities.....	20
7.1 Priority 1 – Continue Water Resource Inventory Area (WRIA) 12 Participation	21
7.2 Priority 2– Improve Water Quality and Reduce Sediment and Pollutant Delivery ..	21
7.3 Priority 3 – Develop, Expand and Implement Public Education and Involvement Programs	22
7.4 Priority 4 –Create or Enhance Natural Shoreline Conditions Along Clover Creek .	22
7.5 Priority 5 – Implement Soft Shoreline Stabilization and Reduce In-water and Over- water Structures.....	23
7.6 Priority 6 – Improve Riparian Vegetation, Reduce Impervious Coverage	23
7.7 Priority 7 – Enhance Habitat as Part of Future Street End Park Improvements	23
7.9 Priority 9 – City Zoning, Regulatory, and Planning Policies	23
8. References	25

Appendix A: City of Lakewood Resolution #05-396 Ratifying the WRIA 9 Salmon Habitat Plan

List of Tables

Table 1. Watershed-Wide Action Items to Support Implementation of Chambers-Clover
Creek Watershed Action Plan 9

Table 2. Implementation Schedule and Funding for Restoration Projects, Programs and
Plans.....19



SHORELINE MASTER PROGRAM UPDATE SHORELINE RESTORATION PLAN

1. INTRODUCTION

A jurisdiction's Shoreline Master Program applies to activities in the jurisdiction's shoreline zone. Activities that have adverse effects on the ecological functions and values of the shoreline must provide mitigation for those impacts. By law, the proponent of that activity is not required to return the subject shoreline to a condition that is better than the baseline level at the time the activity takes place. How then can the shoreline be improved over time in areas where the baseline condition is severely, or even marginally, degraded?

Section 173-26-201(2)(f) WAC of the Shoreline Master Program Guidelines¹ says:

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

However, degraded shorelines are not just a result of pre-Shoreline Master Program activities, but also of unregulated activities and exempt development. The new Guidelines also require that “[l]ocal master programs shall include regulations ensuring that exempt development in the aggregate will not cause a net loss of ecological functions of the shoreline.” While some actions within shoreline jurisdiction are exempt from a permit, the Shoreline Master Program should clearly state that those actions are not exempt from compliance with the Shoreline Management Act or the local Shoreline Master Program. Because the shoreline environment is also affected by activities taking place outside of a specific local master program's jurisdiction (e.g., outside of city limits, outside of the shoreline zone within the city), assembly of actions, programs and policies within the larger watershed that have the potential to impact shoreline ecological functions can be essential for understanding how the City fits into the larger context. The latter is critical when establishing realistic goals and objectives for dynamic and highly inter-connected environments.

As directed by the Guidelines, the following discussions provides a very brief summary of baseline shoreline conditions, lists restoration goals and objectives, and discusses existing or potential programs and projects that positively impact the shoreline environment. Finally, anticipated scheduling, funding, and monitoring of these various comprehensive restoration elements are provided. In total, implementation of the Shoreline Master Program (with

¹ The Shoreline Master Program Guidelines were prepared by the Washington Department of Ecology and codified as WAC 173-26. The Guidelines translate the broad policies of the Shoreline Management Act (RCW 90.58.020) into standards for regulation of shoreline uses. See <http://www.ecy.wa.gov/programs/sea/sma/guidelines/index.html> for more background.

mitigation of project-related impacts) in combination with this Restoration Plan (for restoration of lost ecological functions that occurred prior to a specific project) should result in a net improvement in the City of Lakewood's shoreline environment in the long term.

In addition to meeting the requirements of the Guidelines, this Restoration Plan is also intended to support the City's or other non-governmental organizations' applications for future grant funding to implement elements of this Restoration Plan.

2. SHORELINE ANALYSIS AND CHARACTERIZATION SUMMARY

2.1 Watershed Context and Shoreline Boundary

The City of Lakewood retained AHBL and Otak to conduct an inventory and characterization of the City's shorelines in 2009 and 2010. The purpose of the shoreline inventory was to facilitate the City's compliance with the State of Washington's Shoreline Management Act (SMA) and updated Shoreline Master Program Guidelines. The inventory describes existing physical and biological conditions in the shoreline zone within City limits, including recommendations for restoration of ecological functions where they are degraded. The full Shoreline Analysis Report characterizes shoreline function for each waterbody and describes the areas that fall within the shoreline jurisdiction of the City.

2.2 Biological Resources and Critical Areas

As described in the Shoreline Analysis Report, the shoreline jurisdiction contains a variety of biological resources and environmentally critical areas, including wetlands, geologic hazards, aquifer recharge areas, wellhead protection zones, and critical fish habitat. Wetlands within the shoreline jurisdiction are primarily confined to the northern reaches of Chambers Creek and adjacent to Waughop Lake, with limited wetlands along Clover Creek. Frequently flooded areas are found along Chambers and Clover Creeks.

Steep slopes and geologically hazardous areas are scattered throughout the city, and each water body's associated jurisdiction contains a small amount of steep slope areas, with the exception of Clover Creek, which contains no documented geologic hazards.

The entire City of Lakewood lies within an aquifer recharge area. Portions of Clover Creek and the shoreline jurisdictions associated with American Lake, Lake Steilacoom, Gravelly Lake, Lake Louise, and Waughop Lake fall within a 1-year wellhead protection zone.

Steelhead of the Puget Sound Distinct Population Segment (DPS) (U.S. Federal Register, 11 May 2007) is the only federally listed salmonid species that occurs in the City of Lakewood. Steelhead presence is documented in Chambers Creek and their presence is assumed in Lake Steilacoom and Clover Creek (StreamNet 2010). Additionally, Puget Sound-Strait of Georgia coho salmon (a PHS Species) also occur in the basin and are listed as a Species of Concern (U.S. Federal Register, 15 April 2004), indicating that they are under less active consideration for formal listing. Coho spawn in Chambers and Clover Creeks and their presence is documented in Lake Steilacoom (StreamNet 2010). Critical habitat for Puget Sound steelhead has not yet been designated but is under development. It is not known if there will be critical habitat for steelhead included in the City of Lakewood. All fish that utilize Chambers Creek, Lake Steilacoom, and

Clover Creek are present because they are captured at the mouth of Chambers Creek and released upstream of the fish barrier. Chinook salmon are not released upstream, but are taken to Garrison Springs Hatchery for egg harvest (Pierce Conservation District 2003). The Garrison Springs Hatchery is located in the City of Lakewood near Chambers Creek.

Washington Department of Fish and Wildlife (WDFW) mapping of Priority Habitat and Species (PHS) indicates the presence of a number of habitat areas in the shoreline jurisdiction, including the following:

- WDFW riparian zones and fish species along Chambers Creek, Clover Creek, and Lake Steilacoom.
- WDFW waterfowl concentration areas along Chambers Creek and within Lake Steilacoom, American Lake, Gravelly Lake, Lake Louise, and Waughop Lake.
- WDFW urban natural open space areas along Chambers Creek and surrounding American Lake and Waughop Lake.

2.3 Summary of Ecological Functions

The following briefly summarizes the overall health of ecological functions within specific segments of the Shoreline Management Area.

Chambers Creek - Segment 1A - Overall segment rating = Moderate
Segment 1A consists of low density residential housing. Aerial photos indicate that a majority of the riparian buffer has been left intact, providing a largely forested area with some houses/buildings interspersed.

