4 SHORELINE CHARACTERISTICS AND FUNCTIONS

An assessment of the characteristics and functions of the shoreline is necessary to provide a means of developing viable land use regulations and permitting frameworks. Per WAC 173-26-201(3)(d)(i)(C), shoreline ecological functions for rivers includes, but are not limited to:

- Hydrologic: Transport of water and sediment across the natural range of flow variability; attenuating flow energy; developing pools, riffles, gravel bars, recruitment and transport of large woody debris and other organic material.

- Shoreline vegetation: Maintaining temperature; removing excessive nutrients and toxic compound, sediment removal and stabilization; attenuation of flow energy; and provision of large woody debris and other organic matter.

- Hyporheic functions: Removing excessive nutrients and toxic compound, water storage, support of vegetation, and sediment storage and maintenance of base flows.

- Habitat for native aquatic and shoreline-dependent birds, invertebrates, mammals; amphibians; and anadromous and resident native fish: Habitat functions may include, but are not limited to, space or conditions for reproduction; resting, hiding and migration; and food production and delivery.

Per WAC 173-26-201(3)(d)(i)(C), shoreline ecological functions for wetland includes, but are not limited to:

- Hydrological: Storing water and sediment, attenuating wave energy, removing excessive nutrients and toxic compounds, recruiting woody debris and other organic material.

- Vegetation: Maintaining temperature; removing excessive nutrients and toxic compound, attenuating wave energy, removing and stabilizing sediment; and providing woody debris and other organic matter.

- Hyporheic functions: Removing excessive nutrients and toxic compound, storing water and maintaining base flows, storing sediment and support of vegetation.

- Habitat for aquatic and shoreline-dependent birds, invertebrates, mammals; amphibians; and anadromous and resident native fish: Habitat functions may include, but are not limited to, space or conditions for reproduction, resting, hiding and migration; and food production and delivery.

The following text of this section of the document provides information on the current land use of each of the identified reaches as well as information on hydrologic, vegetation, and habitat functions.

The current land use section provides information on existing land use as well as current and future zoning designations. The current and future zoning designations are established by current zoning maps as well as by the City of Fife’s Comprehensive Plan. This section also
provides data on transportation infrastructure, utilities, and water dependent uses and structures. This section is concluded with information on public access within the reach including direct and/or view access as provided by City parks, trails/pedestrian easements, and public street ends. The information regarding infrastructure, utilities, water dependent uses/structures, and public access was gathered utilizing the knowledge of City of Fife staff, City of Fife GIS mapping data, and Pierce County GIS mapping data. Review of available aerial photography resources including available Pierce County GIS data and online resources was conducted to confirm or expand upon existing mapped data such as confirmation of shoreline armoring types. The current land use section also commonly provides information on archeological, cultural, and historic resources within in a reach. However, at this time, there are no known archeological, cultural, or historic resources mapped within the City reaches. As such this information is not included.

The hydrologic functions section provides information on shoreline armoring and any other noted shoreline modifications, outfalls and streams located within the reach, FEMA data, and sediment transport.

The vegetation functions section provides a qualitative overview of the vegetation within the reach and includes information regarding level of disturbance and amount of habitat.

The habitat functions section provides information on habitat within the reach including fish use, wetlands, and terrestrial habitat. Data was obtained by reviewing WDFW, City of Fife and various on-line mapping resources. The following anadromous fish species may frequent Liberty Bay: bull trout, chinook salmon, chum salmon, coho salmon and steelhead trout. Use of each reach within the City by these species is assumed.

Each function subsection is concluded with an assessment of the functionality. A rating of high, medium-high, medium, medium-low or low based upon the identified components is provided.

A summary table of the function assessment for each reach is provided at the end of this chapter.

4.1 PUYALLUP REACH 1 (P1)

Segment P1 is the most downstream City of Fife shoreline segment on the Puyallup River. It is 13,510 feet in length and extends on the left bank from the City limit at RM 2.4 (at the Interstate 5 bridge) at the downstream extent to RM 4.9, where the Oxbow wetland is connected to the Puyallup River. As noted in Section 1.1 of this document, the Puyallup River waterward of the OHWM is under the sole jurisdiction of the Puyallup Tribe of Indians. Figures 3B, 4B and P1 provide a visual representation of the data provided below in Table 8 pertaining to this reach.
City of Fife Shoreline Master Program Update
Inventory and Characterization

FIGURE P1
Study Segments - Puyallup Segment
Fife Shoreline Master Plan
Fife, WA

Source: Pierce County and City of Fife GIS data

Puyallup River

LEGEND
- Puyallup Tribe Jurisdiction
- Fife City Limits
- Ordinary High Water Mark
- Urban Growth Area
- Adjacent Cities

segments
- H1
- H2
- H3
- P1
- P2
- P3

ALL DATA IS EXPRESSLY PROVIDED "AS IS" AND "WITH ALL FAULTS". The County makes no warranties, express or implied.
Table 8. P1 Summary

<table>
<thead>
<tr>
<th>Land Use Types$^1$</th>
<th>Shoreline Indicators$^2$</th>
<th>Public Shoreline Access$^4$</th>
<th>Habitat$^5$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Acreage – 206.76</td>
<td>Permanently protected areas$^3$ - 34.68 acres</td>
<td>View Access is available throughout reach from the adjacent N Levee Road. Informal areas of direct access have been created. No formal public access areas such as parks and/or trails are identified.</td>
<td>No mapped priority habitat areas within the reach. Vegetation adjacent to the shoreline is primarily invasive species, such as Himalayan blackberry and is subject to levee maintenance.</td>
</tr>
<tr>
<td>Commercial/Service – 9.36 acres (4.52%)</td>
<td>Water quality list, 303(d) – Yes, fecal coliform and mercury</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open Space/Recreation – 0.06 acres (0.03%)</td>
<td>Linear Feet of Levees - 13,150 feet (entire length of shoreline)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resource Land – 34.62 acres (16.74%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single Family Residential – 20.34 acres (9.84%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vacant – 136.68 acres (66.11 %)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Body – 5.70 acres (2.76 %)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Data derived from Pierce County and City of Fife GIS data. Refer to figure 3B of this document. Percentages may not equal 100% due to rounding.

2 Shoreline indicators based upon available No Net Loss indicators as identified by Washington State Department of Ecology. See also Section 6.1 of this document.

3 Based upon GIS Resource Land and Open Space/Recreation designation.

4 Data derived utilizing Washington State public access data resources and City of Fife GIS data.

5 Data derived by aerial review conducted by Grette Associates and City of Fife and Pierce County GIS Data.

Current Land Use

Existing land use designations within this reach include commercial/service (4.52%), Open Space Recreation (0.03%), Resource Land (16.74%), Single Family Residential (9.84%), Vacant (66.11%), and water body (2.76%). Current zoning designations within this reach include Industrial, Community Commercial, and Neighborhood Residential (Figure 4B). The Future Land Use Map found in the City of Fife Comprehensive Plan indicates that zoning designations will remain similar to the current zoning designations. Much of the vacant land has been used for agricultural at some point in the past, but there are large areas that are completely undeveloped, particularly at the downstream end of the segment. Most of the land downstream of Frank Albert Road is owned by railroad companies and is zoned for industrial uses, and the remaining shoreline is either residential or commercial. Based on this, future land use will likely result in greater shoreline development and greater land use density; although the levee area (waterward of Levee Road) is generally undevelopable and will likely remain the same.

