

Cities of Aberdeen, Cosmopolis, and Hoquiam
Shoreline Master Program Update

Cumulative Impacts Analysis and No Net Loss Report

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LIST OF ABBREVIATIONS

AMC –	Aberdeen Municipal Code
BMP –	Best Management Practice
CAO –	Critical Areas Ordinance
Cities –	Cities of Aberdeen, Cosmopolis, and Hoquiam
CMC –	Cosmopolis Municipal Code
CIA –	Cumulative Impacts Analysis
Ecology –	Washington State Department of Ecology
EPA –	United States Environmental Protection Agency
ESA –	Federal Endangered Species Act
FEMA –	Federal Emergency Management Agency
FPA –	Washington State Forest Practices Act (Chapter 76.09 RCW)
GHEMP –	Grays Harbor Estuary Management Plan
HMC –	Hoquiam Municipal Code
MA –	Management Area
NMFS –	National Marine Fisheries Service
OHWM –	Ordinary High Water Mark
RCW –	Revised Code of Washington
SEPA –	State Environmental Policy Act (Chapter 43.21C RCW)
SIC –	Shoreline Inventory and Characterization
SMA –	Shoreline Management Act (Chapter 90.58 RCW)
SMP –	Shoreline Master Program

State –	State of Washington
USACE –	United States Army Corps of Engineers
WAC –	Washington Administrative Code
WDFW –	Washington State Department of Fish and Wildlife
WDNR –	Washington State Department of Natural Resources
WSDOT –	Washington State Department of Transportation

1 INTRODUCTION

1.01 DEPARTMENT OF ECOLOGY DIRECTION AND GUIDANCE

The Shoreline Management Act (SMA) rules in Chapter 173-26 of the Washington Administrative Code (WAC) require local shoreline master programs (SMPs) to include goals, policies, and regulations to ensure that SMP implementation will “achieve no net loss of ecological function” over the long term. The SMP Guidelines (WAC 173-26-186(8)(d)) state that:

“To ensure no net loss of ecological functions and protection of other shoreline functions and/or uses, master programs shall contain policies, programs, and regulations that address adverse cumulative impacts and fairly allocate the burden of addressing cumulative impacts.”

The SMP Guidelines discuss the concept of net loss in more detail in WAC 173-26-201(2)(c). An SMP must contain goals, policies, and regulations that are designed to direct development activities and uses in a manner that will prevent degradation of ecological functions relative to the existing conditions.

The cities of Aberdeen, Hoquiam, and Cosmopolis (cities’) updated SMP contains goals, policies, and regulations that prevent degradation of ecological functions relative to the existing conditions as documented in the *Shoreline Inventory and Characterization (SIC) Report* (Herrera and AHBL, 2014). For those projects that result in degradation of ecological functions, the required mitigation must return the resultant ecological function back to the baseline, as illustrated in Figure 1. In addition, the SMP must address adverse cumulative impacts and fairly allocate the burden of addressing cumulative impacts among development opportunities (WAC 173-26-186(8)(d)).

SMP updates: Achieving no net loss of ecological function

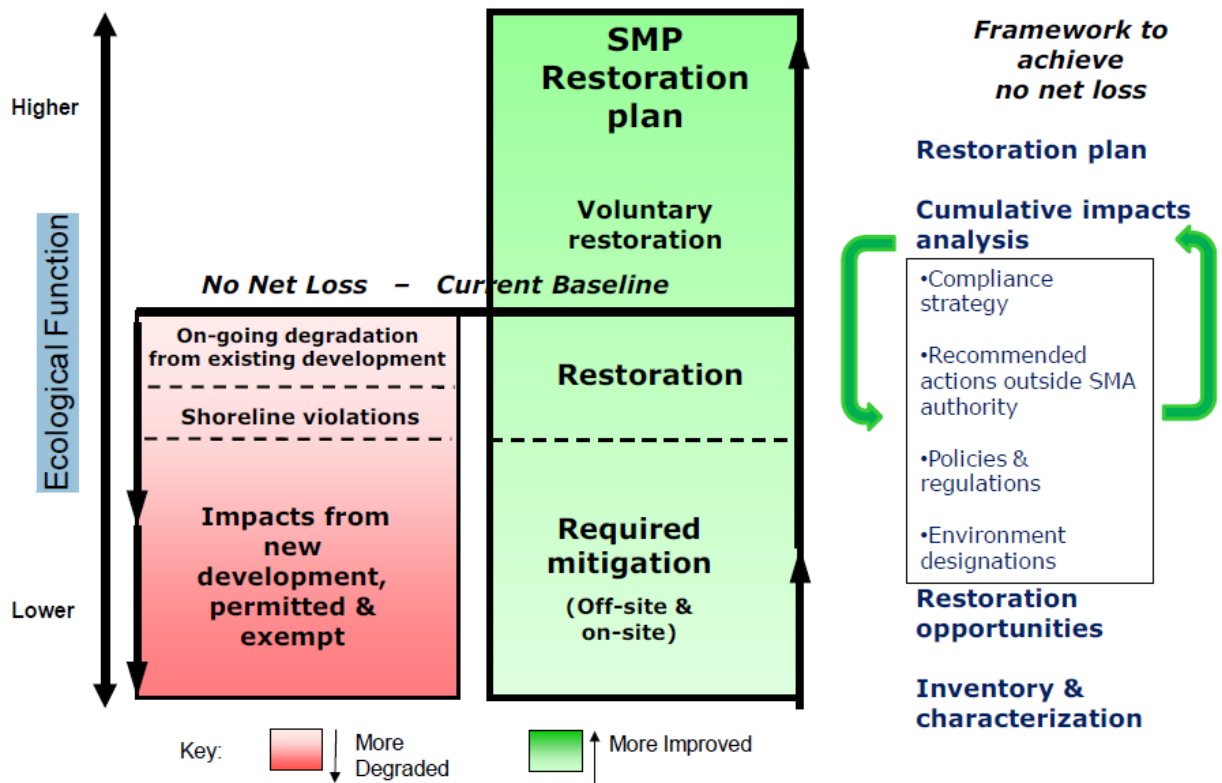


Figure 1. Shoreline Master Program Process for Achieving the No-Net Loss Standard.

Source: Washington State Department of Ecology (Ecology) (2012)

The purpose of the *Cumulative Impacts Analysis* (CIA) is to ensure that implementation of the SMP update for the cities, prepared by AHBL (2015), will not result in a net loss of shoreline ecological functions over the long term. Consistent with guidance from the Washington State Department of Ecology (Ecology), this CIA describes how the impacts of the proposed SMP will contribute toward the total impact of development in the shoreline jurisdiction over time. This analysis includes only those impacts that would result from development and uses within the cities' shoreline jurisdiction, and that are subject to regulation under their SMP. Potential impacts of development outside the shoreline jurisdiction are not considered in this CIA.

The CIA forecasts the estimated impacts of development in shoreline areas, taking into account the SMP policies, programs, and regulations, as well as:

- Existing conditions that affect the shorelines and relevant natural processes. The SIC provides this existing condition, or baseline, information.
- Reasonably foreseeable future development and use of the shorelines that is likely to occur during the next 20 years or so, based on the proposed shoreline environment

designations, proposed land use density and bulk standards, and current shoreline development patterns.

- Beneficial effects of any established regulatory programs under other local, state, and federal laws, such as the federal Clean Water Act.