Chambers Creek - Segment 1B - Overall segment rating = Moderate/High
Segment 1B is the most natural condition segment in Lakewood's shoreline jurisdiction and has an intact riparian buffer that protects the stream banks from erosion as well as providing shade, habitat (in stream and on the banks), and water quality improvement.

Clover Creek - Overall segment rating = Low/Moderate
Clover Creek has been greatly compromised by development. Approximately half of this segment in the City of Lakewood is heavily compromised by commercial development, including the section that runs through a long culvert under I-5. The lower half of the segment located in the City has been built out with high density residential housing.

American Lake – Segment 3A - Overall segment rating = Low
The residential segment of American Lake ranks low for overall functions. The high level of shoreline modification has the largest, overarching impact on the functions of the lake and shoreline. The shoreline modifications impede wave attenuation, organic matter recruitment, the ability of the shoreline to remove toxins, and have compromised the functions provided by shallow groundwater.

American Lake – Segment 3B/C - Overall segment rating = Low/Moderate

While the parks are in a more natural condition than the residential segment, they have still been altered and have moderate amount of impervious surface, some shoreline modification, and compacted soils, all of which compromised the ability to provide necessary shoreline functions.

American Lake – Segment 3D - Overall segment rating = Moderate

Although Silcox Island has been moderately built out with residential structures and has some shoreline modification, the island has mostly retained its forested canopy and has not had as much modification to the soil structure on the island.

American Lake – Segment 3E - Overall segment rating = Moderate/High

The forested peninsula south of Silcox Island appears to have been left in a natural condition for many decades. It has a forested canopy that provides special habitat niches both in the canopy and on the lake edge. Because the lake has such a high amount of development, this parcel provides a high quality area among an otherwise developed area.

Lake Steilacoom – Segment 4A - Overall segment rating = Low/Moderate

The residential area of Lake Steilacoom is similar to that of the other lakes in Lakewood with high density residential housing surrounding the lakeshore. Like American Lake, the shoreline has been extensively armored, reducing the ability of the shoreline to perform many shoreline functions.

Lake Steilacoom – Segment 4B - Overall segment rating = Low/Moderate

Edgewater Park is a small portion of the overall size of Lake Steilacoom and represents the same overall functions and scores. It does have the opportunity to provide organic matter, but again, in relation to the size of the lake, the segments provide similar functions as adjacent residential segments.

Gravelly Lake – Segment 5A/B - Overall segment rating = Moderate

The residential segment of Gravelly Lake is fully developed with residential housing and armored shorelines, reducing the functions the shoreline is able to provide similar to the other constructed shorelines. Segment 5B was included in the functions with 5A because it is also built out, but is managed as a 10-acre garden open to the public. Therefore the functions are the same or similar, but its land use is different from the rest of the lake.

Lake Louise – Segment 6 - Overall segment rating = Low

Lake Louise is completely surrounded by single family housing, boat docks, and armored shoreline. The functions performed by an intact shoreline have almost completely been modified or heavily compromised on Lake Louise. Lake Louise also suffers from water quality issues associated with excessive nutrients cause toxic algae blooms.

Waughop Lake – Segment 7 - Overall segment rating = Moderate/High

Waughop Lake has an intact shoreline and is able to provide nearly all of the functions of a normally functioning shoreline. The lake quality has suffered due to historic use of the lake as a dumping ground for animal waste, as well as urban development. Due to the risk to human health, water quality improvement for Waughop Lake should be a primary focus for the City of Lakewood.

2.4 Summary of Degraded Shoreline Areas

Based on the evaluation of shoreline ecological functions summarized in Section 2.3, the following areas have been identified as being degraded, and restoration efforts in these locations should be prioritized.

Clover Creek – Degraded areas along this stream include the commercially developed areas adjacent to I-5 and areas of high-density residential development along the lower half of the reach. Re-establishment of native riparian buffers should be the highest priority for restoration in this reach.

American Lake – Most of the shoreline of American Lake is considered degraded, due to the high level of residential development and associated shoreline modification. As described in Section 2.3, widespread armoring has impeded wave attenuation and organic matter recruitment functions, and encouraging property owners to transition from bulkheads to softer forms of shoreline stabilization should be the primary focus in this area, as well as restoration of shoreline buffer areas.

Lake Steilacoom – The residential portions of the Lake Steilacoom shoreline have been extensively armored. Similar to American Lake, the presence of this armoring has degraded ecological function, impeding wave attenuation and organic matter recruitment. Encouraging transition to softer, non-structural forms of shoreline stabilization should be the primary focus of restoration efforts in this reach. Augmentation of riparian buffer areas should also be a high priority.

Lake Louise – Residential development and shoreline armoring has degraded natural shoreline function along essentially all of the Lake Louise shoreline. Similar to Lake Steilacoom and American Lake, removal of hard armoring and transition to non-structural methods of shoreline stabilization should be of primary concern, as well as reduction of upland impervious surface and re-establishment of natural riparian buffers.

3. RESTORATION GOALS AND OBJECTIVES

3.1 *Comprehensive Plan*

The following goals and policies relating to shoreline and other natural features are presented in the City of Lakewood's Comprehensive Plan and serve as the foundation of the City's restoration strategy.

1. Provide for the protection, conservation, and enhancement of habitat areas for fish and wildlife. (Goal LU-57)
2. Provide fish and wildlife habitat of sufficient diversity and abundance to sustain existing indigenous fish and wildlife populations. (Policy LU-57.3)
3. Promote the restoration of riparian (streamside) areas to preserve and enhance their natural function of providing fish and wildlife habitat and protecting water quality. (Policy LU-57.5)
4. Preserve and protect native vegetation in riparian habitats and integrate suitable native vegetation in residential and commercial landscapes. (Policy LU-57.6)
5. Preserve the natural character and ecology of shorelines while balancing public access and recreation opportunities. (Goal LU-58)
6. Preserve the ecology and wildlife habitat characteristics of shorelines. (Policy LU-58.1)
7. Expand public ownership of shorelines and opportunities for access to lakes. (Policy LU-58.2)
8. Participate in Watershed Resource Inventory Area (WRIA) 12 watershed cooperative planning efforts in compliance with the State's non-point source pollution prevention program. (Policy LU-58.6)

3.2 *Restoration Policy Development*

Based on this policy guidance and the policy guidance provided by the Chambers-Clover Creek Watershed Council (CCWC) through the efforts described in Section 4 of this Restoration Plan, the City has developed the following restoration policies.

System-Wide Restoration Policies

1. Improve the water quality of all water bodies within the shoreline management area by managing the quality and quantity of stormwater in contributing systems and implementing Low Impact Development techniques to the maximum feasible extent, consistent at a minimum with the City's NPDES Phase II Stormwater Permit and the latest Washington Department of Ecology Stormwater Management Manual for Western Washington.
2. Reclaim and restore to the greatest extent feasible areas which are biologically and aesthetically degraded while maintaining appropriate use of the shoreline.

3. Increase quality, width and diversity of native vegetation in protected corridors adjacent to lake and stream habitats to provide safe migration pathways for fish and wildlife, food, nest sites, shade, perches, and organic debris. Strive to control non-indigenous plants or weeds that are proven harmful to native vegetation or habitats.
4. Continue to work collaboratively with other jurisdictions and stakeholders to implement the Chambers-clover Creek Watershed Action Agenda and the Water Resource Inventory Area (WRIA) 12 Plan.
5. Seek funding where possible for various restoration actions and programs from local sources and by working with other WRIA 12 jurisdictions, the Chambers-Clover Creek Watershed Council and other stakeholders to seek federal, state, grant and other funding opportunities.
6. Develop a public education plan to inform private property owners about the effects of land management practices and other unregulated activities (such as vegetation removal, pesticide/herbicide use, car washing) on fish and wildlife habitats.
7. Where feasible, protect, enhance, and encourage the restoration of lake areas and wetlands throughout the contributing basin where functions have been lost or compromised.