The dominant feature of this segment is the levee, which runs the length of the City shoreline along the Puyallup River. Levee Road runs parallel to the River at the top of the bank for the length of the segment, but it is closed to public vehicle access at approximately the halfway point, downstream of Frank Albert Road.

There are two mapped stormwater inputs into the Puyallup River mapped in this reach. One input is located at the terminus of Frank Albert Road E and is culverted. The other input is mapped as
an open ditch and is located at the southern end of the reach and is associated with the reach terminus as well as the Oxbow wetland.

Review of aerial photographs did not result in the identification of any water dependent uses, such as marinas, or water dependent uses or structures, such as docks or piers within this reach. Water-related enjoyment may be provided by views from the adjacent, informal trail system as well as North Levee Road and Melroy Bridge.

Direct public access to the waterfront may be obtained from informal breaks in the vegetation on the levee. These informal breaks provide access for pedestrians as well as off-road vehicles.

**Hydrologic Function**

Water quality is somewhat impaired, with Category 5, 2, and 1 303(d) listings. The channel has been straightened, hardened, and permanently fixed, all of which have contributed to reduced capacity for functioning salmonid habitat. Land use practices in the greater watershed have also negatively affected salmonid habitat by altering hydrology and water quality. Major modifications to basin hydrology (such as dams, diversions, and the re-routing of the White River into the Puyallup Basin) also have had negative implications on salmonid habitat in this segment.

Due to the high levels of channel modification, including the levee that extends along the entire length of the reach, as well as the impaired water quality evidenced by the 303(d) listings, the hydrologic function of this reach is considered to be low.

**Vegetation Function**

The levee and Levee Road completely disconnect most, if not all, of the shoreline area from the Puyallup River, and therefore restrict its ability to provide any function for salmonid habitat in this segment. Other than the vegetation on the levee, which is subject to maintenance practices by the Corps and Pierce County River Improvement District, there is no functioning riparian habitat. Vegetation management on the levee severely restricts the potential for woody debris recruitment from the banks, although overhanging levee vegetation (relatively continuous fringe of willow, alder, and blackberry) does provide some shade and refuge opportunities for fish in the mainstem. Levee vegetation is primarily herbaceous or shrubby, with some small stands of relatively young alder or cottonwood.

Due to the level of alteration to the vegetation as well as the potential for future alteration, the vegetation function of this reach is considered to be low.

**Habitat Function**

Eight species of salmonids (chinook, chum, coho, pink, sockeye, steelhead, cutthroat, bull trout) use this reach of the Puyallup River for migration. Chinook, coho, and likely chum also spend time rearing there. There are no other records of priority habitats and species within the shoreline area of this segment, but other priority species present in the greater area (e.g., avian species) are likely to at least transit through the area.
The entire segment is part of a greater aquifer recharge and seismic hazard areas. There are no wetlands, 100-year flood zones, or steep slopes mapped within this reach. There are also large areas of open space, including undeveloped land and agricultural areas that are likely to provide wildlife habitat, at least for birds, deer, and small mammals. However, there are no designated habitat areas according to the PHS inventory. Limited vehicle access in the downstream reach also means that the undeveloped areas are less subject to regular human disturbance than those further upstream.

Due to the minimal levels of mapped habitat and in conjunction with the habitat disturbance presented by the reduced hydrologic and vegetation functions, the overall habitat function rating for this reach is low.

4.2 **PUYALLUP REACH 2 (P2)**

Segment P2 consists of two wetland complexes, the Sha Dadx wetland area and the Oxbow wetland, plus the hydrologic connection between Oxbow wetland and the Puyallup River, located at RM 4.9. There is no shoreline length associated with this segment, as it has no shoreline frontage. However, as both wetland areas are associated with the Puyallup River, the shoreline jurisdiction extends to the upper edge of the wetland. It is 63 acres in area. As noted in Section 1.1 of this document, the Sha Dadx wetland areas are solely under the jurisdiction of the Puyallup Tribe of Indians. Portions of the Oxbow wetland including the hydrologic connection to the Puyallup River are under the Tribe’s jurisdiction; the remaining portions would be under shoreline jurisdiction. Figures 3B, 4B and P2 provide a visual representation of the data provided below in Table 9 pertaining to this reach.
Table 9. P2 Summary.

<table>
<thead>
<tr>
<th>Land Use Types†</th>
<th>Shoreline Indicators‡</th>
<th>Public Shoreline Access§</th>
<th>Habitat¶</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Acreage – 138.61</td>
<td>Permanently protected areas³ – 67.41 acres</td>
<td>No formal public access, such as trails, exists for either wetland component of this reach. View access is provided by N. Levee Road. In addition, unintended pedestrian access to the Oxbow wetland may occur by the residents of the adjacent residential development.</td>
<td></td>
</tr>
<tr>
<td>Open Space/Recreation – 25.27 acres (18.23%)</td>
<td>Water quality list, 303(d) – No</td>
<td>Reach contains mapped critical areas, based on wetlands, aquifer recharge and seismic hazard areas, and flood zones. Reach wetlands include forested components, which increases their habitat value. The Oxbow wetland contains large area of undisturbed habitat, which is uncommon in the immediate vicinity.</td>
<td></td>
</tr>
<tr>
<td>Resource – 42.14 acres (30.40%)</td>
<td>Linear Feet of Levees – 0 feet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vacant – 60.17 acres (43.41%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single Family Residential – 7.87 acres (5.68%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transportation, Communication, Utility – 3.16 acres (2.28%)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Data derived from Pierce County and City of Fife GIS data. Refer to figure 3B of this document. Percentages may not equal 100% due to rounding.
2 Shoreline indicators based upon available No Net Loss indicators as identified by Washington State Department of Ecology. See also Section 6.1 of this document.
3 Based upon GIS Resource Land and Open Space/Recreation designation.
4 Data derived utilizing Washington State public access data resources and City of Fife GIS data.
5 Data derived by aerial review conducted by Grette Associates and City of Fife and Pierce County GIS Data.

Current Land Use

Existing land use for reach P2 includes Open Space Recreation (18.23%), Resource Land (30.40%), Single Family Residential (5.68%), Transportation/Communication/Utility (2.28%), and Vacant (43.41%). Refer to Figure 3B. Current zoning designations include industrial, commercial, residential and public use/open space (Figure 4B). The wetland areas themselves are largely undisturbed and serve as either as a resource or open space parcel for the surrounding parcels. The Oxbow wetland is bordered by neighborhood residential/high density residential areas, with some industrial areas on the southeast margin. The area around Frank Albert Road wetland is zoned for industrial and community commercial uses. Potential exists for recreational access in the wetlands and buffer areas in the form of trails and interpretive areas in compliance with the City’s critical areas ordinance.

There is no mapped transportation infrastructure within the shoreline jurisdiction of this reach, as identified on Figure 1B. However, Levee Road does provide view access to both wetlands and also crosses the points where these wetlands connect to the Puyallup River.