To be consistent with the SIC, this analysis organizes the shorelines by city. Combined, the cities have approximately 7,500 acres and 86 miles of shoreline associated with these stream, lake, and marine water bodies.

In accordance with Ecology guidance, the shoreline assessed in the SIC may contain a nested system of management areas (MAs) and reaches. However, since all of the cities' shorelines are associated with a single watershed, the lower Chehalis River, it is appropriate to consider the each city as a single MA. The MAs were broken down into reaches for the purposes of the SIC and CIA.

The cities were divided into the sixteen shoreline reaches shown in Figure 2, Figure 3, and Figure 4. The reaches are listed below by city, based on areas having similar physical and ecological characteristics, land use, and development patterns.

City of Aberdeen

1. Aberdeen Lake
2. Charley Creek
3. Chehalis River - Aberdeen
4. Fry Creek - Aberdeen
5. Grays Harbor North Bank
6. Grays Harbor South Bank
7. Newskah Creek
8. Wedekind Confluence
9. Wishkah River

City of Cosmopolis

10. Chehalis River - Cosmopolis
11. Mill Creek









City of Hoquiam

12. East Hoquiam River
13. Fry Creek - Hoquiam
14. Grays Harbor
15. Hoquiam River
16. Little Hoquiam River

Shoreline Jurisdiction

Figure 1.2: Aberdeen

Date: 7/21/2014

-  Preliminary Shoreline Jurisdiction
-  Reaches
-  City Boundary
-  Associated NWI Wetland
-  Potentially Associated NWI Wetland
-  SMA Rivers
-  SMA Lakes
-  Highways

0 0.25 0.5 Miles

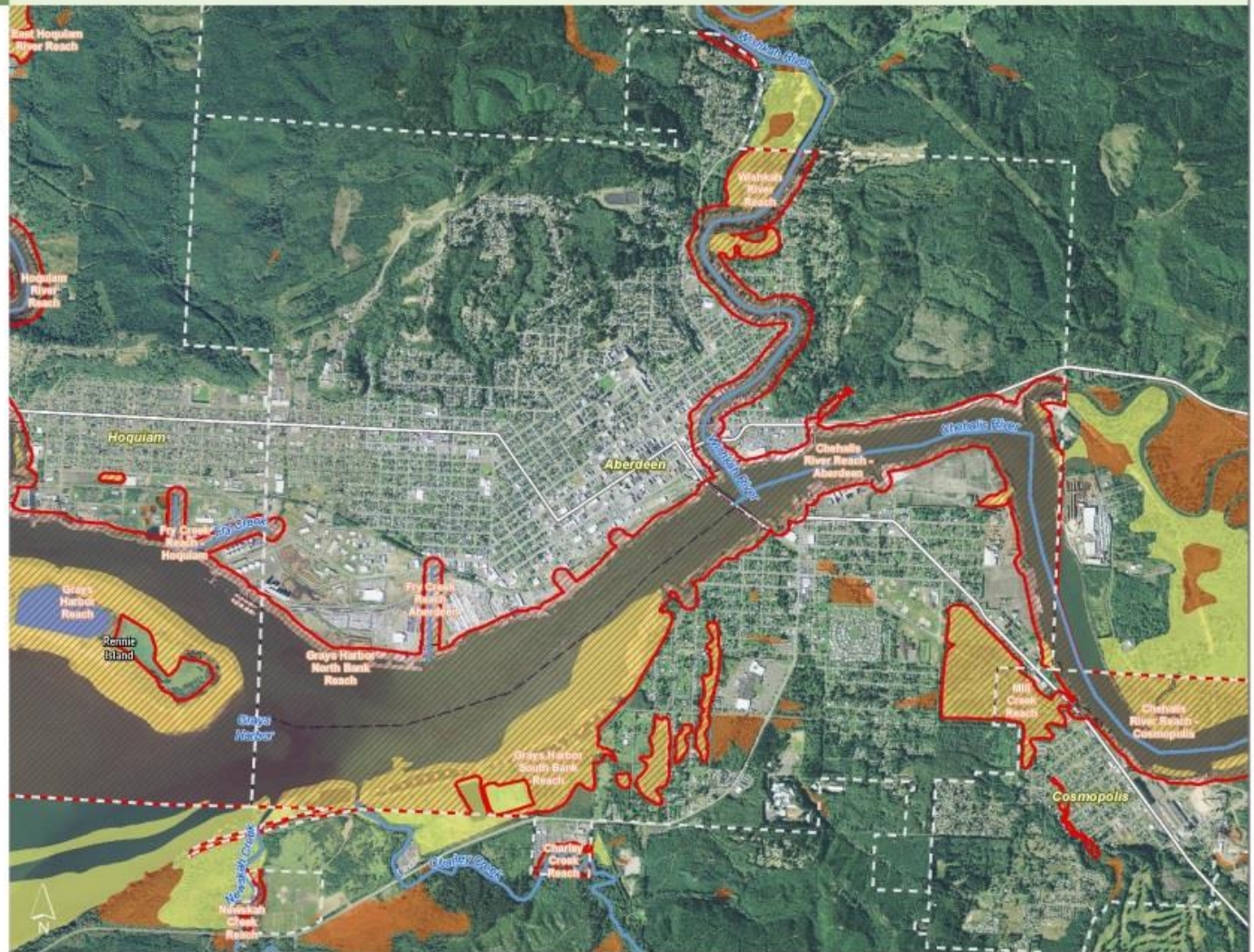
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Area of interest in app



Source: Grays Harbor County USFWS NWI (2011), FEMA Preliminary DFIRM (2013), WA DNR, WSDOT, DOE, NRCS NAIP (2013)









Shoreline jurisdiction boundaries depicted on this map are approximate. They have not been formally delineated or surveyed and are intended for planning purposes only. Additional site-specific evaluation may be needed to corroborate information shown on this map.



Shoreline Jurisdiction

Figure 1.4: Cosmopolis

Date: 7/21/2014

-  Preliminary Shoreline Jurisdiction
-  Reaches
-  City Boundary
-  Associated NWI Wetland
-  Potentially Associated NWI Wetland
-  SMA Rivers
-  SMA Lakes
-  Highways

0 0.25 0.5 Miles

1:10,000



Source: Grays Harbor County, USFWS NWI (2011), FEMA Preliminary OFIRM (2013), WADNR, WSDOT, DOE, NRCS NAIP (2013)









Shoreline jurisdiction boundaries depicted on this map are approximate. They have not been formally delineated or surveyed and are intended for planning purposes only. Additional site-specific evaluation may be needed to corroborate information shown on this map.