SMA Restoration Policies

1. Target Waughop Lake (Fort Steilacoom Park) and Edgewater Park for restoration of shoreline natural resources and functions while ensuring continued public access to the shoreline.
2. The City of Lakewood should protect natural areas and continue to identify and implement shoreline restoration projects and measures to address persistent water quality issues at Fort Steilacoom Park that negatively impact beneficial uses of the lake, while ensuring continued public access.
3. Target American Lake North Park and Harry Todd Park for limited habitat enhancements that are designed and sited to be compatible with the heavy active recreation use at these parks. Opportunities include planting of native vegetation where appropriate.
4. Target Springbrook Park and Open Space, and Chambers Creek Canyon Park for the use of environmentally friendly materials and design and vegetation enhancement during the future planned development of trails and recreational facilities.
5. Restoration of aquatic and riparian habitat along Clover Creek should be encouraged and accomplished over time through incentives for private property owners, and continued stormwater management improvements and City capital improvement projects.
6. The City of Lakewood should collaborate with Pierce County and the City of University Place for any restoration activities that would improve habitat and other ecological functions within Chambers Creek Canyon Park.

7. Improve the ecological functions of lake shorelines by removing bulkheads and replacing these features to the extent feasible with bioengineered stabilization solutions to improve aquatic habitat conditions.
8. Improve the ecological functions of streams and related habitat with stream bank stabilization using native vegetation. Preserve and restore native vegetation along lake shorelines to the greatest extent feasible.
9. Improve habitat conditions by increasing large woody debris recruitment potential through plantings of trees along the lake shore, particularly conifers. Where a safety hazard will not be created, encourage the installation of large woody debris to meet short-term needs.
10. Target single family residential properties with incentives, outreach and information for homeowners who are willing to voluntarily remove bulkheads, plant native vegetation and encourage large woody debris recruitment.
11. Decrease the amount and impact of overwater and in-water structures within SMP lakes through minimization of structure size and use of more environmentally friendly materials, including grated decking.
12. Monitor and control aquatic invasive species in American Lake, Gravelly Lake, Lake Louise, and Waughop Lake, and continue to participate in lake-wide efforts at Lake Steilacoom to reduce populations of non-native aquatic vegetation.

4. LIST OF EXISTING AND ONGOING PROJECTS AND PROGRAMS

The following series of existing projects and programs are generally organized from the larger watershed scale to the City-scale, including City projects and programs and finally non-profit organizations that are also active in the City of Lakewood area.

4.1 Chambers-Clover Creek Watershed Planning Participation and Ongoing Efforts

The Chambers-Clover Creek Watershed has been the focus of coordinated watershed planning efforts for roughly 20 years. The Chambers-Clover Creek Watershed Action Plan was completed in 1997 and contained 56 actions. The action plan identified which jurisdictions, state agencies and other organizations would be responsible for implementation and the estimated costs of the proposed actions. Lakewood incorporated at the end of the planning process in 1996 and was not significantly involved in the creation of the Action Plan. The Watershed Action Plan was also the genesis of the Chambers-Clover Creek Watershed Council (CCWC). While the primary function of the group is to help facilitate the implementation of the watershed action plans, the members of the CCWC are also dedicated to improving fish habitat and fostering a sense of stewardship among watershed residents. CCWC members include representatives from local governments, tribes, businesses, elected officials, environmental agencies, non-profit groups and private citizens.

Restoration of coho salmon stocks are a priority in WRIA 12 because the watershed was historically highly suited to coho salmon and because Chinook do not presently use the freshwater habitat of WRIA 12. Coho are still present in the watershed, though at relatively low numbers. Recent analysis (Mobrاند 2001) indicate coho salmon would make an excellent indicator species for formulating priority actions to address salmonid conservation and recovery needs in WRIA 12.

The City of Lakewood is one of six cities and towns that are members of the CCWC. The lead agency is Pierce County’s Public Works department that has responsibility for surface water planning in the Chambers-Clover Creek Watershed (WRIA 12). The CCWC provides local agencies and citizens with an opportunity to coordinate their planning efforts for the benefit of the watershed. In 2007, the CCWC published their *Watershed Action Agenda: Priorities for Focus within the Chambers-Clover Creek Watershed – 2007-2011*. The Action Agenda establishes the following ten action items designed to meet the goals and objectives of the watershed council.

Table 1. Watershed-Wide Action Items to Support Implementation of Chambers-Clover Creek Watershed Action Plan

Program	Action Item	Lakewood Implementation
1	Minimize and Manage Runoff from New Development. Action involves two components: supporting and encouraging implementation of Low Impact Development (LID) and supporting the implementation of Temporary Erosion (TESC) and Sediment Control Best Management Practices (BMPs)	City of Lakewood adopted 2005 DOE Stormwater Manual in 2009 and has also adopted the 2008 Pierce County Stormwater Management and Site Development Manual, which covers LID. City Public Works staff review development applications to ensure compliance with all adopted stormwater regulation. Specifically, the City requires TESC BMPs, and the municipal code requires developers to retain stormwater on-site to the maximum extent feasible (LMC 12A.11.044). Lakewood is fortunate to have soils suitable for infiltration throughout most of the city. Since the NPDES Permit was issued, all new developments are infiltrating their stormwater on site or in a few cases discharging to City infiltration systems. Also unique to Lakewood, much of the City’s infrastructure infiltrates and does not discharge to surface waters. The City has not defined goals or metrics to identify, promote or measure LID use. The City has not determined schedules for requiring of implementing additional LID techniques on a broader scale.
2	Maintain and Retrofit Existing Stormwater Facilities	Phase II NPDES Permit approved in 2007, See above and Section 4.4 for additional details. In addition, the City has taken the following actions to maintain and retrofit existing stormwater facilities: <ul style="list-style-type: none"> • Since incorporation, the City has retrofitted 13 outfalls that discharge to lakes and creeks within Lakewood; • The City has replaced approximately 500 obsolete stormwater dry-wells with improved infiltration systems. The City plans to continue this effort until all remaining dry-wells have been replaced; • As part of the ongoing improvements to Pacific Highway,