A storm water ditch is mapped through the majority of the Oxbow wetland (Figure 5B). However upon further review, City staff has confirmed that the line on the map is not a ditch, but more or less indicative of the conveyance of storm water through the wetland. This storm water system appears to convey water from the 70th Avenue East as well as portions of the adjacent subdivision to the north through the Oxbow system and eventually connecting with the Puyallup River.
There are no water dependent uses in this reach. Shoreline related/enjoyment uses within this reach include view access from North Levee Road.

No formal public access, such as trails, exists for either wetland component of this reach. View access is provided by N. Levee Road. In addition, unintended pedestrian access to the Oxbow wetland may occur by the residents of the adjacent residential development.

*Hydrologic Function*

The wetlands of this reach are likely to provide floodwater storage for adjacent development. The transport of stormwater to the Puyallup River is also facilitated by a ditch that traverses the Oxbow wetland system from 70th Avenue to the Puyallup River. Connectivity between the Oxbow wetland and the Puyallup River is restricted by the North Levee Road Crossing and associated culvert, controlled by the Puyallup Tribe of Indians. It is anticipated that the combined culvert and crossing does not provide the level of function that would exist if the crossing and culvert were not present.

Waterflow in the Sha Dadx wetland is controlled by a floodgate/culvert maintained by the Puyallup Tribe of Indians. A ring levee is located around the site to control floodwaters within the habitat area and protect the properties adjacent to the site.

Due to the flood water storage capacity, the hydrologic function of this reach is considered to be medium-high.

*Vegetation Function*

P2 is the most intact shoreline of the Puyallup reach series. Both wetlands within this reach contain forested components. Neither of these wetlands is subject to the vegetation maintenance prescribed to maintain the Levee that is found in reaches P1 and P3.

Due to the relatively low level of alteration to the vegetation as well as the semi-protected nature of the existing land use, the vegetation function of this reach is considered to be medium-high.

*Habitat Function*

The Oxbow wetland does have potential for salmonid access, but presence has not been documented in the wetland.

The Sha Dadx wetland area is a habitat site created from a relic Oxbow channel of the Puyallup River. It provides the opportunity for off-channel habitat and is connected to the Puyallup River via a culvert. Fish use including Coho salmon has been documented by Puyallup Tribe of Indians staff (Sullivan, Per. Comm. 2010).

Both wetlands are listed as polygons in the PHS inventory, with multiple attributes including (for both):
- Wetlands (broadleaf shrub, shrub scrub, emergent, farmed, cottonwood swamps)
- Waterfowl concentrations (regular, regular large)
• Deer and raptor use

Segment P2 is entirely comprised of critical areas, based on wetlands, aquifer recharge and seismic hazard areas, and flood zones. As noted in the vegetation function text, both wetlands include forested components, which increases their habitat value. The Oxbow wetland in particular is a very large area of undisturbed habitat, which is uncommon in the immediate vicinity.

Due to the higher levels of mapped habitat relatively intact hydrologic and vegetation functions, the habitat function rating for this reach is medium-high.

4.3 Puyallup Reach 3 (P3)

Segment P3 is the most upstream reach in the City on the Puyallup River. It is 9,840 feet in length and extends on the left bank from the hydrologic connection to the Oxbow wetland (RM 4.9) to Freeman Road (RM 6.8). As noted in Section 1.1 of this document, the Puyallup River waterward of the OHWM is under the sole jurisdiction of the Puyallup Tribe of Indians. Figures 3B, 4B and P3 provide a visual representation of the data provided below in Table 10 pertaining to this reach.
Table 10. P3 Summary.

<table>
<thead>
<tr>
<th>Land Use Types</th>
<th>Shoreline Indicators</th>
<th>Public Shoreline Access</th>
<th>Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Acreage- 116.87</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial/Service – 1.6 acres</td>
<td>Permanently protected</td>
<td>View Access is available</td>
<td>No mapped PHS areas</td>
</tr>
<tr>
<td>Industrial – 16.39 acres (14.02%)</td>
<td>areas - 52.82 acres</td>
<td>throughout reach from</td>
<td>within the reach.</td>
</tr>
<tr>
<td>Open Space/Recreation – 0.38</td>
<td>Water quality list,</td>
<td>Informal areas of direct</td>
<td>Vegetation adjacent to</td>
</tr>
<tr>
<td>acres (0.34%)</td>
<td>303(d) – Yes, fecal</td>
<td>access have been</td>
<td>the shoreline is</td>
</tr>
<tr>
<td></td>
<td>coliform and mercury</td>
<td>created. No formal</td>
<td>primarily invasive</td>
</tr>
<tr>
<td>Resource Land – 52.44 acres</td>
<td>Linear Feet of Levees</td>
<td>public access areas</td>
<td>species, such as</td>
</tr>
<tr>
<td>(44.87%)</td>
<td>- 9,840 feet (entire</td>
<td>such as parks and/or</td>
<td>Himalayan blackberry</td>
</tr>
<tr>
<td>Single-Family Residential –</td>
<td>length of shoreline)</td>
<td>trails are identified.</td>
<td>and is subject to</td>
</tr>
<tr>
<td>22.19 Acres (23.93%)</td>
<td></td>
<td></td>
<td>levee maintenance.</td>
</tr>
<tr>
<td>Vacant – 13.94 acres (11.93%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mobile Home Park – 8.20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acres (7.01%)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Data derived from Pierce County and City of Fife GIS data. Refer to Figure 3B of this document. Percentages may not equal 100% due to rounding.
2 Shoreline indicators based upon available No Net Loss indicators as identified by Washington State Department of Ecology. See also Section 6.1 of this document.
3 Based upon GIS Resource Land and Open Space/Recreation designation.
4 Data derived utilizing Washington State public access data resources and City of Fife GIS data.
5 Data derived by aerial review conducted by Grette Associates and City of Fife and Pierce County GIS Data.

Current Land Use

As with segment P1, the dominant feature of this segment is the levee. Existing land use includes Commercial/Service (1.37%), Industrial (14.02%), Open Space/Recreation (0.38%), Resource Land (44.87%), Single-Family Residential (23.93%), Vacant (11.93%), and Mobile Home Park (7.01%). Refer to Figure 3B. The area is zoned for medium density residential, commercial, and industrial uses. This indicates that the shoreline area will become increasingly developed, except for the levee itself. Potential for increased recreational use in this segment is the same as for segment P1. The Future Land Use Map found in the City of Fife Comprehensive Plan indicates that zoning designations will remain similar to the current zoning designations. Based upon current zoning designations, it is anticipated that future land use within this reach will likely include development of the undeveloped parcels pursuant to zoning, and redevelopment of previously developed properties as property value increases.

There is one mapped stormwater input into the Puyallup River mapped in this reach. This input is mapped as an open ditch and is located at the northern end of the reach and is associated with the reach terminus as well as the Oxbow wetland.

Review of aerial photographs did not result in the identification of any water dependent uses, such as marinas, or water dependent uses or structures, such as docks or piers within this reach. Water-related enjoyment may be provided by views from the adjacent, informal trail system as well as North Levee Road.
Direct public access to the waterfront may be obtained from informal breaks in the vegetation on the levee. These informal breaks provide access for pedestrians as well as off-road vehicles.