Shoreline Jurisdiction

Figure 1.1: Hoquiam

Date: 7/21/2014

-  Preliminary Shoreline Jurisdiction
-  Reaches
-  City Boundary
-  Associated NWI Wetland
-  Potentially Associated NWI Wetland
-  SMA Rivers
-  SMA Lakes
-  Highways

0 0.25 0.5 Miles

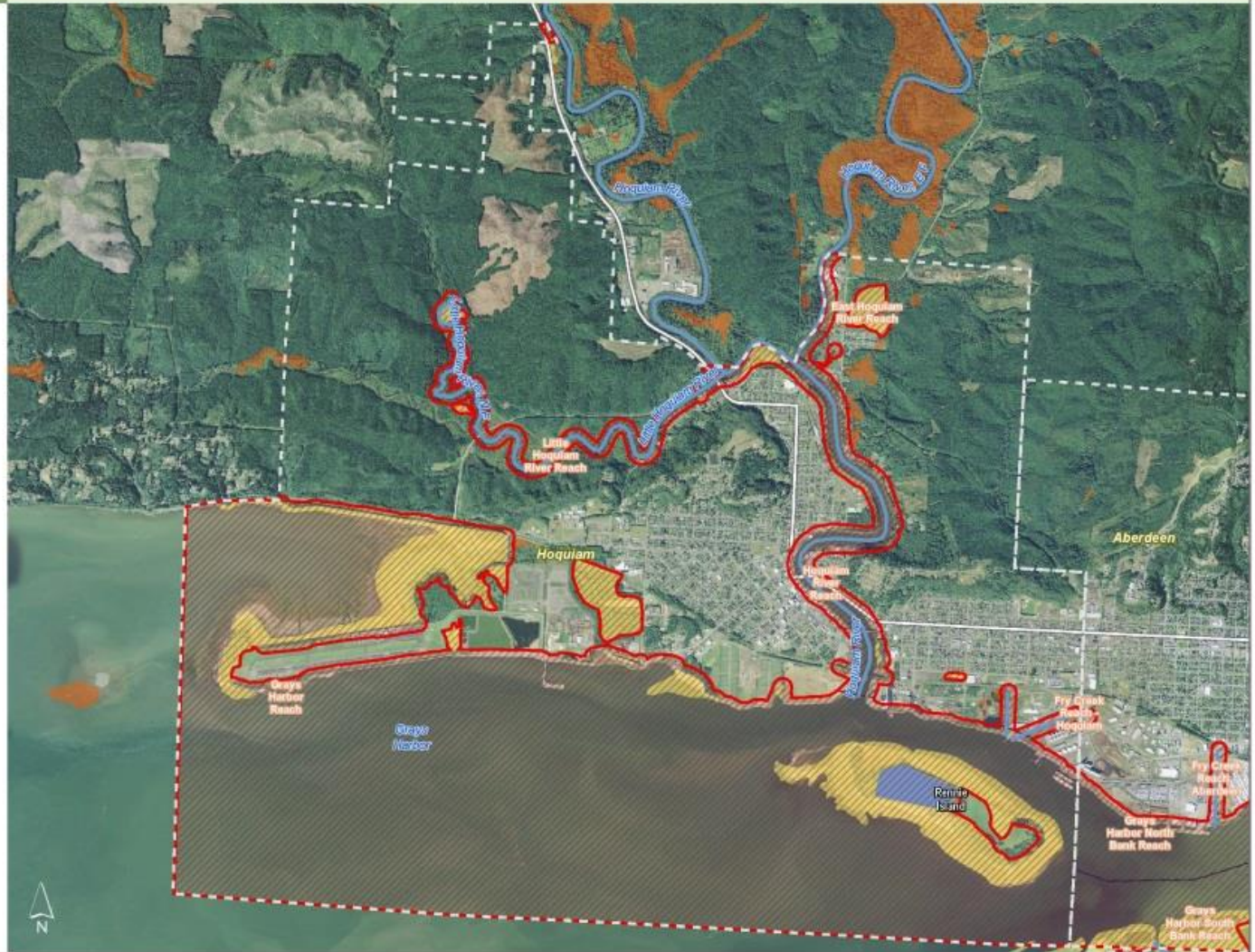
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Area of Interest in Map



Source: Gray's Harbor County USFWS NWI (2011), FEMA Preliminary DFIRM (2013), WA DNR, WSDOT, DOE, NRCS NAIP (2013)

Shoreline jurisdiction boundaries depicted on this map are approximate. They have not been formally delineated or surveyed and are intended for planning purposes only. Additional site-specific evaluation may be needed to corroborate information shown on this map.



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1.02 RELATIONSHIP TO SEPA

The State Environmental Protection Act (SEPA) requires an assessment of environmental impacts. The CIA is a supplement to the nonproject environmental review done under SEPA and is intended to address cumulative rather than isolated or individual impacts that might not be considered otherwise as part of the environmental checklist.

The SEPA review process is intended to provide a list of possible environmental impacts that may occur because of a project (SEPA project review) or change in policy (SEPA nonproject review). This helps identify potential impacts that may need to be mitigated, conditioned, or this may result in the denial of a project or proposal. This CIA is intended to look at impacts as a whole based on whether or not multiple similar projects collectively result in gradual, but significant impacts. While SEPA looks at impacts by topic and the effects they may have as a whole for the project area, the CIA examines impacts that may result from multiple projects over time.

1.03 ASSUMPTIONS

This analysis considered foreseeable impacts over time. Impacts are examined in the shoreline jurisdiction as completed in the existing SMP document and in the SIC. In addition, site-specific impacts are expected to be addressed on a case-by-case basis during individual shoreline project reviews.

1.04 DOCUMENT ROADMAP

This CIA summarizes the existing conditions in the sixteen shoreline reaches of the cities. It details the potential impacts and risks to shoreline functions and processes, identifies anticipated development in each shoreline reach and how the SMP regulations would address this development, discusses how other local, state and federal regulations would address these potential impacts, and describes the net effect on ecological functions and processes. Cumulative impacts tables are included in Chapter 8. The tables describes the relationship between ecological function, potential alteration, resources at risk, and proposed SMP regulations and non-regulatory measures designed to assure no net loss at a minimum.

2 EXISTING CONDITIONS

This chapter summarizes information presented in the SIC. For each shoreline reach, this chapter presents a summary of shoreline characteristics and uses, and describes ecological functions (habitat, water quantity, water quality) considered to be at risk.

2.01 REACH 1 – ABERDEEN LAKE

The Aberdeen Lake Reach (WRIA 22 – the Lower Chehalis Watershed) is approximately 114 acres in area. Land cover is comprised of 40 percent open water, 18 percent woody wetlands, 18 percent evergreen forest, seven percent emergent herbaceous wetlands, six percent developed open space, five percent low intensity development, four percent shrub/scrub, three percent deciduous forest, one percent barren land, and less than one percent of medium intensity development, herbaceous, and mixed forest. Thirty-nine percent (44 acres) of the Aberdeen Lake Reach is in public ownership, with 38 percent (43 acres) of the public land owned by the city of Aberdeen, 0.7 percent (less than one acre) owned by the Washington State Department of Natural Resources (WDNR), and 0.1 percent (less than 0.1 acre) owned by the Washington State Department of Fish Wildlife (WDFW).

2.01.01 SHORELINE CHARACTERISTICS

The Aberdeen Lake Reach is inland from the Grays Harbor and Chehalis River shorelines, and does not have the development intensity or pressure that is present in most other shoreline reaches throughout the city. The reach is influenced only by lowland rainfall, as opposed to other reaches within Aberdeen, which are subject to tidal influences.

2.01.02 LAND USE

The primary land use within Aberdeen Lake Reach is the Lake Aberdeen Recreation Area, a 640-acre park. The park consists mostly of undeveloped forestlands but also includes 5 acres of land developed for recreational purposes.

The current land use patterns found in the Aberdeen Lake Reach are provided in Table 2-1 below.

Table 2-1. Current Land Use Patterns for the Aberdeen Lake Reach.