Lakewood Shoreline Restoration Plan

Program	Action Item	Lakewood Implementation
		<p>specifically the segment from Gravelly Lake Drive to Bridgeport Way, the City implemented various LID techniques to reduce the amount of runoff entering Clover Creek;</p> <ul style="list-style-type: none"> Nearly all of the City's planned public work capital projects include a stormwater management component. As roads are improved and public facilities are constructed, existing stormwater systems are upgraded, and new systems are designed to meet current standards.
3	Restore Streams, Wetlands, and Riparian Areas	<p>The City partnered with the Pierce Conservation District to install fish ladders on existing dams and weirs on Clover Creek in 1999 and 2000-2002, which restored fish passage to nearly 7 miles of the stream above Gravelly Lake. The City also partnered with the PCD around the same time to remove a fish barrier on Flett Creek at 75th St. W. and has partnered with the PCD over the years to implement several stream restoration projects, including invasive plant removal and native plantings.</p> <p>The City also partnered with the City of University Place in 2005 to replace an undersized culvert at the boundary between the two cities where Leach Creek crosses under Bridgeport Way. The project, which was partially funded by the Salmon Recovery Funding Board, replaced the existing undersized culvert with a larger 3-sided box culvert and opened habitat for fish and wildlife further upstream in the Leach Creek sub-basin.</p>
4	Improve Onsite Septic and Wastewater Treatment System Management	<p>The vast majority of the City is served by sanitary sewer. An area of approximately 40 acres located just north of Lake Louise and southwest of Lake Waughop, but outside the proposed SMA of either lake, contains 93 single-family residences that rely on on-site sewage disposal systems. Residences in the Tillicum and Woodbrook portions of the City, south of American Lake, also currently rely on on-site sewage disposal systems, but will soon have public sanitary sewer service provided by Pierce County. The City of Lakewood is working to transition properties that use on-site sewage disposal systems to sanitary sewer service, <u>and</u> all development within the City must connect to sanitary sewer if such is available. LMC 12A.15.040 requires existing development to connect to sanitary sewer within 90 days after the City has provided notice that service is available. New development shall connect to sanitary sewer in order to qualify for a certificate of occupancy (LMC 12A.15.060).</p>
5	Enhance Understanding of Ground and Surface Water Interactions	<p>The City of Lakewood evaluates effects on ground and surface water during compliance inspections. If businesses are found to be out of compliance with development regulations with regard to ground and surface water practices, City inspectors provide an explanation of why current practices need to be corrected.</p>
6	Review Existing Regulations and Monitor Enforcement	<p>The City employs a full-time stormwater compliance inspector whose duties include inspections of businesses and properties for compliance with Lakewood's stormwater management regulations. The inspector works closely with inspectors from other City departments (building, code enforcement, community service officers)</p>

Lakewood Shoreline Restoration Plan

Program	Action Item	Lakewood Implementation
		<p>on enforcement efforts that require multiple disciplines.</p> <p>City staff also remains informed of changes in regulations at the state and federal level that may impact local regulatory requirements.</p>
7	Restore Beneficial Uses of Lakes	The City has ongoing public works improvement programs that offer potential benefits to lakes, including outfall retrofits, drywell retrofits, and sanitary sewer installation in Tillicum/American Lake Gardens.
8	Promote Education, Outreach, and Public Involvement	The City has adopted a Stormwater Education and Outreach Plan per the conditions of its Phase II NPDES permit. The objective of the plan is to educate public employees, businesses, and the general public about illegal discharges and their potential negative effects on water quality. The plan establishes groups of target audiences and identifies the specific topics and distribution formats most applicable to each, as well as measurable goals to determine if outreach efforts are having a positive effect on reduction of illicit discharge. The plan also contains a timeline for outreach efforts to each of the audience groups.
9	Support Local and Regional Salmon Recovery Efforts in WRIA 12	As noted under Program 3, the City has implemented several projects to remove barriers to fish passage on Clover Creek, Flett Creek, and Leach Creek, making additional upstream habitat available for fish and wildlife, including salmon. In addition, local stormwater management projects indirectly contribute to salmon recovery by reducing pollution in ground and surface water that may eventually flow to Puget Sound.
10	Monitor the Watershed and Report Results	<p>The City has participated in the Benthic Index of Biotic Integrity (BIBI) sampling program with Pierce County. The BIBI program consists of surveys of water bodies to evaluate water body health based on the prevalence of various indicator species.</p> <p>The City also financially supports the Pierce Conservation District Stream Team in its efforts to sample and analyze water from several lakes in Lakewood. This is a long-term, ongoing project, and several more years of data will be necessary before it can be determined if there are any measurable trends in water quality.</p>

In addition to the watershed action planning process, the Chambers-Clover Creek Watershed has also been the focus of a number of other major planning efforts. A salmon recovery plan for the watershed (WRIA 12) was completed in 2005, a requirement of the federal listing of Puget Sound Chinook as threatened under the Endangered Species Act. The Washington State Department of Ecology continues to develop water cleanup plans for impaired water bodies, as well as administer Clean Water Act implementation programs, such as NPDES permitting. Pierce County completed the Clover Creek Basin Plan in 2003, which focuses on water quality, flooding and habitat issues in unincorporated areas. Additionally, a comprehensive watershed management plan for WRIA 12 was completed in 2004. However, this plan was not approved by all stakeholders.

4.2 Comprehensive Plan Policies

The City's comprehensive plan defines goals and policies addressing protection of the environment and shorelines in its Land Use Element. Topics addressed include environmentally critical areas, fish and wildlife habitat, water quality, air quality, wetland protection, and flood management. Many of the goals and policies applicable to the shoreline environment were used as the basis for the restoration objectives discussed in Section 3. Comprehensive Plan Policies are implemented through the City's Municipal Code, Capital Improvement Program and other mechanisms.

4.3 Environmentally Sensitive Areas Regulations

The City of Lakewood's critical areas and natural resource lands regulations are found in Lakewood Municipal Code Title 14A – Environmental Protection. The City completed its last critical areas regulations update in 2004, consistent with the requirements of the GMA. The regulations are based on "best available science," and provide protection to critical areas in the City. The regulations categorize streams based on the Department of Natural Resources classification system and dictate buffers ranging from 35 feet to 150 feet. Wetland buffers range between 50 and 200 feet and are classified according to Lakewood Municipal Code 14A.162.080. Management of the City's environmentally sensitive areas using these regulations should help insure that ecological functions and values are not degraded, and impacts to critical areas are mitigated. These critical areas regulations are one important tool that will help the City meet its restoration goals. The City's critical areas regulations are adopted by reference into the Shoreline Master Program, with certain modifications and deletions based on the SMP Guidelines, to regulate critical areas found within the shoreline zone.

4.4 Stormwater Management and Planning

The Lakewood Department of Public Works Surface Water Management Division is responsible for maintaining the City's stormwater infrastructure. In 2007, Ecology approved the City's National Pollution Discharge Elimination System (NPDES) Phase II permit. The NPDES Phase II permit is required to cover the City's stormwater discharges into regulated lakes and streams. Under the conditions of the permit, the City must protect and improve water quality through public education and outreach, detection and elimination of illicit non-stormwater discharges (e.g., spills, illegal dumping, wastewater), management and regulation of construction site runoff, management and regulation of runoff from new development and redevelopment, and pollution prevention and maintenance for municipal operations. The policies and regulations of the proposed SMP and this Restoration Plan are intended to support the City's ongoing NPDES Phase II Permit compliance efforts.

4.5 Public Education

The City of Lakewood's Comprehensive Plan identifies policy statements based on goals associated with the Land Use and Utilities elements (excerpted below). These items help guide City staff and local citizen groups in developing mechanisms to educate the public and broaden the interest in protecting and enhancing local environmental resources.

Policy LU-62.9: Work cooperatively with local water districts to maximize protection of wellheads and aquifers. Support ongoing efforts to:

- Educate citizens and employers about Lakewood’s dependence on groundwater;
- Establish and maintain public awareness signs delineating the boundaries and key access points to the Lakewood Water District’s wellhead protection areas;
- Maintain groundwater monitoring programs;
- Implement a well decommissioning program for all unused wells;
- Coordinate planning and review of drainage, detention, and treatment programs within wellhead protection areas.

Comment [g1]: SWM hasn’t done much with the Lakewood Water District on wellhead protection. Planning has worked with them in the past.