**Hydrologic Function**

Water quality is somewhat impaired, with Category 5, 2, and 1 303(d) listings. The channel has been straightened, hardened, and permanently fixed, all of which have contributed to reduced capacity for functioning salmonid habitat. Land use practices in the greater watershed have also negatively affected salmonid habitat by altering hydrology and water quality. Major modifications to basin hydrology (such as dams, diversions, and the re-routing of the White River into the Puyallup Basin) also have had negative implications on salmonid habitat in this segment.

Due to the high levels of channel modification, including the levee that extends along the entire length of the reach, as well as the impaired water quality evidenced by the 303(d) listings, the hydrologic function of this reach is considered to be low.

**Vegetation Function**

The levee and Levee Road serve to disconnect the majority of the of the associated shoreline area from the Puyallup River, and therefore restrict its ability to provide any function for salmonid habitat in this segment. Other than the vegetation on the levee, which is subject to maintenance practices by the Corps and Pierce County River Improvement District, there is no functioning riparian habitat. Vegetation management on the levee prevents the potential for woody debris recruitment from the banks, although overhanging levee vegetation (relatively continuous fringe of willow, alder, and blackberry) does provide some shade and refuge opportunities for fish in the mainstem. Levee vegetation is primarily herbaceous or shrubby, with some small stands of relatively young alder or cottonwood.

Due to the level of alteration to the vegetation as well as the potential for future alteration, the vegetation function of this reach is considered to be low.

**Habitat Function**

Critical areas are similar to those in segment P1. The entire segment is part of a greater aquifer recharge and seismic hazard areas. There are also three small wetlands, totaling 0.7 acre in area. There is a small forested wetland area at the intersection of Freeman Road and Levee Road that is connected to a larger wetland to the east, outside of the City, by way of a culvert under Freeman Road. There is no hydrologic connection from this wetland to the Puyallup River. There are also two other small wetlands near Levee Road, one halfway between 56th Ave and 70th Ave (emergent), and the other at the Melroy Bridge (shrub).

Salmonid use in this segment is the same as segment P1. There is also a PHS polygon the wetland at Freeman Road that has been assigned the same PHS attributes as Frank Albert Road and Oxbow wetlands: wetlands, waterfowl concentrations, and deer and raptor use.
Salmonid habitat limiting factors are the same as for segment P1. There is severely limited riparian function, no access to off-channel habitat, impaired water quality, and factors related to practices and conditions in the greater watershed.

Due to the minimal levels of mapped habitat and in conjunction with the habitat disturbance presented by the reduced hydrologic and vegetation functions, the overall habitat function rating for this reach is low.

### 4.4 Hylebos Reach 1 (H1)

Segment H1 is the most downstream reach of Hylebos Creek in the City. Located between RM 0.3 and 0.6 (4th St E), it is 1,650 feet in length. Both the right and left bank are in City jurisdiction. Figures 3A, 4A and H1 provide a visual representation of the data provided below in Table 12 pertaining to this reach.
Table 11. H1 Summary.

<table>
<thead>
<tr>
<th>Land Use Types</th>
<th>Shoreline Indicators</th>
<th>Public Shoreline Access</th>
<th>Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Acreage – 23.31</td>
<td>Permanently protected areas – 0 acres</td>
<td>None</td>
<td>Right side of the bank contains residential development and impacts to shoreline vegetation and habitat generally associated with residential development such as shoreline armoring and ornamental vegetation and lawns. The left side of the bank also contains residential development but at a greatly reduced amount as these areas are only accessed by bridges across the Hylebos as a result shoreline vegetation and habitat appears to be generally more intact on the left side of the bank.</td>
</tr>
<tr>
<td>Multi-Family Residential – 1.34 acres (5.76%)</td>
<td>Water quality list, 303(d) – yes (bioassessment)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residential Outbuildings – 0.22 acres (0.92%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single Family Residential – 19.97 acres (88.58%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vacant – 1.10 acres (4.73%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mobile Home Park – 0.39 Acres (1.65%)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Data derived from Pierce County and City of Fife GIS data. Refer to Figure 3B of this document. Percentages may not equal 100% due to rounding.
2 Shoreline indicators based upon available No Net Loss indicators as identified by Washington State Department of Ecology. See also Section 6.1 of this document.
3 Based upon GIS Resource Land and Open Space/Recreation designation.
4 Data derived utilizing Washington State public access data resources and City of Fife GIS data.
5 Data derived by aerial review conducted by Grette Associates and City of Fife and Pierce County GIS Data.

Current Land Use

Existing land use in this segment includes Multi-family Residential (5.76%), Residential Outbuildings (0.92%), Single Family Residential (88.58%), Vacant (4.73%) and Mobile Home Park (1.65%). Refer to Figure 3A. Most of the lots are entirely within the shoreline jurisdiction. The current zoning designation for the entire reach is Neighborhood Commercial. The Future Land Use Map found in the City of Fife Comprehensive Plan indicates that the intended future zoning of this area is Mixed Medium Density Residential/Commercial. Based on current and future zoning, it is anticipated that future land use may result in greater shoreline development and greater land use density.

There is one mapped stormwater input into the Hylebos River in this reach. It is located along the northern side of 4th street and is primarily a ditch. However, a small portion of the conveyance is culverted within the shoreline jurisdiction, and is likely the result of a residential driveway.

Review of aerial photographs did not result in the identification of any water dependent uses, such as marinas. Four bridges (either foot or vehicular) were also noted during review of available aerial photographs.

There is no direct public access to the Hylebos Creek in this area, although view access of the southern end of the reach is available from a bridge located at the end of 4th Street East. As such,
shoreline recreational activities, if any, are likely limited to in-water activities. However, Hylebos Creek is generally too shallow and has too many obstructions (road crossings) to be accessible to small boats (e.g., kayaks, canoes). It is anticipated that there will be continue to be no opportunities for public recreation in this segment.

**Hydrologic Function**

Shoreline armoring along the Hylebos have not been mapped; however, review of available aerial photography indicates that portions of the left and right banks contain shoreline armoring. Residential development of the right bank, including the removal of native shoreline vegetation has likely modified the flow and velocity of precipitation inputs.

Based upon the information listed above, the hydrologic function of this reach is considered to be medium.

**Vegetation Function**

Vegetation on both the right and left banks of this segment have been modified by residential development. Vegetation on the left bank of this segment is somewhat less impacted than the right as access to the left bank is limited by steep slopes to the east of the Hylebos resulting in bridges extending from the right bank as the primary way to access the left bank. Along the right bank, the majority of the tree canopy has been removed and the shoreline contains lawns and ornamental shrubs associated with residential development.

Due to the reduced level of alteration to the vegetation, the vegetation function of this reach is considered to be medium-low.

**Habitat Function**

Segment H1 includes a number of critical areas. The 100-year flood zone extends up into the shoreline area. There are areas of erosion and landslide hazards. The entire segment is part of the greater seismic hazard and aquifer recharge areas. There are no identified habitat conservation areas, or substantial open spaces available for habitat.

