CHAPTER 3 SHORELINE INVENTORY AND RESTORATION PLANNING

A. PURPOSE OF THE SHORELINE INVENTORY AND CHARACTERIZATION

A first step in the comprehensive Master Program update process is development of a shoreline inventory and characterization, consistent with state guidelines (WAC 173-26-201, Comprehensive Process to Prepare or Amend Shoreline Master Programs). The inventory and characterization documents current shoreline conditions and provides a basis for updating the City's Master Program goals, policies, and regulations. The characterization identifies existing conditions, evaluates existing functions and values of shoreline resources, and explores opportunities for conservation and restoration of ecological functions.

The report was reviewed and revised based on technical review comments from City staff, Department of Ecology, the Muckleshoot and Puyallup Tribes, and state Department of Transportation.

B. PURPOSE OF SHORELINE RESTORATION PLANNING

State guidelines require that local governments develop Master Program policies that promote "restoration" of damaged shoreline ecological functions and develop a "real and meaningful" strategy to implement restoration objectives. Planning for shoreline restoration includes identifying opportunities (both programmatic and site-specific), establishing goals and policies, working cooperatively with other regional entities, and supporting restoration through other regulatory and non-regulatory programs.

C. PUYALLUP RIVER – KEY FINDINGS AND ASSESSMENT OF SHORELINE FUNCTIONS

The city of Puyallup (including the urban growth area (UGA)) lies between River Miles (RM) 5.7 and 11.4 on the Puyallup River in the lower Puyallup Watershed. "River Miles" refers to mileage measured along the river, with reference to river mile designations based on USGS mapping data. River miles begin at the mouth of the river and increase with distance upstream. Within Puyallup, the River extends generally from the Melroy Bridge and mouth of Clarks Creek to approximately 1.3 miles upstream of the confluence with the White River. The portion of the Puyallup River within the city and its UGA is approximately 10 percent of the total length of the river. Given the city's location in the lower watershed, conditions in the Puyallup River within the city are driven largely by activities and conditions upstream.

Table 3-1.- Puyallup River Shoreline

Puyallup River Shoreline	
Habitat	• ESA Protected Species: Salmon / Bull Trout / Steelhead (Critical Habitat designated for Chinook and Bull Trout) • Wetlands / Riparian Habitat between river and golf course
Water Quality	• "Impaired" waterbody • Upstream Causes: development, logging, leaking septic systems, agriculture, channelization. • Fecal Coliform; Minimum Flows; Suspended Sediment (affects habitat) • June 2011 – Fecal coliform total maximum daily load (TMDL) • City improvements to Wastewater Treatment Plant
Flooding	• "The Flood Insurance Study for Pierce County, and Incorporated Areas" dated March 7, 2017FEMA remapping floodplain (not adopted as of April, 2014) • and accompanying Flood Insurance Rate Map (FIRM) • Floodplain connectivity impaired throughout • Levees impair flow attenuation • Peak Flows – result of natural seasonal changes
Shoreline Modifications	• Pierce County Levees throughout • Historic floodplains and wetlands disconnected • Reduces riparian vegetation / habitat
Public Access and Recreation	• Recreation / Fishing • River Front Trail • Palmer Property • River Road Levees
Land Use	• Agriculture, open space, and vacant on eastern portion • Residential, commercial, light industrial on western portion

The Puyallup River is a highly altered system as a result of major river and flood management practices as well as land use change in the watershed. Most impairment to ecological processes and shoreline functions are driven by practices and activities at a watershed or ecosystem scale. This includes major changes to hydrology from dams and withdrawals and construction of an extensive levee, dike, and revetment system. Such changes have affected channel migration, habitat, and wetland functions within the watershed. Water quality impairments are driven by a variety of factors related to land use in the watershed. Runoff from agricultural areas, leaking septic systems, and stormwater runoff in urbanized areas are concerns.

D. Clarks Creek - Key Findings and Assessment of Shoreline Functions

Clarks Creek is approximately 3.8 miles in length, extending from its headwaters at Maplewood Springs to its confluence with the Puyallup River. Nearly all of Clarks Creek is in the city limits and/or the UGA.– Clarks Creek originates from groundwater surfacing at Maplewood Springs, which is located on the upland plateau. It flows north, descending into the Puyallup River floodplain and entering the Puyallup River near RM 5.8, near the Melroy Bridge.

Table 3-2. -Clarks Creek Shoreline

Clarks Creek Shoreline	
Habitat	• Protected –fish species: Chinook, coho, and chum salmon, and steelhead and cutthroat trout • Other Species: Herons, eagles, osprey • Wetlands / Riparian Habitat • WDFW Hatchery / State Owned Land • Clarks Creek Park and Open Space
Water Quality	• "Impaired" Waterbody • Fecal Coliform; Temperature; Suspended Sediment (affects habitat) • Meeker Creek affects Clarks Creek • City studies underway • Clean-up (TMDL) Plan