Comment [g2]: Marc, anything you can add here?

Policy U-3.10: Cooperate with the Pierce County Conservation District Stream Team Program to provide water quality education to the community.

Additionally, Priority Action #8 in the *Watershed Action Agenda: Priorities for Focus within the Chambers-Clover Creek Watershed 2007-2011*, developed by the Chambers-Clover Creek Watershed Council (CCWC) is: “Promote Education, Outreach, and Public Involvement.” This action involves six components:

- Provide a monthly meeting for discussion of important watershed topics
- Sponsor tours of the watershed
- Maintain a CCWC website
- Public an annual or bi-annual report
- Provide public input to local governments in the implementation of their projects
- Involve students in hands-on activities and learning opportunities in the watershed

The City has been a member of the CCWC since its inception and actively implements all six of the public outreach components listed above. Additional details about CCWC public education, outreach and stewardship programs may be found at [http://www.co.pierce.wa.us/xml/services/home/envIRON/water/ps/ccwc/2007/CCWCActionAgendaFINAL\(web\).pdf](http://www.co.pierce.wa.us/xml/services/home/envIRON/water/ps/ccwc/2007/CCWCActionAgendaFINAL(web).pdf).

4.6 Other Lakewood Programs and Projects

Illegal Discharge Detection and Elimination Program

The City's Phase II NPDES Permit requires the implementation of an Illegal Discharge Detection and Elimination (IDDE) program to help meet the requirements of the Clean Water Act. The City's latest IDDE plan, completed in July 2011, contains policies for finding and eliminating discharges of pollutants not allowed under the terms of the NPDES permit. The IDDE Plan contains an inventory of all known outfall locations and establishes a schedule for inspecting outfalls greater than 24 inches in diameter to detect illicit discharges.

The IDDE Plan also contains protocols for spill prevention and response that are designed to ensure that spills of hazardous substances within the city are properly identified, reported, contained, and cleaned up.

Carwash Public Education

The City has established Best Management Practices for charity car washes, which can be a source of pollutants in the stormwater stream. The City requires that charity car washes obtain a free permit and that such car washes be located either on a pervious surface (grass, gravel) or on an impervious surface that drains to a stormwater infiltration system, rather than the general stormwater network. Other guidelines and BMPs are published on fact sheets publicly available from the City.

Automotive Industry BMPs

In addition to public education for car washes, the City also publishes fact sheets containing good practices for auto-oriented businesses, such as car dealerships and automotive repair shops. Such practices include preventing wash water from vehicles or car parts from entering the storm drain, proper disposal of hazardous waste, and covering outdoor storage areas to prevent potentially toxic runoff from flowing into the storm drain.

Safe Pet Waste Disposal BMPs

The City publishes fact sheets on pet waste disposal to educate the public on the importance of managing this contributor to poor water quality. The fact sheets explain that pet waste often contains pathogens that can cause disease in humans and other animals, and stormwater flows can transmit these pathogens to streams and lakes. Residents are encouraged to scoop up after their pets often and place the waste in the garbage. Placing pet waste in the municipal yard waste collection bins is highly discouraged because the pet waste then contaminates any compost that is made from the collected yard waste. Flushing pet waste down the toilet in areas using septic systems is also discouraged, as septic systems are often not designed to handle pet waste, which differs in composition from human waste, and septic systems may become overloaded and cause groundwater pollution.

5. LIST OF ADDITIONAL PROJECTS AND PROGRAMS TO ACHIEVE LOCAL RESTORATION GOALS

The following series of additional projects and programs are generally organized from the larger watershed scale to the City-scale, including City projects and programs and finally non-profit organizations that are also active in the Lakewood area.

5.1 Recommended Projects

The following is partially developed from an initial list of opportunities identified within the *Shoreline Analysis Report*. The list of potential projects is intended to contribute to improvement of impaired functions.

General: Many shoreline properties have the potential for improvement of ecological functions through: 1) reduction or modification of shoreline armoring, 2) reduction of overwater cover and in-water structures (grated pier decking, pier size reduction, pile size and quantity reduction, moorage cover removal), 3) reductions in upland impervious surface coverage, 4) improvements to vegetation within the shoreline setback or buffer and/or 5) improvements to upland vegetation and soils to provide additional habitat and mitigate stormwater impacts. These opportunities generally apply to private residential properties, public parks, share recreational lots, private recreation uses, public street-ends and utility corridors.

Segment 1: Chambers Creek

While a significant portion of the creek shoreline runs through properties containing private residences, Chambers Creek Park (i.e. Chambers Creek Properties owned and administered by Pierce County) occupies a large portion of the creek's northern reach, providing a relatively straight forward opportunity to preserve and enhance the existing riparian zone on public lands. In addition, along much of the southern reach, homes are located considerable distance from the creek which is largely confined to a ravine. Forested and largely intact riparian areas provide valuable ecological functions as documented in the Shoreline Inventory and Analysis Report.

Protecting existing high quality habitat along Chambers Creek is the highest priority. Implementation and enforcement of critical area regulations and the City's NPDES stormwater program are cornerstones of the City's efforts to protect habitat along Chambers Creek and improve water quality. Interagency coordination with Pierce County, particularly for Chambers Creek Park, as well as WDFW (which has a fish hatchery and significant management role for fish in the basin) should be emphasized in refining the management strategy for the northern reach. Limited opportunities may also exist for property acquisition. Additional outreach to homeowners and habitat enhancement efforts in the park and on private properties with willing homeowners can help ensure that the highest quality fish and wildlife habitat in the City is protected and enhanced.

Segment 2: Clover Creek

Because the majority of Clover Creek shoreline is in private ownership, the primary opportunities for restoration and enhancement occur on private property. Enhancement of the area could be achieved by encouraging private property owners to remove existing bank

Comment [g3]: Does the city have any thoughts on this? Is the city considering anything in this realm?

modifications and implement shoreline enhancement projects, such as native vegetation planting. Homeowner education programs could also be established to discourage the use of chemicals on lawn areas and landscaping that may adversely affect water quality. The City expects that implementation of the NPDES Phase II Stormwater Program and the incentive-based setback regulations included in the SMP, which encourages enhancement of the creek shoreline and vegetation, will help improve conditions along Clover Creek.

In addition, the City previously identified a fish blockage approximately 600 feet upstream of Lake Steilacoom. Removal of this blockage has not been feasible in past years due to an uncooperative property owner, but the property has recently been sold, and the City intends to pursue removal. If the property owner cooperates, the City will apply for a Salmon Recovery Funding Board grant in 2012 and conduct the project in partnership with Pierce County Stormwater Management.

Segment 3: American Lake

As noted in the Chambers-Clover Creek Watershed Action Plan and other sources, phosphorus and other pollutants from improperly functioning on-site sewage systems (OSS) is a concern in the watershed overall as well as in the immediate vicinity of American Lake. The City should set a time frame for the required conversion of existing OSS in the Tillicum and American Lake Garden Tract neighborhoods to sanitary sewer and explore additional means to accomplish this goal. In the mean time, the City should work with the Tacoma-Pierce County Health Department to identify problem OSS, work with property owners to educate them about the need to maintain their systems and support TPCHD to ensure the enforcement of existing regulations.