Five species of salmonids (chinook, chum, coho, steelhead, cutthroat) are present in Hylebos Creek. It is likely that chinook, coho, and chum also spend time rearing there. There are no other PHS records within the shoreline area of this segment, but other priority species present in the greater area (e.g., bald eagles) are likely to at least transit through the area.

In general, Hylebos Creek is much more connected to its floodplain than is the Puyallup River in the City of Fife. There is no structure comparable to the levee in this stream. The channel at the upstream extent of segment H1 is not stabilized, but it is likely that banks in front of some of the residences have been stabilized with riprap or other similar material, which is detrimental to instream salmonid habitat. There are no barriers to access in the mainstem of the Creek, but there is no off-channel habitat available for fish. It is apparent from aerial photos that most of the
riparian vegetation has been removed along this reach, also reducing habitat function. However, the left bank in this area is forested, and the creek is relatively narrow.

Based upon the information provided above the habitat function of this reach is considered to be medium-high.

4.5 HYLEBOS REACH 2 (H2)

Segment H2 consists of both banks Hylebos Creek between 4th Street East (RM 0.6) and 12th Street East (RM 1.3). It is 3,335 feet in length, portions of the right and left bank are within City jurisdiction. Figures 3A, 4A and H2 provide a visual representation of the data provided below in Table 12 pertaining to this reach.
Table 12. H2 Summary.

<table>
<thead>
<tr>
<th>Land Use Types</th>
<th>Shoreline Indicators</th>
<th>Public Shoreline Access</th>
<th>Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Acreage – 30.36</td>
<td>Permanently protected areas(^2) - 24.33 acres</td>
<td>4(^{th}) Street Bridge</td>
<td>Northern portion of the reach contains restored off and side channel habitat on both the right and left banks (Milgard Nature Area and Hylebos Nature area). For the remainder of the reach, the right bank contains residential development and associated modification to shoreline habitat including lawns and ornamental vegetation. Review of aerial photos indicate that the left bank is fairly intact and contains forested canopy.</td>
</tr>
<tr>
<td>Mobile Homes – 1.37 acres (4.51%)</td>
<td>Water quality list, 303(d) – yes (bioassessment)</td>
<td>Milgard Nature Area</td>
<td></td>
</tr>
<tr>
<td>Open Space – 24.33 acres (80.15 %)</td>
<td></td>
<td>Hylebos Estuary Nature Area</td>
<td></td>
</tr>
<tr>
<td>Single Family Residential – 0.38 acres (1.25 %)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transportation, Communication, Utility – 4.28 acres (14.10 %)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Data derived from Pierce County and City of Fife GIS data. Refer to Figure 3B of this document. Percentages may not equal 100% due to rounding.
2 Shoreline indicators based upon available No Net Loss indicators as identified by Washington State Department of Ecology. See also Section 6.1 of this document.
3 Based upon GIS Resource Land and Open Space/Recreation designation.
4 Data derived utilizing Washington State public access data resources and City of Fife GIS data.
5 Data derived by aerial review conducted by Grette Associates and City of Fife and Pierce County GIS Data.

**Current Land Use**

Existing land use within this reach includes Mobile Homes (4.51%), Open Space (80.15 %), Single Family Residential (1.25 %), and Transportation, Communication, Utility (14.10 %). Refer to Figure 3A. Current zoning designations within this reach include neighborhood commercial, public use open space, industrial, small lot residential, and single family residential. The future land use map found in the City of Fife Comprehensive Plan indicates that zoning designations will remain similar to current zoning designations. Based on current and future zoning, it is anticipated that future land use may result in greater shoreline development and greater land use density.

Segment H2 has relatively more open space than do any of the other segments within the City. Included in this segment are the Milgard Nature Area, Hylebos Estuary Nature Area, two City well sites, and a great deal of vacant land, including much of the forested hillside on the left bank. Residential development is almost entirely limited to the right bank of Hylebos Creek in this area. The Milgard Nature Area is zoned industrial, but because it is a mitigation area, it is unlikely that land use will change on that site in the future. The remaining area of this segment is designated either single family or zoned small lot residential. On the right bank, there is potential for increased residential development as vacant, formerly agricultural land is converted to residential use.

However, the left bank is mostly forested, steep slopes that are on the backside of residential lots on the hill above Hylebos Creek. Under the City’s critical areas ordinance, these areas are likely to remain undeveloped. The Milgard Nature Area and Hylebos Estuary Nature area currently
provides the most opportunity for shoreline access and recreation on Hylebos Creek. Although there are no formal trails or interpretive areas in the Milgard Nature area, the area is available for bird watching and other low-impact activities. The Hylebos Estuary Nature area contains a public trail as well as interpretive signage.

Transportation infrastructure, including 8th Street East, 12th Street East, and 64th Avenue East, is located within the shoreline jurisdiction of this reach.

A storm water ditch that flows into the Hylebos is mapped adjacent to the southern side of 8th Street East (Figure 5A).

There are no water dependent uses in this reach, such as marinas or other commercial uses. Shoreline related/enjoyment uses within this reach include view access from Milgard and Hylebos Estuary Nature areas.

There is no direct public access to the Hylebos Creek in this area, although view access of the northern end of the reach is available from a bridge located at the end of 4th Street East. In addition view access may also be obtained from trails associated with the Milgard and Hylebos Estuary Nature areas. Shoreline recreational activities, if any, are likely limited to in-water activities. However, Hylebos Creek is generally too shallow and has too many obstructions (road crossings) to be accessible to small boats (e.g., kayaks, canoes). It is anticipated that there will be continue to be no opportunities for public recreation in this segment.

**Hydrologic Function**

Due to the high percentage of dedicated open space and intact forest canopy that exists along the left bank of this reach segment, it is anticipated that overall impacts to hydrologic function within this reach are minimal. However, some impact to normal hydrologic processes may occur within the reach on the right side of the bank southeast of 8th Street, where the majority of the residential development and modification to shoreline vegetation is located. In addition, given the proximity of residential development to the shoreline it is anticipated that some form of shoreline armoring may be present within this area.

Hylebos Creek is crossed by both 8th Street East and 62nd Avenue East in this reach.

Based upon the information listed above, the hydrologic function of this reach is considered to be medium-high

**Vegetation Function**

As noted in the hydrologic function section, the majority of this reach contains either undisturbed or restored habitat with a relatively small portion of the reach containing residential development.
Due to the low amount of alteration to the vegetation, the vegetation function of this reach is considered to be medium-high.

**Other Habitat Function**

There are a number of critical areas in segment H2. The 100-year flood zone extends up into the shoreline area on both banks. Much of the left bank, with its steep slopes, is an erosion and landslide hazard area. The entire right bank and areas of the left bank are part of the greater seismic hazard and aquifer recharge areas. The Milgard Nature area and Hylebos Estuary Nature Area have identified wetland areas that based on aerial photos and field observations include emergent, shrub-scrub, and forested components. There is an additional wetland area on the left bank upstream from 62nd Avenue East that appears to be primarily emergent vegetation.

In addition to the salmonids in Hylebos Creek, the PHS inventory includes two polygons on the left bank in this segment. Immediately adjacent to Hylebos Creek is a polygon extending almost the length of shoreline area that is identified as undeveloped riparian habitat. It provides general habitat for birds and mammals, and limited salmonid habitat. Landward of that polygon, extending north from 12th Street East is identified as urban natural open space comprised of steep slopes and bluffs, providing raptor habitat and bird and mammal refugia.