Current Land Use Patterns	Percentage of Reach
Parks/Open Space	93.2%
Vacant/Undeveloped	6.8%

Land Cover	Percentage of Reach
Open Water	36.6%
Woody Wetlands	18.4%
Evergreen Forest	17.7%
Emergent Herbaceous Wetlands	6.8%
Developed Open Space	6.3%
Low Intensity Development	4.6%
Shrub/Scrub	3.6%
Deciduous Forest	3%
Barren Land	1.4%
Medium Intensity Development	0.7%
Herbaceous	0.6%
Mixed Forest	0.2%

The zoning designations from Aberdeen Municipal Code (AMC) Title 17 – Zoning found in the Aberdeen Lake Reach are provided in Table 2-2 below.

Table 2-2. Current Zoning Designations for the Aberdeen Lake Reach.

Description	Symbol	Typical Uses	Percentage of Reach
Industrial	I	Manufacturing, light manufacturing, processing, light processing, light assembly, fabricating, and light fabrication and industrial activities all within a building; equipment, heavy equipment sales, repair and rentals, auto and truck rental, repair and servicing within a building, exterior storage of goods and equipment, shipping terminals, truck terminals, materials movement facilities, and docks, wharfs, marine terminals, and contractors yards; warehousing, indoor and outdoor storage,	100%

Description	Symbol	Typical Uses	Percentage of Reach
		wholesale sales, industrial sales, building and industrial material retail sales, and retail sales accessory to a related permitted or conditional use; kennels and animal hospitals; service stations; laboratories and industrial research facilities.	

2.01.03 EXISTING PUBLIC ACCESS

Lake Aberdeen includes one of the two public boat-launching facilities, which allows non-motorized boats to access the 100-acre lake. The lake is used for swimming and fishing activities. The city has identified expansion opportunities for areas directly adjacent to the lake, which would allow for more public access to the lake. Long-term plans for Lake Aberdeen include adding tent camping areas and a native/interpretive trail around the lake.

2.01.04 SHORELINE MODIFICATIONS

There is a public boat launching facility located at the lake, which is used to support non-motorized boating and other recreational activities that occur around the lake. A boat dock on the southern bank of the lake is also used to support boating and recreational activities.

Table 2-3 lists the total length of dikes and levees for reaches where they are found in the available data, along with other shoreline modifications observed on aerial photographs in the course of doing reach functional assessments. Comprehensive information on shoreline modifications other than dikes and levees is not available for this reach.

Table 2-3. Aberdeen Lake Reach Shoreline Modifications.

Sum of Dike and Levee Length (feet)	Other Shoreline Modifications
Approx. 40 feet	Aberdeen Lake Dam

2.01.05 ECOLOGICAL FUNCTIONS

The Aberdeen Lake Reach scored the highest on the functional assessment out of all Aberdeen reaches, primarily due to good vegetative conditions along the shoreline, relatively low level of shoreline development, and good connectivity between habitats. There are areas of altered vegetation along the south shore associated with the dam, roads, parking areas, and the fish hatchery. Docks are also present, but it is unlikely the structures significantly impair functions

for the lake overall due to their limited number and extent along the lake shoreline. Although it is an anthropogenic structure, the dam is the key physical feature responsible for the presence of the lake, its current character, and much of the function that it provides, particularly in terms of floodwater storage.

The relatively undeveloped and well-vegetated condition of the shoreline provides deep water and riparian habitat for several fish species and waterfowl. Most emergent and scrub-shrub wetlands, providing additional water quality and habitat functions, are associated with the delta where Van Winkle Creek and a smaller unnamed tributary enter the reservoir from the north. Although channel migration zones have not been formally mapped, the channel migration zone of Van Winkle Creek extends the entire valley width.

A. *Geologically Hazardous Areas*

Eighteen percent of the area within the Lake Aberdeen Reach is subject to moderate to high risk of liquefaction hazards based on the soil characteristics present throughout the reach. Nine percent of the reach is also subject to deep-seated landslide hazard zones based on the topography within and directly adjacent to the reach's boundary. This reach is outside of the mapped Cascadia Scenario 1A seismic hazard zone.

B. *Flood Hazard Areas*

The Aberdeen Lake Reach is mapped outside of the Federal Emergency Management Agency (FEMA) 100-year floodplain area.

C. *Wetlands*

Approximately 71 acres of identified wetlands exist within the Aberdeen Lake Reach, comprising 63 percent of the reach's total area.

D. *Streams*

There are no river or stream features within the Aberdeen Lake Reach that qualify as an instream habitat area. The shorelines within this reach are more closely associated with lake's habitat and ecological processes, however, since the entire shoreline jurisdiction is dominated by river and stream water features, there is a close association with nearby instream habitats.

E. *Other Fish and Wildlife Habitat Conservation Areas*

The following fish have been identified within the Aberdeen Lake Reach, with their associated habitat type and length of documented presence listed below:

Fish Species	Habitat Type	Documented Presence
Chinook Salmon	Presence/Migration	234 ft.
Coast Resident Cutthroat	Presence/Migration	2,925 ft.
Coho Salmon	Juvenile Rearing	176 ft.
Coho Salmon	Presence/Migration	6,058 ft.
Steelhead Trout	Presence/Migration	434 ft.
Steelhead Trout	Planted	5,628 ft.

Coastal resident trout use habitats in nearly all of the shoreline jurisdictions, and both the cutthroat and rainbow trout are WDFW designated priority species due to their recreational value.

Olympic mudminnow (*Novumbra hubbsi*) presence is not well documented throughout the cities' shoreline jurisdictions, however their range includes all the cities' freshwater shorelines. Their typical environment includes slow-moving streams, wetlands, ponds, ditches, or sloughs with muddy substrate, still or slow moving water, and areas with abundant aquatic vegetation. Wetland protection is considered essential for the conservation of the species (WDFW 2013b).

Pacific lamprey (*Entosphenus tridentate*) is documented near the outfall of Lake Aberdeen, and are listed as a state priority species and federal species of concern.

Bald eagles are present throughout the cities' shorelines and have been observed perching on natural and human-made structures throughout the shoreline jurisdiction.

Wood duck priority areas are mapped around Aberdeen Lake and the immediately surrounding area. There are approximately 76 acres of wood duck habitat located in this reach.

F. Critical Aquifer Recharge Areas

Critical aquifer recharge areas have not been mapped in the cities. There are no known wellhead protection areas in the cities or their shoreline jurisdictions (WDOH 2014b). Where no specific studies have been done, the cities may use existing soil and surficial geologic information to determine where recharge areas exist. To determine the threat to groundwater quality, existing land use activities and their potential to lead to contamination should be evaluated (WAC 365-190-100). Critical aquifer recharge areas may be present and require protection in the shoreline jurisdiction but none has been identified in the cities at the time of this inventory and characterization report.

2.02 REACH 2 – CHARLEY CREEK

The Charley Creek Reach (WRIA 22 – the Lower Chehalis Watershed) is approximately 16.73 acres in area. Land cover is comprised of 60 percent woody wetlands, 14 percent emergent herbaceous wetlands, nine percent medium intensity development, eight percent low intensity development, eight percent barren land, and three percent high intensity development. There are no publically owned lands within the Charley Creek Reach.

2.02.01 SHORELINE CHARACTERISTICS

The Charley Creek Reach is located south of Grays Harbor in Aberdeen and along the portion of Charley Creek that crosses into the city boundary. The north shoreline of the reach is more intensely developed than the southern shoreline, which is currently has no development.

2.02.02 LAND USE

The Charley Creek Reach is zoned entirely Industrial. The northern portion of the reach contains industrial land uses, such as an auto-wrecking yard.