Most of the habitat enhancement potential for American Lake is concentrated on privately owned parcels because of the high degree of private ownership surrounding the lake. Restoration on private property could be achieved by encouraging private property owners to remove existing bank modifications and implement shoreline enhancement projects, such as native vegetation planting. The replacement of bulkheads and other forms of hard armoring with bioengineered solutions should be especially encouraged. Replacement of deteriorating piers should also be a high priority. Homeowner education programs could also be established to discourage the use of chemicals on lawn areas and landscaping that may adversely affect water quality.

Restoration activities could also occur at City parks, focusing on the removal of bulkheads whenever feasible and the reestablishment of native vegetation. New facilities constructed at City shoreline parks should employ Low Impact Development (LID) practices and green building techniques. Areas where native vegetation cover is still extensive should be protected.

The City expects that implementation of the NPDES Phase II Stormwater Program and the incentive-based setback regulations included in the SMP, which encourages enhancement of the lake shoreline and vegetation, will help improve conditions along American Lake, as well as on other lakes in the City. A long range goal for the City's Surface Water Management Division is the preparation of management plans for the City's lakes, including American Lake. While American Lake currently has an aquatic vegetation management plan in place, the plan is narrowly focused. A new lake management plan would address a broad range of topics with bearing on the health of the lake, including water quality and upland vegetation enhancement.

Segment 4: Lake Steilacoom

Most of the restoration potential for Lake Steilacoom is concentrated on privately owned parcels because of the high degree of private ownership surrounding the lake. Restoration on private property could be achieved by encouraging private property owners to remove existing bank modifications and implement shoreline enhancement projects, such as native vegetation planting. The replacement of bulkheads and other forms of hard armoring with bioengineered solutions should be especially encouraged. Replacement of deteriorating piers should also be a high priority. Because steelhead, an ESA listed fish species, are known to occur in Lake Steilacoom, dock and pier standards require light transmission through deck materials to limit impacts on salmonids. Homeowner education programs could also be established to discourage the use of chemicals on lawn areas and landscaping that may adversely affect water quality.

Restoration activities could also occur at Edgewater Park, and the city should consider acquiring additional property on Lake Steilacoom for public access. New facilities constructed at City shoreline parks should employ Low Impact Development (LID) practices and green building techniques. Areas where native vegetation cover is still extensive should be protected.

A long range goal for the City's Surface Water Management Division is the preparation of management plans for the City's lakes, including Lake Steilacoom. The lake management plan would address a broad range of topics with bearing on the health of the lake, including water quality, aquatic vegetation management, and upland vegetation enhancement.

Segment 5: Gravelly Lake

Gravelly Lake is entirely surrounded by private parcels, and restoration opportunities are therefore restricted to private property. Restoration on private property could be achieved by encouraging private property owners to remove existing bank modifications and implement shoreline enhancement projects, such as native vegetation planting. The replacement of bulkheads and other forms of hard armoring with bioengineered solutions should be especially encouraged. Replacement of deteriorating piers should also be a high priority. Homeowner education programs could also be established to discourage the use of chemicals on lawn areas and landscaping that may adversely affect water quality.

While privately owned, Lakewold Gardens is open to the public and provides an opportunity for further shoreline restoration. The City should work with Lakewold Gardens to explore possibilities for expanded public access at this location, as well as implementation of restoration measures, such as bulkhead removal and reduce use of chemicals and fertilizers that may adversely affect water quality in Gravelly Lake.

Segment 6: Lake Louise

Lake Louise is surrounded by private parcels, and with the exception of the public boat launch at the restoration opportunities are therefore restricted to private property. Restoration on private property could be achieved by encouraging private property owners to remove existing bank modifications and implement shoreline enhancement projects, such as native vegetation planting. The replacement of bulkheads and other forms of hard armoring with bioengineered solutions should be especially encouraged. Replacement of deteriorating piers should also be a high

priority. Homeowner education programs could also be established to discourage the use of chemicals on lawn areas and landscaping that may adversely affect water quality.

Segment 7: Waughop Lake

Waughop Lake is located entirely within Fort Steilacoom Park, so restoration efforts could be undertaken by the City of Lakewood. Due to poor water quality and potential risks to human health, water quality improvement should be the highest priority for restoration projects at Waughop Lake. Discontinuing the practice of stocking the lake with game fish is recommended, as well as taking steps to reduce the amount of pet waste that washes into the lake, such as increased provision of waste bags and trash cans along the park trails.

As noted in the Chambers-Clover Creek Watershed Action Plan and other sources, phosphorus and other pollutants from improperly functioning on-site sewage systems (OSS) is a concern in the watershed overall as well as in the vicinity of Waughop Lake. The City should set a time frame for the required conversion of existing OSS in the area to sanitary sewer and explore additional means to accomplish this goal. In the mean time, the City should work with the Tacoma-Pierce County Health Department to identify problem OSS, work with property owners to educate them about the need to maintain their systems and support TPCHD to ensure the enforcement of existing regulations.

A long range goal for the City's Surface Water Management Division is the preparation of management plans for the City's lakes, including Waughop Lake. The lake management plan would address a broad range of topics with bearing on the health of the lake, including water quality, aquatic vegetation management, and upland vegetation enhancement. Improving water quality would be a primary focus for Waughop Lake.

Educational signage regarding the lake and surrounding wetlands would help fulfill the public outreach and education goals of this restoration plan, and enhancements to the wetlands and associated buffers would provide improvements to water quality and fish and wildlife habitat.

6. PROPOSED IMPLEMENTATION TARGETS AND MONITORING METHODS

As previously noted, the vast majority of the City's shoreline zone is occupied by single-family residences, with small areas of vacant property and two parks. Therefore, other than watershed level programs, such as NPDES Phase II Stormwater Permit compliance, the largest potential for directly improving shoreline ecological function generally lies in promoting restoration and healthy practices on private property and the lot scale. The City of Lakewood can continue improvement of shoreline ecological functions along the shoreline through a more comprehensive watershed approach, which combines the both public education programs and lakefront and streamside improvements.

The following table (Table 2) outlines a possible schedule and funding sources for implementation of a variety of efforts that could improve shoreline ecological function, and are described in previous sections of this report.

Table 2. Implementation Schedule and Funding for Restoration Projects, Programs and Plans.

Restoration Project/Program	Schedule	Funding Source or Commitment
4.1 Chambers-Clover Watershed Council Participation	Ongoing	The City has been and continues to play an active role on the Chambers-Clover Watershed Council. The City sends a staff representative to a monthly CCWC meeting, and the City's Surface Water Division Manager serves as the CCWC chairman. City of Lakewood staff commit approximately 4-5 hours per month to CCWC activities.
4.2 Comprehensive Plan Policies	Last updated 2009	The City commits substantial staff time to the review of projects and programs to ensure consistency and compliances with the goals and policies of the Comprehensive Plan. The City last updated its Comprehensive Plan in 2009, and the next update is mandated by the Growth Management Act to occur before the end of 2015.
4.3 Critical Areas Regulations	Updated 2009	The City commits substantial staff time to the review of projects and programs to ensure consistency and compliances with the goals and policies of the Critical Areas Regulations.
4.4 Stormwater Management and Planning	Ongoing	The City adopted a Stormwater Management Program in 2008. The City prepares annual updates to its Stormwater Management Program, pursuant to the conditions of its NPDES permit. The Stormwater Management Program is funded by a stormwater utility fee paid for by Lakewood property owners.
4.5 Public Education/Outreach	Ongoing	The City has an active Stormwater Public Education and Outreach Plan. The plan is updated annually in accordance with NPDES permit requirements.
5.1 Recommended Improvements	As funds and opportunity allow	Projects identified in this section will be implemented when funding is obtained, either through grants or through partnerships with other agencies or non-profit groups, or as required by critical areas regulations or the Shoreline Master Program during project-level review by the City. Projects that directly benefit salmon habitat may be eligible to receive funding from the Washington State Salmon Recovery Funding Board. \$28 million dollars of project funding was announced by the SRFB for Fiscal Year 2011.