Many of the same limiting factors from segment H1 apply to this segment. However, there is significantly more riparian vegetation and much larger areas of completely undeveloped shoreline in this segment. The channel has been stabilized in a number of places, including a timber bulkhead on both banks between 4th Street East and 8th Street East. There also are areas where the banks are stabilized, particularly the left bank upstream of 62nd Avenue East.

Based upon the information listed above, the habitat function rating for this reach is medium-high.

### 4.6 Hylebos Reach 3 (H3)

Segment H3 is the most upstream reach of the Hylebos Creek, extending 4,380 feet from the 70th Avenue East (RM 2.1) to 12th Street East (RM 1.3), with the exception of a small area of unincorporated Pierce County immediately downstream of the Pacific Highway crossing. Figures 3A, 4A and H3 provide a visual representation of the data provided below in Table 13 pertaining to this reach.
Table 13. H3 Summary.

<table>
<thead>
<tr>
<th>Land Use Types</th>
<th>Shoreline Indicators</th>
<th>Public Shoreline Access</th>
<th>Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Acreage -2.03</td>
<td>Permanently protected areas(^1) - 0 acres</td>
<td>No direct public access, such as parks, was identified in this reach.</td>
<td>The majority of the habitat in this reach is disrupted either by residential or commercial development. The northern portion of the segment, from 12(^{th}) Street to Pacific Highway contains adjacent forested canopy of varying widths. The majority of Hylebos Creek to the south of Pacific Highway is channelized with poor quality adjacent vegetation.</td>
</tr>
<tr>
<td>Single Family Residential – 2.03 acres (100.00%)</td>
<td>Water quality list, 303(d) – yes (bioassessment)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Data derived from Pierce County and City of Fife GIS data. Refer to Figure 3B of this document. Percentages may not equal 100% due to rounding.
2 Shoreline indicators based upon available No Net Loss indicators as identified by Washington State Department of Ecology. See also Section 6.1 of this document.
3 Based upon GIS Resource Land and Open Space/Recreation designation.
4 Data derived utilizing Washington State public access data resources and City of Fife GIS data.
5 Data derived by aerial review conducted by Grette Associates and City of Fife and Pierce County GIS Data.

Current Land Use

Only one parcel within this reach is located within the City of Fife. The rest of the parcels are located in Pierce County. A general review of existing land use in the segment, including Pierce County indicates that land use is mostly residential, but also includes Commercial/Service, Open/Space/Recreation and Vacant. Upstream of Pacific Highway is commercial use, open space, and a single residential lot. Current zoning of this segment includes small lot residential, single family residential and regional commercial. The future land use map found in the city of Fife Comprehensive Plan indicates that zoning designations will remain similar to current zoning designations. Zoning in this segment indicates that future land use is likely to result in increasing of residential areas downstream of Pacific Highway as vacant land is developed. The zoning upstream of Pacific Highway is commercial, but future land use and environmental conditions will be dependent upon the final configuration of the planned State Route 167 extension. Restoration, enhancement, and re-configuration of reaches of Hylebos Creek in this reach and immediately upstream of the City are an important environmental component of this Project. As with Segment H1 there are no existing opportunities for public access and recreation in segment H3.

Transportation infrastructure, including portions of 12\(^{th}\) Street East, Pacific Highway East, 65\(^{th}\) Avenue Court East, 67\(^{th}\) Avenue East, is located within the shoreline jurisdiction of this reach.

A storm water ditch that extends along the I-5 corridor connects with the Hylebos in the southern portion of the reach (Figure 5A).
There are no water dependent uses in this reach or formal public access, such as trails. Shoreline related/enjoyment uses within this reach include view access from 12th Street East, Pacific Highway East, 65th Avenue Court East, 67th Avenue East.

**Hydrologic Function**

Due to the impacts of residential and commercial development to the adjacent shoreline vegetation, arterial road crossing, as well as the channelization of the Hylebos in the southern portion of this segment, it is anticipated that overall impacts to hydrologic function within this reach are relatively higher than the other Hylebos segments within this jurisdiction. In addition, given the proximity of residential and commercial development to the shoreline it is anticipated that some form of shoreline armoring may be also be present within this segment.

Based upon the information listed above, the hydrologic function of this reach is considered to be medium-low.

**Vegetation Function**

As noted in the Hydrologic function section, this segment contains areas of modified vegetation related to residential and commercial development. In the northern portion of the segment, vegetation on the left bank is relatively more intact than the vegetation on the right bank. The left and right banks are equally disturbed and contain a small number of adjacent trees for the portion of the segment located to the south of Pacific Highway.

Due to the level of alteration to the vegetation, the vegetation function of this reach is considered to be medium-low.

**Other Habitat Function**

There are a number of critical areas in segment H3. The 100-year flood zone extends beyond up into the shoreline area of both banks. The right bank is part of larger aquifer recharge and seismic hazard areas. However, there are no wetlands or erosion and landslide hazard areas in this segment.

PHS information for this segment is similar to segment H2, except that the steep slope polygon does not extend upstream into this segment and the riparian habitat polygon ends at the downstream side of Pacific Highway.

Many of the same limiting factors from segments H1 and H2 apply to this segment. The only off-channel habitat in this segment is a large drainage ditch (Surprise Lake Stream) flowing into Hylebos Creek immediately upstream of Pacific Highway.

Based on the information provided above, the habitat function rating for this reach is medium-low.
4.7  SHORELINE FUNCTION SUMMARY

Table 15 provides a qualitative summary of relative hydrology, vegetation, and habitat function for each reach based on the detailed reach assessment provided for the specified reach in the above text, comparison to function of other reaches within the City, as well as the anticipated function of an undeveloped reach. Designations of high, medium-high, medium, medium-low, or low are assigned for each reach function followed by a brief supporting narrative. In the final column, an overall qualitative score, also based upon high/medium/low designations, is provided. The overall qualitative score is determined based upon the qualitative ratings of the three separate functions as well as the quantitative assessment provided in the specific reach assessments. In general, as is typical in urban areas, the quality of habitat, hydrologic, and vegetative function within the City is diminished by the concentrated level of development.
Table 14. Ecological Function Assessment Summary for City shorelines.