Flooding	• "The Flood Insurance Study for Pierce County, and Incorporated Areas" dated March 7, 2017 and the accompanying Flood Insurance Rate Map (FIRM) ~~• FEMA remapping floodplain (not adopted as of April, 2014)~~ ~~• Floodplain connectivity impaired in lower reach~~ ~~•~~ Peak Flows – result of increased flow volumes from • ~~—~~Maplewood Springs • Summer flooding from weed growth in channel (high nutrients, minimal shade)
Shoreline Modifications	• Residential "armoring" • Increases peak flows (increases water velocity and limits channel migration / impervious area increases peak flows) • Reduces riparian vegetation / habitat (limited ability to create or sustain wetland/ side channel/ backwater areas) • Reduces filtration and water quality
Public Access and Recreation	• Clarks Creek Park • DeCoursey Park • Open space near Maplewood Springs and fish hatchery
Land Use	• Significant open space, park, and public facility uses • Single-family, low-density residential uses predominant elsewhere

Shoreline functions along Clarks Creek have been impaired on a smaller scale when compared to the Puyallup River. Native riparian vegetation has been affected by agricultural development and shoreline "armoring" (e.g., bulkheads or riprap). This has affected instream and riparian habitat conditions and limited connectivity with off-channel and riparian wetlands. Water quality issues of concern on Clarks Creek include fecal coliform and high pH levels. Excessive nutrients in the stream bed sediments are also a concern and are currently being studied.

E. Opportunities and Priorities for Shoreline Restoration

Based on the key ecosystem functions that are currently altered, there appear to be three specific types of restoration actions that will most benefit the Puyallup River and Clarks

Creek. These actions are intended to address ecosystem and shoreline ecological functions that have been impaired or degraded. While these projects are intended to restore ecosystem functions, the restoration activities are not intended to achieve pre-development conditions. In addition, some restoration actions must occur at the watershed scale, which will restore ecosystem functions that cannot be addressed solely within the city. Opportunities identified thus far include programmatic actions (such as stormwater management techniques city-wide to address water quality) and site-specific actions (such as levee setbacks, bulkhead replacements, or vegetation enhancement projects on individual properties).

1. **Reconnect channel to floodplain.** Actions in this category will increase flood storage, restore floodplain area, and provide a more natural transition from aquatic to upland habitats. For the Puyallup River, these actions could include the use of setback levees and revetments, and grading portions of the floodplain to create back channels and reconnect wetlands. On Clarks Creek, these actions could include the removal of bank armoring currently intended to prevent channel migration and/or bank erosion.

2. **Enhance existing habitats.** Actions in this category will improve the functioning of the existing aquatic, wetland, and riparian habitats that currently exist along the Puyallup River and Clarks Creek. These actions could include the removal of non-native invasive vegetation, installation of native riparian vegetation, replacement of traditional "hard" shoreline armoring with more natural alternative bank stabilization, replacement of culverts that impede fish passage, and installation of in-stream habitat structures intended to increase habitat complexity.

3. **Water quality improvements**. Actions in this category could take many forms. While the causes of water quality impairments may be numerous and not well understood, ongoing studies are underway to investigate and establish baseline thresholds. Programmatic and site-specific measures could focus on source control, retrofitting, and advanced treatment technologies. These measures may relate to regulations for land use and development, protection of wetlands, and enhanced stormwater treatment. Opportunities for restoration should be informed by TMDL studies, and basin plans and their associated Capital Improvement Projects.

Establishing restoration priorities should be informed by and support regional efforts. Regional efforts that are underway include the WRIA 10 planning process for salmon recovery, and the Lower Puyallup River Feasibility Study led by Pierce County to examine flood hazard issues in the valley. In evaluating its own options, the City could consider prioritizing its shoreline restoration efforts to distinguish the Puyallup River from Clarks Creek in the following manner:

Puyallup River – Most impairment to ecosystem processes and shoreline ecological functions has occurred at a watershed scale. Pierce County owns and maintains the levees in the city and is undertaking a comprehensive evaluation of flood management options in the lower Puyallup valley. The WRIA 10 salmon recovery planning process should continue to identify site-specific priority actions in the lower watershed. For these reasons, the City could pursue restoration along the river in two ways:

- First, the City could act as a partner to support regional efforts for shoreline restoration, such as those related to flood management, but not act as a lead entity in most cases.
- Secondly, the City could lead projects within its jurisdiction that address more local-scale issues, such as habitat improvements within and along the river channel. The restoration plan identifies six specific areas along the Puyallup River where such actions could be accomplished.

Clarks Creek – A significant portion of the stream and its contributing basin is in the city and its UGA, giving the City greater control for actions along Clarks Creek. Most impairment to processes and ecological functions has occurred at a reach scale or basin-wide scale. The issues related to Clarks Creek are on a smaller scale with more straightforward or standard solutions. For these reasons, it may be most feasible for the City to focus its resources on shoreline restoration efforts on Clarks Creek such as:

- Removal of bulkheads, revetments, and/or other "shoreline armoring" and replacement with more natural bank stabilization techniques and materials, using logs and root wads. Technical resources include WDFW's Integrated Streambank Protection Guidelines.
- Removal of non-native vegetation along stream banks and replacement with native riparian vegetation. This could be accomplished in coordination with bank stabilization projects or in areas where native shoreline vegetation has been cleared during past development (for agriculture or residential lawns). This appears to be the best long-term, sustainable solution to protecting and restoring environmental functions to this watercourse as well as eliminating the elodea infestation in the stream bed. Attention should also be given to Meeker Creek in terms of re-establishing riparian vegetation along its banks.
- Continue to focus on stormwater reduction techniques to reduce overall storm inputs to Clarks Creek, focusing primarily on low impact development techniques such as rain gardens to accomplish this goal.