The current land use patterns found in the Charley Creek Reach are provided in Table 2-4 below.

Table 2-4. Current Land Use Patterns for the Charley Creek Reach.

Current Land Use Patterns	Percentage of Reach
Public Services	65.1%
Industrial	24.3%
Commercial	10.6%

Land Cover	Percentage of Reach
Woody Wetlands	58.9%
Emergent Herbaceous Wetlands	13.9%
Medium Intensity Development	8.6%
Low Intensity Development	8.2%
Barren Land	7.8%
High Intensity Development	2.6%

The zoning designations from AMC Title 17 – Zoning found in the Charley Creek Reach are provided in Table 2-5 below.

Table 2-5. Current Zoning Designations for the Charley Creek Reach.

Description	Symbol	Typical Uses	Percentage of Reach
Industrial	I	Manufacturing, light manufacturing, processing, light processing, light assembly, fabricating, and light fabrication and industrial activities all within a building; equipment, heavy equipment sales, repair and rentals, auto and truck rental, repair and servicing within a building, exterior storage of goods and equipment, shipping terminals, truck terminals, materials movement facilities, and docks, wharfs, marine terminals, and contractors yards; warehousing, indoor and outdoor storage, wholesale sales, industrial sales, building and industrial material retail sales, and retail sales accessory to a related permitted or conditional use; kennels and animal hospitals; service stations; laboratories and industrial research facilities.	100%

2.02.03 EXISTING PUBLIC ACCESS

There is no existing public access to shorelines in the Charley Creek Reach.

2.02.04 SHORELINE MODIFICATIONS

There are no visible or identified shoreline modifications present in the Charley Creek Reach.

2.02.05 ECOLOGICAL FUNCTIONS

The Charley Creek Reach scored high on the functional assessment, partly due to good vegetation and channel conditions, despite existing development and lack of vegetation in the northern portion of the reach. The NWI indicates only 2 percent wetland cover in the reach, although land cover data indicates significant amounts of woody wetland (scrub-shrub and forested areas likely containing wetlands) comprising 59 percent of the reach. This is primarily in the undeveloped southern portion of the reach. The northern portion of the reach is

characterized by the wrecking yard and is an area identified as a potential restoration opportunity. Charley Creek channel migration is dominated by marine flooding events that extend throughout the lower reaches of the creek. Seventy-six percent of the reach is mapped within the 100-year floodplain and therefore designated as a frequently flooded area.

A. Geologically Hazardous Areas

The entirety Charley Creek Reach is subject to liquefaction hazards based on the soil characteristics: 85 percent of the area subject to moderate to high risk and the remaining 15 percent subject to very low to low risks. Nearly 10 percent of the reach is also subject to deep-seated landslide hazard zones based on the topography within and directly adjacent to the reach's boundary. The entire extents of the reach are within the mapped Cascadia Scenario 1A seismic hazard area.

B. Flood Hazard Areas

Seventy-six percent of the Charley Creek Reach is within the 100-year floodplain.

C. Wetlands

Approximately 0.38 acres of identified wetlands exist within the Charley Creek Reach, comprising 2.3% of the reach's total area.

D. Streams

Instream priority habitats exist within the Charley Creek Reach, and serve as areas where a combination of physical, biological, and chemical processes and conditions interact to provide functional life history requirements for instream fish and wildlife resources.

E. Other Fish and Wildlife Habitat Conservation Areas

Fish Species	Habitat Type	Documented Presence
Coast Resident Cutthroat	Presence/Migration	1,933 ft.

Coastal resident trout use habitats in nearly the entire shoreline jurisdiction, and both the cutthroat and rainbow trout are WDFW designated priority species due to their recreational value.

Olympic mudminnow (*Novumbra hubbsi*) presence is not well documented throughout the cities' shoreline jurisdictions, however their range includes all the cities' freshwater shorelines. Their typical environment includes slow-moving streams, wetlands, ponds, ditches, or sloughs with muddy substrate, still or slow moving water, and areas with

abundant aquatic vegetation. Wetland protection is considered essential for the conservation of the species (WDFW 2013b).

Bald eagles are present throughout the cities' shorelines and have been observed perching on natural and human-made structures throughout the shoreline jurisdiction.

F. Critical Aquifer Recharge Areas

Critical aquifer recharge areas have not been mapped in the cities. There are no known wellhead protection areas in the cities or their shoreline jurisdictions (WDOH 2014b). Where no specific studies have been done, the cities may use existing soil and surficial geologic information to determine where recharge areas exist. To determine the threat to groundwater quality, existing land use activities and their potential to lead to contamination should be evaluated (WAC 365-190-100). Critical aquifer recharge areas may be present and require protection in the shoreline jurisdiction but none has been identified in the cities at the time of this inventory and characterization report.

2.03 REACH 3 – CHEHALIS RIVER - ABERDEEN

The Chehalis River – Aberdeen Reach (WRIA 22 – the Lower Chehalis Watershed) is approximately 429 acres. Land cover is comprised of 50 percent open water, 15 percent woody wetlands, nine percent low intensity development, seven percent medium intensity development, six percent high intensity development, four percent herbaceous, four percent barren land, three percent emergent herbaceous wetlands, three percent developed open space, and less than one percent evergreen forest. Eight percent (33 acres) of the Chehalis River Reach - Aberdeen is in public ownership.

2.03.01 SHORELINE CHARACTERISTICS

The Chehalis River – Aberdeen Reach is located in central Aberdeen and splits the city into its northern and southern banks. The reach flows directly into Grays Harbor. There are extensive levees and shoreline armoring present throughout the reach, but especially along the southern shoreline.

2.03.02 LAND USE

Chehalis River – Aberdeen Reach merges with Elliot Slough and it is primarily used for passive recreation and log staging along the cleared land waterward of the levees.

The current land use patterns found in the Chehalis River - Aberdeen Reach are provided in Table 2-7 below.

Table 2-6. Current Land Use Patterns for the Chehalis River – Aberdeen Reach.

Current Land Use Patterns	Percentage of Reach
Industrial	38.7%
Vacant/Undeveloped	30.3%
Commercial	14.3%
Manufacturing	8.2%
Public Services	6%
Residential	0.9%
Transportation/Communication/Utilities	0.6%
Parks/Open Space	0.5%
Cultural/Entertainment/Recreational	0.5%

Land Cover	Percentage of Reach
Open Water	49.8%
Woody Wetlands	14.7%
Low Intensity Development	9%
Medium Intensity Development	7.4%
High Intensity Development	5.5%
Herbaceous	3.8%
Barren Land	3.7%
Emergent Herbaceous Wetlands	3.2%
Developed Open Space	2.8%
Evergreen Forest	0.1%

The zoning designations from the Title 17 – Zoning found in the Chehalis River – Aberdeen Reach are provided in Table 2-8 below.

Table 2-7. Current Zoning Designations for the Chehalis River – Aberdeen Reach.