The City is required to monitor development under the Shoreline Master Program to ensure no net loss. We recommend that City planning staff track all land use and development activity, including exemptions, within shoreline jurisdiction, and incorporate actions and programs of the Parks and Recreation and Public Works departments as well. We recommend that a report be assembled that provides basic project information, including location, permit type issued, project description, impacts, mitigation (if any), and monitoring outcomes as appropriate. Examples of data categories might include square feet of non-native vegetation removed, square feet of native

vegetation planted or maintained, reductions in chemical usage to maintain turf, linear feet of eroding shoreline stabilized through plantings, linear feet of shoreline armoring removed, number of fish passage barriers eliminated or stream miles opened to anadromous fish. The report could also update Tables 1 and 2 above, and outline implementation of various programs and restoration actions (by the City or other groups) that relate to watershed health.

The staff report could be assembled to coincide with Comprehensive Plan updates and could be used, in light of the goals and objectives of the Shoreline Master Program, to determine whether implementation of the Shoreline Master Program is meeting the basic goal of no net loss of ecological functions relative to the baseline condition established in the *Shoreline Analysis Report* (Otak/AHBL 2010). In the long term, the City should be able to demonstrate a net improvement in the City of Lakewood's shoreline environment.

Based on the results of this future assessment program, the City may make recommendations for future changes to the Shoreline Master Program.

7. RESTORATION CONSTRAINTS AND PRIORITIES

The process of prioritizing actions that are geared toward restoration of Lakewood's shoreline area involves balancing ecological goals with a variety of constraints. General constraints related to potential restoration of shoreline functions include:

1. Persistent water quality problems that are a result of nonpoint pollution within the entire watershed, including areas outside of the City of Lakewood.
2. Persistent problems with base flows in Clover Creek.
3. An extensively developed shoreline area throughout the SMA with predominantly private land ownership (Chambers Creek being the exception).
4. Heavy use of public parks and demand for parking, active recreation and water dependent facilities that have the potential to conflict with shoreline habitat restoration.

The goals in Section 3 and constraints were used to develop a hierarchy of restoration actions to rank different types of projects or programs associated with shoreline restoration. Programmatic actions, like providing public education and outreach programs to local residents, tend to receive relatively high priority opposed to restoration actions involving private landowners. Other factors that influenced the hierarchy are based on scientific recommendations specific to WRIA 12, potential funding sources, and the projected level of public benefit.

Although restoration project/program scheduling is summarized in the previous section (Table 2), the actual order of implementation may not always correspond with the priority level assigned to that project/program. This discrepancy is caused by a variety of obstacles that interfere with efforts to implement projects in the exact order of their perceived priority. Some projects, such as those associated with riparian planting, are *relatively* inexpensive and easy to permit and should be implemented over the short and intermediate term despite the perception of lower priority than projects involving extensive shoreline restoration or large-scale capital improvement projects. Straightforward projects with available funding should be initiated

immediately for the worthwhile benefits they provide and to preserve a sense of momentum while permitting, design, site access authorization, and funding for the larger, more complicated, and more expensive projects are under way.

7.1 Priority 1 – Continue Water Resource Inventory Area (WRIA) 12 Participation

Of basic importance is the continuation of ongoing, programmatic, basin-wide programs and initiatives such as Watershed Action Agenda and the WRIA 12 efforts. The City should continue to work collaboratively with other jurisdictions and stakeholders in WRIA 12 through the Chambers-Clover Creek Watershed Management Committee to implement the actions called for in the related plan. This process provides an opportunity for the City to keep in touch with its role on a basin-wide scale and to influence habitat conditions beyond its borders, which, in turn, come back to influence water quality and quantity and habitat issues within the City.

7.2 Priority 2– Improve Water Quality and Reduce Sediment and Pollutant Delivery

Maintaining and improving water quality throughout the Chambers-Clover Creek Watershed is considered a high priority for the City of Lakewood. The water quality in the City's streams and lakes directly influences recreational uses such as swimming and boating, as well as fish and wildlife habitat. Water from the surrounding basin flows into Clover Creek, flows into Lake Steilacoom and then flows north through chambers Creek to the Puget Sound. The remaining lakes in the City are isolated from these surface flows, but receive stormwater inputs and are connected via groundwater.

The City received its final National Pollutant Discharge Elimination System (NPDES) Phase II permit in January 2007 from Ecology. The NPDES Phase II permit is required to cover the City's stormwater discharges into regulated lakes and streams. Under the conditions of the permit, the City must protect and improve water quality through public education and outreach, detection and elimination of illicit non-stormwater discharges (e.g., spills, illegal dumping, wastewater), management and regulation of construction site runoff, management and regulation of runoff from new development and redevelopment, and pollution prevention and maintenance for municipal operations.

The City has adopted Ecology's 2005 Stormwater Manual for Western Washington, and the city existing standards as well as the proposed standards in the SMP require the use of Low Impact Development techniques to the maximum extent feasible.

Development activities within the watershed have led to higher peak flows, excessive sediment loading and gravel scouring. Implementation of the City's stormwater program is expected to help address these issues to some extent, but again, these impacts occur as a result of development within the entire basin. Loss of flow in the central section of the mainstem Clover Creek within the City creates a passage barrier as well as loss of habitat area. Poor water quality has led to fish kills in the past, which are typically the result of "first flush" events on holding coho. Chambers and Clover creek are the highest priority fish habitat areas in the City.

As noted in the Chambers-Clover Creek Watershed Action Plan and other sources, phosphorus and other pollutants from improperly functioning on-site sewage systems (OSS) is a concern in the watershed overall as well as in the immediate vicinity of American Lake and Waughop Lake. The City should set a time frame for the required conversion of remaining neighborhoods to sanitary sewer and explore additional means to accomplish this goal. In the mean time, the City should work with the Tacoma-Pierce County Health Department to identify problem OSS, work with property owners to educate them about the need to maintain their systems and support TPCHD to ensure the enforcement of existing regulations.

7.3 Priority 3 – Develop, Expand and Implement Public Education and Involvement Programs

Public education and involvement should be a high priority in the City of Lakewood due to the extent of residential development in the shoreline jurisdiction. Opportunities for restoration outside of residential property are limited to City parks and right-of-way. Therefore, in order to achieve the goals and objectives set forth in this Restoration Plan, most of the restoration projects would need to occur on private property. Thus, providing education opportunities and involving the public are keys to success, and would possibly entail coordinating the development of a long-term Public Education and Outreach Plan to gain public support. This could include local workshops to educate shoreline property owners and other shoreline users on maintaining healthy shoreline environments, promoting enhancement and restoration opportunities, and use of low impact development techniques.

7.4 Priority 4 – Create or Enhance Natural Shoreline Conditions Along Clover Creek

As noted in the Chambers-Clover Watershed Action Plan, the Watershed Action Agenda and the WRIA 12 Plan, the principal impacts to habitat along Clover Creek have been caused by dredging and rerouting of stream channels, ditching or burying the stream, elimination of wetlands and estuarine habitat, riparian forest removal, as well as non-point water quality pollution, industrial discharges, fish passage barriers and removal of large wood from channels. Recommended projects are listed in Section 5.1.