<table>
<thead>
<tr>
<th>Reach (Planning Segment)</th>
<th>Hydrologic</th>
<th>Vegetation</th>
<th>Habitat</th>
<th>Qualitative Summary Function Score $^1$</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>Low: This reach contains high amounts of channel modification, including the levee that extends along the entire length of the reach, as well as the impaired water quality evidenced by the 303(d) listings.</td>
<td>Low: This reach contains high amounts of alteration to the vegetation as well as the potential for future alteration.</td>
<td>Low: This reach has a minimal amount of mapped habitat. Existing shoreline habitat coincides with the levee and is subject to disturbance.</td>
<td>Low</td>
</tr>
<tr>
<td>P2</td>
<td>Medium-High: This reach provides high levels of stormwater storage capacity for the City</td>
<td>Medium-High: This reach contains two protected wetlands. Each wetland is primarily emergent but also contains forested areas. Both wetlands contain Tribal Land.</td>
<td>Medium – High: Both wetlands within this reach have been mapped as containing Priority Habitat.</td>
<td>Medium-high</td>
</tr>
<tr>
<td>P3</td>
<td>Low: This reach contains high amounts of channel modification, including the levee that extends along the entire length of the reach, as well as the impaired water quality evidenced by the 303(d) listings.</td>
<td>Low: This reach contains high amounts of alteration to the vegetation as well as the potential for future alteration.</td>
<td>Low: This reach has a minimal amount of mapped habitat. Existing shoreline habitat coincides with the levee and is subject to disturbance.</td>
<td>Low</td>
</tr>
<tr>
<td>H1</td>
<td>Medium: Shoreline vegetation within this reach has been modified, which often leads to modification of the hydrologic process. Shoreline also contains an undetermined amount of shoreline armoring.</td>
<td>Medium-low: Vegetation on both the right and left banks within this reach are modified as a result of residential development.</td>
<td>Medium-high: This segment contains a number of critical areas. However, existing impacts to hydrology and vegetation prevent a rating of “high”.</td>
<td>Medium</td>
</tr>
<tr>
<td>Reach (Planning Segment)</td>
<td>Hydrologic</td>
<td>Vegetation</td>
<td>Habitat</td>
<td></td>
</tr>
<tr>
<td>-------------------------</td>
<td>------------</td>
<td>------------</td>
<td>---------</td>
<td></td>
</tr>
<tr>
<td>H2</td>
<td>Medium-High: Segment has relatively intact vegetation and low amounts of impervious surfaces, based upon visual estimation of aerial photographs. Shoreline also contains an undetermined amount of shoreline armoring.</td>
<td>Medium-High: Shoreline vegetation within this reach is relatively intact, when compared to adjacent segments. Segment contains two restoration projects (Milgard and Hylebos Estuary Nature Areas)</td>
<td>Medium-High: This segment contains a number of critical areas. However, existing impacts to hydrology and vegetation prevent a rating of “high”.</td>
<td></td>
</tr>
<tr>
<td>H3</td>
<td>Medium-Low: Review of aerial photographs indicates that portions of the segment have been channelized. Shoreline also contains an undetermined amount of shoreline armoring.</td>
<td>Medium-Low: The majority of the vegetation within this reach has been disturbed by both residential and commercial development. However, review of aerial photography indicates that central portions of the left bank do contain tree canopy that extends over the Hylebos.</td>
<td>Medium-Low: This segment contains a number of critical areas. However, impacts to hydrology and vegetation function prevent higher habitat functionality.</td>
<td></td>
</tr>
</tbody>
</table>

1 – Qualitative Summary Function Score provides a qualitative score (high, medium-high, medium, medium-low, low) based upon the summary of the hydrologic, vegetation, and habitat analysis contained in Section 4 of this document and summarized in the table.
OPPORTUNITIES FOR SHORELINE PROTECTION, RESTORATION, PUBLIC ACCESS AND USE

SHORELINE PROTECTION AND RESTORATION OPPORTUNITIES

This section of the Inventory and Characterization document describes opportunities within the City to advance the goals of shoreline protection and restoration. Shoreline protection and restoration opportunities were primarily identified by utilizing the baseline watershed processes and reach characterization and functions information provided in Sections 3 and 4 of this document. Suggestions based upon the analysis for each shoreline reach as well as general suggestions for all City shorelines area provided. It should be noted that all of the protection and recommendation opportunities identified in this section of the document will be considered by the City and associated stakeholders. The City may ultimately choose to incorporate and/or implement any or all of the restoration measures as identified in the text below based upon community visioning, stakeholder comments and guidance from the Department of Ecology. In addition, the City intends to work with adjacent jurisdictions including Pierce County and neighboring tribes in identifying collaborative shoreline restoration efforts, such as those identified in the Pierce County Shoreline Restoration Report. Further refinement of the proposed restoration goals, policies and activities will occur during Task 4.1 – Restoration Planning of the update process.

5.1.1 P 1

Many of the conditions in segment P1, particularly those related to salmonid habitat, are due to factors outside the jurisdiction of the City of Fife. These include upstream land use, major alterations in basin hydrology, and placement and maintenance of the levee. However, the City can identify areas for conservation and/or restoration within the shoreline area that would provide some habitat for non-aquatic species. In particular, as the City works with land owners to plan development downstream of Frank Albert Road, areas could be identified for open space corridors that connect upland and shoreline areas. Forested areas are strongly recommended for conservation, and could also be prioritized for connection to the shoreline areas by way of open space corridors. Additionally, where possible, the City could collaborate with the Corps and Pierce County River Improvement District to develop vegetation plans for the levee that complement vegetation and open space across Levee Road as well as improve water quality, habitat, and vegetation functions.

5.1.2 P 2

The majority of this reach contains open space and resource land uses. It is highly recommended that zoning be modified to reflect the existing land use. In addition, land use in the immediately adjacent areas should be planned to minimize impacts. Areas of the wetlands or their associated buffers that may have been altered due to past development are recommended for enhancement actions, including invasive species removal and native vegetation planting. The Oxbow wetland represents the greatest potential for the City to enhance salmonid habitat on the Puyallup shoreline.
5.1.3  P 3

As with segment P1, the City does not have jurisdiction over many of the factors influencing salmonid habitat function in this segment. Conservation of upland open space areas, particularly forested areas, is highly recommended, as is conservation and enhancement of wetland areas. Collaboration with the Pierce County River Improvement District to develop vegetation and habitat enhancement plans that complement each other on both sides of Levee Road also is recommended.

5.1.4  H 1

Because the entire segment is privately owned and occupied, there are essentially no opportunities for conservation and restoration without homeowner involvement or property acquisition. However, the City could explore developing an educational program to inform homeowners of actions they can take to minimize their impacts in-stream habitat or ways to enhance it with native landscaping, soft shoreline armoring techniques and invasive species removal. Non-governmental organizations (such as Friends of the Hylebos, Citizens for a Healthy Bay) familiar with outreach programs in the watershed would be useful partners in such an effort.

5.1.5  H 2

Restoration activities have been completed on both the right and left banks within the northern portion of this reach. The Milgard Nature area is located along the right bank and the Hylebos Estuary Nature area is located along the left bank. Conservation of the remaining undeveloped riparian areas on the left bank is strongly recommended. Additional property acquisition for conservation and restoration actions on the right bank to complement and enhance the riparian areas on the left bank also is recommended where possible, as is shoreline property owner outreach and education regarding actions they can take to minimize impacts and enhance habitat on their property. One opportunity for restoration is the left bank between 8th Street East and 62nd Avenue East, where an undeveloped area dominated by reed canary grass with limited riparian vegetation could be cleared and replanted with native vegetation, or even graded down to create off-channel wetland habitat. Kerwin (1999) identified off-channel habitat as a limiting factor in Hylebos Creek. Off-channel habitat with a riparian community could provide input of nutrients and a forage base for coho salmon (as well as chinook). Another opportunity for restoration is the left bank immediately downstream of 12th Street East, where there is a large amount of debris and invasive vegetation in the shoreline area.