Description	Symbol	Typical Uses	Percentage of Reach
Industrial	I	Manufacturing, light manufacturing, processing, light processing, light assembly, fabricating, and light fabrication and industrial activities all within a building; equipment,	53.4%

Description	Symbol	Typical Uses	Percentage of Reach
		heavy equipment sales, repair and rentals, auto and truck rental, repair and servicing within a building, exterior storage of goods and equipment, shipping terminals, truck terminals, materials movement facilities, and docks, wharfs, marine terminals, and contractors yards; warehousing, indoor and outdoor storage, wholesale sales, industrial sales, building and industrial material retail sales, and retail sales accessory to a related permitted or conditional use; kennels and animal hospitals; service stations; laboratories and industrial research facilities.	
Single Family Residential	RS	Single-family dwellings; mobile homes; home day care.	17.9%
Waterfront Development	WD	Light manufacturing, fabrication and repair within a building; commercial marine uses including fuel service, docks, wharfs, shipyards, ways, passenger and ferry terminals; wholesale and retail sales within a building, and warehousing; personal, professional, financial and business services; farmers' markets; truck and equipment rental, repair and servicing within a building; eating and drinking establishments, outdoor cafes and restaurants, hotels, motels, meeting rooms facilities, convention centers; food processing and baking for retail sales on premises; multiple-family dwellings, residences in the upper floors of buildings, townhouses and residential cluster developments; child care facilities; public and semi-	14.2%

Description	Symbol	Typical Uses	Percentage of Reach
		public uses, and related support services; kennels and animal hospitals; service stations.	
Multiple Family Residential	RM	Duplexes and townhomes; multiple-family dwellings; single-family dwellings; home day care and mini day care; mobile homes.	11.6%
Commercial/ Residential	CR	Personal and professional services and offices; retail sales within a building; single-family dwellings; multiple-family dwellings; duplexes and townhomes; hotels, motels, bed and breakfast inns, and meeting rooms and facilities; child care facilities; kennels and animal hospitals.	1.6%
Light Industrial	LI	Light manufacturing, light processing, light assembly and light fabrication; warehousing, wholesale sales, industrial sales, building and industrial material retail sales, retail sales accessory to a related permitted or conditional use; equipment, auto and truck rental, repair and servicing within a building; laboratories and industrial research facilities; restaurants accessory to a permitted use; truck terminals, shipping terminals, docks and contractors yards.	0.7%
General Commercial	CG	Retail sales; personal, professional and business services; financial services; offices; eating and drinking establishments; food processing and baking for retail sales on premises; automobile repair services within a building and service stations; equipment repair and servicing within a building; recycling drop boxes; parking lots and parking structures; parks, recreation	0.6%

Description	Symbol	Typical Uses	Percentage of Reach
		centers, public buildings, colleges and other public and semipublic uses.	

2.03.03 EXISTING PUBLIC ACCESS

Within the Chehalis River - Aberdeen Reach, residents have access to the shoreline at the Morrison Riverfront Park on the northern bank of the river, which includes 4,650 feet of waterfront access as well as a pavilion, picnic tables, and a fishing/viewing dock. A public access site adjacent to the Walmart provides access to an associated trail that connects to the Morrison Riverfront Park. A trail also connects the Morrison Riverfront Park to the Chehalis River via the East Aberdeen Waterfront Walkway. This 6-foot-wide asphalt trail runs along the north side of the Chehalis River. Aberdeen Ramp, also on the Chehalis River, provides boat access to the river via a concrete plank ramp on the site.

2.03.04 SHORELINE MODIFICATIONS

There are extensive shoreline modifications present throughout the Chehalis River – Aberdeen Reach. Most of the shoreline modifications present in the reach are along the northern bank of the Chehalis River. There is over 4,100 feet of dike/levee in the reach. Also present in the reach are 2,290 feet of rip rap, 375 feet of concrete bulkhead, 520 feet of landfill, 20 tide gates, and three partial road crossing blockages.

2.03.05 ECOLOGICAL FUNCTIONS

The Chehalis River – Aberdeen Reach scored low on the function assessment, primarily due to the extensive levees along the entire southern shoreline and armoring along the active channel. Most of the land waterward of the levee has been cleared and is used for log staging. Although most of it is outside the floodplain, the levee and historical filling of the area likely contribute to the present day form of the channel and floodplain. Wetlands are limited and are primarily associated with the wetland area adjacent to the Mill Creek Reach in Cosmopolis, and near the mouth of Elliot Slough. They are less common, but also present, along the main channel shorelines. Nearshore estuarine vegetation is not present in this reach. However, the reach provides an important migration corridor for species moving upstream and downstream to key habitats in the Chehalis River's tidal surge plain. Due to levee construction and fill, the entire reach is disconnected permanently from the remainder of its historical channel migration zone.

A. Geologically Hazardous Areas

Forty-four percent of the area within the Charley Creek Reach is subject to moderate to high risk of liquefaction hazards based on the soil characteristics, and 43 percent of the reach is within the mapped Cascadia Scenario 1A seismic hazard area.

B. Flood Hazard Areas

Eighty percent of the Chehalis River - Aberdeen Reach is within the 100-year floodplain.

C. Wetlands

Approximately 82 acres of identified wetlands exist within the Chehalis River - Aberdeen Reach, comprising 19 percent of the reach's total area.

D. Streams

Instream priority habitats exist within the Chehalis River - Aberdeen Reach, and serve as areas where a combination of physical, biological, and chemical processes and conditions interact to provide functional life history requirements for instream fish and wildlife resources.

E. Other Fish and Wildlife Habitat Conservation Areas

The following fish have been identified within the Chehalis River - Aberdeen Reach, with their associated habitat type and length of documented presence listed below:

Fish Species	Habitat Type	Documented Presence
Bull Trout	Presence/Migration	9,050 ft.
Chinook Salmon	Presence/Migration	29,100 ft.
Chum Salmon	Presence/Migration	9,050 ft.
Coast Resident Cutthroat	Presence/Migration	10,999 ft.
Coho Salmon	Juvenile Rearing	1,948 ft.
Coho Salmon	Presence/Migration	9,050 ft.
Largemouth Bass	Presence/Migration	906 ft.
Steelhead Trout	Juvenile Rearing	1,593 ft.
Steelhead Trout	Spawning	843 ft.
Steelhead Trout	Presence/Migration	8 ft.

The Chehalis River – Aberdeen Reach is designated under the ESA as critical habitat for bull trout (75 FR 63898). The reach provides freshwater and marine foraging, migration, and overwintering habitat outside of the Hoh, Queets, and Quinault core areas where breeding populations occur.

Coastal resident trout use habitats in nearly all of the shoreline jurisdictions, and both the cutthroat and rainbow trout are WDFW designated priority species due to their recreational value.

Olympic mudminnow (*Novumbra hubbsi*) presence is not well documented throughout the cities' shoreline jurisdiction; however, their range includes all the cities' freshwater shorelines. Their typical environment includes slow-moving streams, wetlands, ponds, ditches, or sloughs with muddy substrate, still or slow moving water, and areas with abundant aquatic vegetation. Wetland protection is considered essential for the conservation of the species (WDFW 2013b).

The lower estuarine waters of the Chehalis River are a common foraging area for harbor seals.

Bald eagles are present throughout the cities' shorelines and have been observed perching on natural and human-made structures throughout the shoreline jurisdiction.

Priority areas for peregrine falcons are designated along much of the undeveloped north shoreline of the Chehalis River in Aberdeen. There are approximately 19 acres of Peregrine Falcon habitat in this reach.