Areas of WRIA 12 that would provide the most benefit to coho salmon are located upstream of Steilacoom Lake and include all of the Clover main stem, as well the North fork Clover Creek and Spanaway Creek which are located outside of the City. The principal factors that provide the greatest benefit to coho salmon are generally sediment load, substrate quality, habitat types (e.g. pool frequency, back water pools), water quality and removal of fish passage obstructions. Restoration of flow to the lower sections of Clover Creek, from Lake Steilacoom upstream to above the north fork confluence is necessary to achieve the benefits of habitat restoration. Pierce County has recently been exploring effective ways to seal the streambed and thereby retain existing lows in the stream channel, in addition to projects to improve base flows from the contributing basin. The City of Lakewood should continue to work with Pierce County in these efforts.

7.5 Priority 5 – Implement Soft Shoreline Stabilization and Reduce In-water and Over-water Structures

The majority of lake shoreline is armored at or below the ordinary high water mark. (Otak/AHBL 2010) Since the majority of the City’s shoreline is residential, no specific project sites have been identified under this restoration priority. However, emphasis should be given to future project proposals that involve or have the potential to restore shoreline areas to more natural conditions, and the City should continue to develop incentives for property owners to remove existing armoring or replace with softer stabilization systems.

Reduction of in- and over-water cover by piers, docks, and other boat-related structures is one mechanism to improve shoreline ecological functions. Pier and docks are extensive along lakes in the City, with approximately 80 percent of all residential parcels having a pier or dock. The Washington Department of Fish and Wildlife already regulates the size and materials for in- and over-water structures throughout the State and generally recommends finding ways to reduce both the size and density of these structures. Although no specific project sites to reduce in-water and over-water structures within residential areas are identified here, future project proposals involving reductions in the size and/or quantity of such structures should be emphasized. Such future projects may involve joint-use pier proposals or pier reconstruction and may be allowed an expedited permit process or promoted through project incentives.

7.6 Priority 6 – Improve Riparian Vegetation, Reduce Impervious Coverage

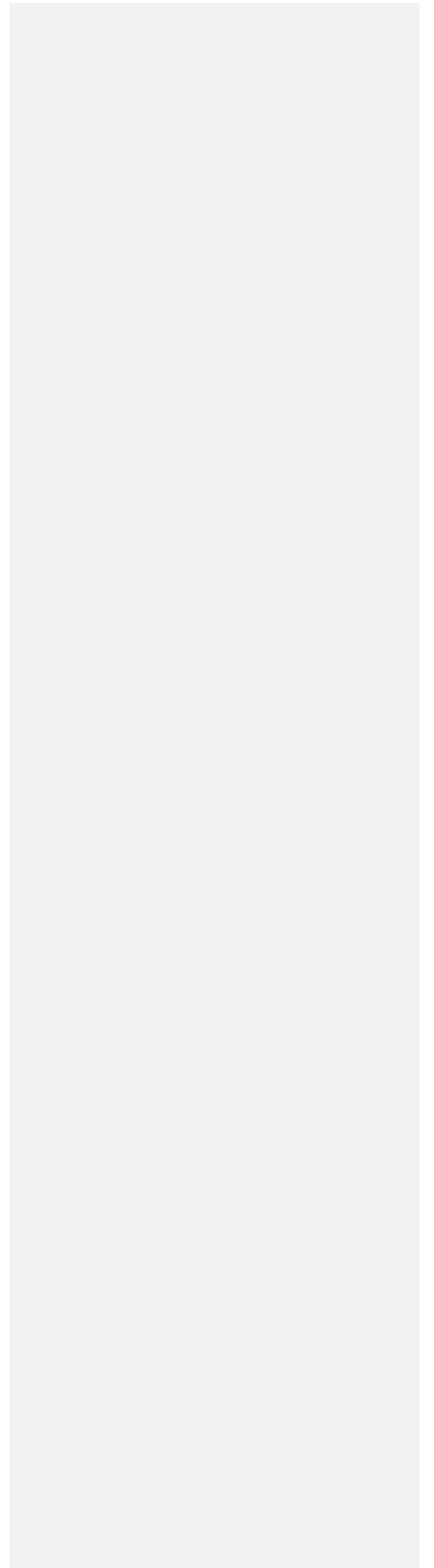
Similar to the priority listed above to improve water quality and reduce sediment and pollutant delivery, improved riparian vegetation and reduction in impervious surfaces are emphasized throughout the WRIA 12 Salmon Habitat Plan. Watershed-wide programmatic actions described in the Salmon Habitat Plan include many references to improving vegetative conditions and reducing impervious surface coverage.

7.7 Priority 7 – Enhance Habitat as Part of Future Street End Park Improvements

The street end parks provide opportunities for habitat restoration and public education, particularly at Westlake Avenue, Edgewater Park, Lake City Boulevard, Wadsworth Street, Lakeland Avenue, and Melody Lane. Development and restoration of these areas, including enhancement of native riparian vegetation could provide recreational space and give park visitors the opportunity to see habitat restoration in progress.

7.9 Priority 9 – City Zoning, Regulatory, and Planning Policies

City Zoning, Regulatory, and Planning Policies are listed as being of lower priority in this case simply because they were recently reviewed and updated in 2009. The City’s Critical Areas regulations were also reviewed at this time and updated to be consistent with the Best Available Science for critical areas, including those within the shoreline zone. The City will update the Comprehensive Plan to include the revised policy direction in the updated SMP and should consider additional efforts to forward restoration priorities as part of future major Comprehensive Plan updates.



8. REFERENCES

- Chambers-Clover Creek Watershed Management Committee, 1997. Watershed Action Plan: A Water Quality Plan for Reducing Nonpoint Pollution. October 1997.
- Chambers-clover Creek Watershed Council. 2007. Watershed Action Agenda: Proirities for Focus Within the Chambers-Clover Creek Watershed, 2007 through 2011.
- Herrera Environmental Consultants. 2009. Lake Steilacoom Calcium Hydroxide Treatment Monitoring Report. Prepared for City of Lakewood Public Works Department. June 2009.
- Pierce Conservation District. 2003. Salmond Habitat Limiting Factors Analysis Chambers-Clover Creek Watershed – Water Resource Inventory Area 12. June 2003.
- Pierce County (Lead Entity), 2008. Slamon Habitat Protection and Restoration Strategy, WRIA-10 (Puyallup Watershed), WRIA 12 (Chambers/Clover Creek Watershed). March, 2008.
- Robinson and Noble. 2003. Chambers-Clover Technical Assessment Final Report. April 10, 2003. Prepared for Tacoma-Pierce County Health Department.
- Russell, Donald and Douglas Dorling. 2008. Waughop Lake-Lake Nutrient Inactivation Experimental Use of Calcium Hydroxide. Prepared jointly by Chambers-Clover Creek Watershed Council and Northwest Aquatic Eco-Systems.
- Tetra Tech KCM. 2002. Clover Creek Basin Plan. Prepared for Pierce County Surface Water Management, October 2002.
- Woodward-Clyde. January 1998. American Lake Watershed Management Plan. Prepared for Pierce County Department of Public Works and Utilities.

APPENDIX A

CITY OF LAKEWOOD RESOLUTION XXX RATIFYING THE WRIA 12 SALMON HABITAT PLAN

Comment [g4]: Marc, Does this exist? Has the city ratified this plan?