These opportunities are typical of those in the City shoreline area on Hylebos Creek in that they would require either significant property owner cooperation or property acquisition. The City also could develop guideline for building setbacks and riparian vegetation requirements for new residential development in this segment.
5.1.6  H 3

It is strongly recommended that the City conserve remaining riparian vegetation in this segment. As with segments H1 and H2, opportunities for conservation and restoration area somewhat limited to options involving property owner involvement or property acquisition. Guidelines for building new residential development as vacant land is converted to residential areas could be used to enhance and conserve riparian areas. This is a likely scenario for the undeveloped and agricultural shoreline areas immediately upstream of 12th Street East. As this area becomes developed, riparian areas could be conserved and vegetation restored, including removal of the large stand of Japanese knotweed (*Polygonum cuspidatum*) on the left bank and its replacement with native vegetation. The eventual extension of State Route 167 may present the greatest opportunity for habitat restoration and enhancement, as well as the greatest opportunity for partnership and coordination with stakeholders working upstream of the City.

5.1.7  General Recommendations for all City Shorelines

The following recommendations are provided for the entire jurisdiction:

- Work with the Corps of Engineers and the Pierce County River Improvement district to investigate means to provide increased shoreline function along the Puyallup River without compromising flood control capacity.

- Conserve wetlands in the shoreline area through buffer maintenance. Consider off-channel habitat creation, enhancement or improvement projects for the Hylebos Creek, wherever possible.

- Carefully consider the impacts of uplands development upslope of shoreline areas, even outside of the shoreline jurisdiction.

- Ensure stormwater facilities and stormwater designs provide adequate water treatment before re-introduction to waterbodies. Explore new stormwater technologies, including low impact development and water recycling.

- Conserve riparian vegetation within the shoreline areas, wherever possible, especially where there is opportunity for large woody debris (LWD) recruitment into the adjacent streams.

- Inform shoreline property owners about shoreline habitat and the special functions associated with shoreline areas. Promote restoration or re-vegetation of riparian areas through education or incentive programs.


- Coordinate with local jurisdictions, business, and citizen action groups on large scale habitat creation or restoration projects.
5.2 **PUBLIC ACCESS OPPORTUNITIES**

Shoreline public access is the ability of the general public to reach and touch the water and the ability to view the water and the shoreline from upland locations. Public access facilities include public parks, boat launches, trails, improved street ends and overlooks. On Fife shorelines, public access to the Puyallup is provided by N. Levee Road adjacent to the Puyallup as well as informal areas of direct access created by an adjacent trail as well as breaks in the adjacent vegetation. Public access to the Hylebos is limited due to adjacent residential and commercial development.

As the majority of the parcels adjacent to the shoreline are not owned by the city, potential new public access opportunities to Fife’s shoreline area are limited and would likely require obtaining new shoreline properties. The City of Fife may choose to work with adjacent jurisdictions, such as Pierce County to explore future public access opportunities.

5.3 **SHORELINE USE ANALYSIS AND IDENTIFICATION OF POTENTIAL CONFLICTS**

Planned shoreline use for the City of Fife includes Industrial, Mixed Medium Density Residential/Commercial, Medium Density Residential, Low Density Single Family Residential, Small Lot Single Family Residential, and Mixed Commercial High Density Residential (City of Fife 2009). There are a substantial number of vacant, agricultural, and/or undeveloped properties that are zoned for other uses such as commercial or industrial. Future development is likely to involve the conversion of existing agricultural and residential use parcels to industrial and commercial uses.

As identified in the shoreline characterization and function portion of this document (Section 4), the levee system adjacent to the Puyallup River as well as the lack of navigability within the Hylebos result in a reduced opportunity for water dependant activities within the City. At this time, only limited water dependent recreational activities, such as fishing along the Puyallup and Hylebos Creek are available.
This section of the Inventory and Characterization describes data gaps or limitations identified during document development. Identification of data gaps uncovered during the Shoreline Master Program Update is a necessary part of the Inventory and Characterization process pursuant to WAC 173-26-201(3)(c)(viii). These data gaps generally represent elements of the report where the analysis may be limited, relevant data cannot be found, and/or the City will continue to obtain information beyond the completion of this document. This section is not intended to provide an exhaustive list of all of the items the City should address. However, the items listed within this section are provided to serve as the initial development of possible directions the City may wish to pursue to facilitate future code updates and/or amendments to the Shoreline Master Program.

6.1 Identified Gaps

Regional Information

As noted in Section 2 of this document, Pierce County is conducting its SMP update concurrent with the City effort, and will prepare a county-wide assessment of regional conditions including watershed processes and shoreline functions. Additionally, Ecology is preparing analyses of watershed processes for Puget Sound marine shorelines that will become available in 2010. This information should be utilized for this update process, as it becomes available, as well as for future updates.

Land Cover/Impervious Surfaces

The overall level of impervious surface for the City of Fife is estimated to be 44%, as derived from external GIS resources including the National Oceanic and Atmospheric Administration and the Washington State Department of Ecology. However, this document is not able to provide quantitative data regarding the percent or acreage of impervious land cover for each reach, which is the common metric utilized for obtaining baseline land cover information, based on the level of information currently available.

Site Specific Critical Area Information

As noted within some of the reach assessments within Section 4 of this document, site specific studies may yield information regarding critical areas that are currently unknown and unmapped.

Shoreline Indicators

The Washington State Department of Ecology has identified several quantifiable shoreline indicators that are intended for use to demonstrate no net loss during future update processes. These potential no net loss indicators include: loss of forest cover (preferred measurement acres converted), shoreline stabilization (linear length), shoreline vegetation (linear measurement or percent cover), permanently protected areas in acres, Docks/overwater structures (square footage), road lengths in feet within 200 feet of waterbody, number of road crossings of water
bodies, water quality list 303(d) listing, linear feet of levees/docks, and floodplain area (acres allowed to flood – as determined by lack of structures). Unfortunately, due to the lack of digitized information as well as the limitation of the update to existing data, the majority of these parameters could not be quantified for this update process.

**FEMA flood maps**

The currently available flood map information was utilized by the City of Fife during this Inventory and Characterization process. However, FEMA is in the process of revising the maps that designate flood areas within the City of Fife. These maps once adopted would change the extent of the shoreline jurisdiction within the city and amendments to the Shoreline Master Program in Fife would be required. It is anticipated that these maps will be made available to the City in time for the next Shoreline Master Program Update.

### 6.2 Recommendations to Address Data Gaps

The City of Fife has shoreline information in several formats; GIS, hard copy maps, photographs and project reports. The bulleted items provided below are suggestions that the City may choose to pursue to facilitate future update processes:

- Digitize all existing paper maps for use in GIS, if possible, and update content during digitization.

- Complete an impervious surface analysis for the City, and digitize the results.

- Complete a detailed wetland inventory, both within the shoreline area and in the City at large to improve critical areas management and provide information for comprehensive planning; digitize the results.

- Log wetlands delineations from shoreline permit applications into a central file for reference, and if possible, digitize wetland data.

- Coordinate with other local jurisdictions and interest groups (i.e., Friends of the Hylebos), to share data regarding salmon habitat, distribution and use of both Hylebos Creek and the Puyallup River.