F. Critical Aquifer Recharge Areas

Critical aquifer recharge areas have not been mapped in the cities. There are no known wellhead protection areas in the cities or their shoreline jurisdictions (WDOH 2014b). Where no specific studies have been done, the cities may use existing soil and surficial geologic information to determine where recharge areas exist. To determine the threat to groundwater quality, existing land use activities and their potential to lead to contamination should be evaluated (WAC 365-190-100). Critical aquifer recharge areas may be present and require protection in the shoreline jurisdiction but none has been identified in the cities at the time of this inventory and characterization report.

2.04 REACH 4 – FRY CREEK - ABERDEEN

The Fry Creek - Aberdeen Reach (WRIA 22 – the Lower Chehalis Watershed) is approximately 22 acres in area. Land cover is comprised of 46 percent medium intensity development, 41 percent low intensity development, and 13 percent high intensity development. 66.4 percent (14.89 acres) of the Fry Creek - Aberdeen Reach is in public ownership.

2.04.01 SHORELINE CHARACTERISTICS

The Fry Creek – Aberdeen Reach extends to the north from the eastern portion of Grays Harbor North Bank Reach into the city of Aberdeen. The shoreline has been extensively modified throughout its history to make the surrounding area suitable for development, which is primarily comprised of industrial uses.

2.04.02 LAND USE

Fry Creek Reach – Aberdeen is an industrial reach that ranges from standard to light industrial land uses. The current land use patterns found in the Fry Creek - Aberdeen Reach are provided in Table 2-8 below.

Table 2-8. Current Land Use Patterns for the Fry Creek - Aberdeen Reach.

Current Land Use Patterns	Percentage of Reach
Industrial	100%

Land Cover	Percentage of Reach
Medium Intensity Development	45.9%
Low Intensity Development	40.7%
High Intensity Development	13.4%

The zoning designations from AMC Title 17 – Zoning found in the Fry Creek – Aberdeen Reach are provided in Table 2-11 below.

Table 2-9. Current Zoning Designations for the Fry Creek - Aberdeen Reach.

Description	Symbol	Typical Uses	Percentage of Reach
Industrial	I	Manufacturing, light manufacturing, processing, light processing, light assembly, fabricating, and light fabrication and industrial activities all within a building; equipment, heavy equipment sales, repair and rentals, auto and truck rental, repair and servicing within a building, exterior storage of goods and equipment, shipping terminals, truck terminals, materials movement facilities, and docks, wharfs, marine terminals, and	87.5%

Description	Symbol	Typical Uses	Percentage of Reach
		contractors yards; warehousing, indoor and outdoor storage, wholesale sales, industrial sales, building and industrial material retail sales, and retail sales accessory to a related permitted or conditional use; kennels and animal hospitals; service stations; laboratories and industrial research facilities.	
Light Industrial	LI	Light manufacturing, light processing, light assembly and light fabrication; warehousing, wholesale sales, industrial sales, building and industrial material retail sales, retail sales accessory to a related permitted or conditional use; equipment, auto and truck rental, repair and servicing within a building; laboratories and industrial research facilities; restaurants accessory to a permitted use; truck terminals, shipping terminals, docks and contractors yards.	12.5%

2.04.03 EXISTING PUBLIC ACCESS

There is no existing public access to shorelines in the Fry Creek - Aberdeen Reach.

2.04.04 SHORELINE MODIFICATIONS

Shoreline modifications present in the Fry Creek – Aberdeen Reach are limited to eight tide gates and one partial road crossing blockage. There is no visible or identified shoreline armoring.

2.04.05 ECOLOGICAL FUNCTIONS

The Fry Creek - Aberdeen Reach scored low on the functional assessment. The reach is highly altered by development and by reduced vegetative conditions. The shoreline lacks channel complexity and connectivity with key habitats, and shoreline functions are likely impaired by tide gates. The channel is constructed in historical fill and the reach is dominated by

impervious surface associated with industrial uses. Wetlands are not mapped within the reach and, if present, are likely limited to the creek channel itself or a narrow margin along its edge. Fry Creek likely once meandered throughout the city, prior to substantial fill, development, and channelization. Therefore, a channel migration zone is no longer present in this constructed channel and floodplain.

A. Geologically Hazardous Areas

The majority, or 96 percent, of the area within the Fry Creek - Aberdeen Reach is subject to moderate to high risk of liquefaction hazards based on the soil characteristics. The entire extents of the reach are within the mapped Cascadia Scenario 1A seismic hazard area. There are no landslide hazard areas mapped within the reach.

B. Flood Hazard Areas

Nineteen percent of the Fry Creek - Aberdeen Reach is within the 100-year floodplain.

C. Wetlands

There are no identified wetlands within the Fry Creek – Aberdeen Reach.

D. Streams

Instream priority habitats exist within the Fry Creek - Aberdeen Reach, and serve as areas where a combination of physical, biological, and chemical processes and conditions interact to provide functional life history requirements for instream fish and wildlife resources.

E. Other Fish and Wildlife Habitat Conservation Areas

The following fish have been identified within the Fry Creek - Aberdeen Reach, with their associated habitat type and length of documented presence listed below:

Fish Species	Habitat Type	Documented Presence
Coast Resident Cutthroat	Presence/Migration	532 ft.
Coho Salmon	Juvenile Rearing	532 ft.

Coastal resident trout use habitats in nearly all of the shoreline jurisdictions, and both the cutthroat and rainbow trout are WDFW designated priority species due to their recreational value.

Olympic mudminnow (*Novumbra hubbsi*) presence is not well documented throughout the cities' shoreline jurisdictions, however their range includes all the cities' freshwater shorelines. Their typical environment includes slow-moving streams, wetlands, ponds,

ditches, or sloughs with muddy substrate, still or slow moving water, and areas with abundant aquatic vegetation. Wetland protection is considered essential for the conservation of the species (WDFW 2013b).

Bald eagles are present throughout the cities' shorelines and have been observed perching on natural and human-made structures throughout the shoreline jurisdiction. There are approximately 2 acres of Peregrine Falcon habitat in this reach.

F. Critical Aquifer Recharge Areas

Critical aquifer recharge areas have not been mapped in the cities. There are no known wellhead protection areas in the cities or their shoreline jurisdictions (WDOH 2014b). Where no specific studies have been done, the cities may use existing soil and surficial geologic information to determine where recharge areas exist. To determine the threat to groundwater quality, existing land use activities and their potential to lead to contamination should be evaluated (WAC 365-190-100). Critical aquifer recharge areas may be present and require protection in the shoreline jurisdiction but none has been identified in the cities at the time of this inventory and characterization report.

2.05 REACH 5 – GRAYS HARBOR NORTH BANK

The Grays Harbor North Bank Reach (WRIA 22 – the Lower Chehalis Watershed) is approximately 414 acres in area. Land cover is comprised of 76 percent open water, seven percent low intensity development, six percent medium intensity development, five percent high intensity development, three percent barren land, three percent herbaceous, and less than one percent emergent herbaceous wetlands and shrub/scrub. Six percent (22 acres) of the Grays Harbor North Bank Reach is in public ownership.

2.05.01 SHORELINE CHARACTERISTICS

The Grays Harbor North Bank Reach runs adjacent to the northern bank of Aberdeen's shoreline along the Chehalis River as it spills into Grays Harbor. Two other reaches, Fry Creek – Aberdeen and Chehalis River – Aberdeen, feed directly into this reach. The shoreline has been extensively modified and armored.

2.05.02 LAND USE

Grays Harbor North Bank Reach is used as industrial land; industrial land with buildings; commercial land; churches; and other water systems transportation, communication, and utilities.

The current land use patterns found in the Grays Harbor North Bank Reach are provided in Table 2-10 below.

Table 2-10. Current Land Use Patterns for the Grays Harbor North Bank Reach.

Current Land Use Patterns	Percentage of Reach
Industrial	67.3%
Commercial	24.8%
Public Services	5.1%
Transportation/Communication/Utilities	2.3%
Manufacturing	0.4%

Land Cover	Percentage of Reach
Open Water	75.7%
Low Intensity Development	6.5%
Medium Intensity Development	5.6%
High Intensity Development	5.2%
Barren Land	3%
Herbaceous	2.5%
Emergent Herbaceous Wetlands	0.8%
Shrub/Scrub	0.7%

The zoning designations from AMC Title 17 – Zoning found in the Grays Harbor North Bank Reach are provided in Table 2-11 below.

Table 2-11. Current Zoning Designations for the Grays Harbor North Bank Reach.

Description	Symbol	Typical Uses	Percentage of Reach
Industrial	I	Manufacturing, light manufacturing, processing, light processing, light assembly, fabricating, and light fabrication and industrial activities all within a building; equipment, heavy equipment sales, repair and rentals, auto and truck rental, repair and servicing within a building, exterior storage of goods and equipment, shipping terminals, truck terminals, materials movement facilities, and docks,	75.2%

Description	Symbol	Typical Uses	Percentage of Reach
		wharfs, marine terminals, and contractors yards; warehousing, indoor and outdoor storage, wholesale sales, industrial sales, building and industrial material retail sales, and retail sales accessory to a related permitted or conditional use; kennels and animal hospitals; service stations; laboratories and industrial research facilities.	
Light Industrial	LI	Light manufacturing, light processing, light assembly and light fabrication; warehousing, wholesale sales, industrial sales, building and industrial material retail sales, retail sales accessory to a related permitted or conditional use; equipment, auto and truck rental, repair and servicing within a building; laboratories and industrial research facilities; restaurants accessory to a permitted use; truck terminals, shipping terminals, docks and contractors yards.	24.8%

2.05.03 EXISTING PUBLIC ACCESS

There is no existing public access to shorelines in the Grays Harbor North Bank Reach.

2.05.04 SHORELINE MODIFICATIONS

Much of the north shore of Grays Harbor waterfront has been filled in the past and subsequently armored. Tide gates placed throughout the reach are necessary to prevent marine or river inundation of developed areas during high water events. These gates are most likely at least a partial barrier to fish, though most stormwater infrastructure does not provide access to valuable habitat.

Table 2-12 lists shoreline modifications observed on aerial photographs in the course of doing reach functional assessments. Comprehensive information on shoreline modifications is not available for this reach.

Table 2-12. Grays Harbor North Bank Reach Shoreline Modifications.

Shoreline Modifications
1,514 feet of concrete bulkhead
7,652 feet of landfill
2,000 feet of rip rap
550 feet of wooden bulkhead
8 tide gates
1 total road crossing blockage

2.05.05 ECOLOGICAL FUNCTIONS

The Grays Harbor North Bank Reach scored low on the function assessment, due to extensive industrial development and shoreline modifications that reduce many of the functions provided by native vegetation and wetlands that would occur with less developed conditions. The shoreline lacks significant wetlands and nearshore vegetation. A patchy distribution of dunegrass is mapped along the shoreline west of Fry Creek. Portions of the reach are listed as Category 2 for water quality concerns related to various pollutants. These include areas near Fry Creek and downstream of the Chehalis River Bridge. Although functions in the reach are relatively impaired due to historical filling and development, the reach is an important migration corridor for salmon that migrate from the Chehalis River and its tributaries to the Pacific Ocean.

A. Geologically Hazardous Areas

Thirteen percent of the area within the Grays Harbor North Bank Reach is subject to moderate to high risk of liquefaction hazards based on the soil characteristics. Sixteen percent of the reach is within the mapped Cascadia Scenario 1A seismic hazard area. There are no landslide hazard areas mapped within the reach.

B. Flood Hazard Areas

Thirty-five percent of the Grays Harbor North Bank Reach is within the 100-year floodplain.

C. Wetlands

There are no identified wetlands within the Grays Harbor North Bank Reach.

D. Streams

There are no river or stream features within the Grays Harbor North Bank Reach that qualify as an instream habitat area. The shorelines within this reach are more closely associated with marine habitats and ecological processes, however, since the entire

shoreline jurisdiction is dominated by river and stream water features, there is a close ecological association with nearby instream habitats.

E. Other Fish and Wildlife Habitat Conservation Areas

The following fish have been identified within the Grays Harbor North Bank Reach, with their associated habitat type and length of documented presence listed below:

Fish Species	Habitat Type	Documented Presence
Coast Resident Cutthroat	Presence/Migration	195 ft.
Coho Salmon	Juvenile Rearing	214 ft.
Bull Trout	Presence/Migration	N/A
Chinook Salmon	Presence/Migration	N/A
Chum Salmon	Presence/Migration	N/A
Steelhead Trout	Presence/Migration	N/A

The Grays Harbor North Bank Reach is designated under the ESA as critical habitat for bull trout (75 FR 63898). The reach provides freshwater and marine foraging, migration, and overwintering habitat outside of the Hoh, Queets, and Quinault core areas where breeding populations occur.

Coastal resident trout use habitats in nearly all of the shoreline jurisdictions, and both the cutthroat and rainbow trout are WDFW designated priority species due to their recreational value.

Olympic mudminnow (*Novumbra hubbsi*) presence is not well documented throughout the cities' shoreline jurisdictions, however their range includes all the cities' freshwater shorelines. Their typical environment includes slow-moving streams, wetlands, ponds, ditches, or sloughs with muddy substrate, still or slow moving water, and areas with abundant aquatic vegetation. Wetland protection is considered essential for the conservation of the species (WDFW 2013b).

Forage fish spawning areas including sand lance, smelt, and herring spawning are mapped just outside of the Grays Harbor North Bank Reach, but they may indirectly support eelgrass and coastal nearshore habitat in the shoreline jurisdiction by providing water quality and rearing habitat for larvae and juvenile forage fish. Additionally, local studies, including site-specific investigations for individual project reviews, may result in the identification of known or potential spawning habitats that have not yet been identified and mapped.

Numerous species of groundfish and rockfish are state priority species and may be present in Grays Harbor. Marine shorelines in Grays Harbor are designated EFH for English sole (*Pleuronectes vetulus*) and black rockfish (*Sebastes melanops*). Although groundfish and rockfish are more likely to use habitat in the outer harbor and offshore areas due to their habitat preferences, their presence within the shoreline jurisdiction has been identified.

Bald eagles are present throughout the cities' shorelines and have been observed perching on natural and human-made structures throughout the shoreline jurisdiction.

Common loons (*Gavia immer*), a state sensitive species, are regularly observed foraging for fish in the cities' marines shorelines, including the Grays Harbor North Bank Reach. Other priority marine birds such as brown pelican (*Pelecanus occidentalis*), listed as endangered in the state, may occasionally enter the cities' shoreline areas during migration or foraging forays, although their presence is limited and regular concentrations are not mapped by WDFW.

F. Critical Aquifer Recharge Areas

Critical aquifer recharge areas have not been mapped in the cities. There are no known wellhead protection areas in the cities or their shoreline jurisdictions (WDOH 2014b). Where no specific studies have been done, the cities may use existing soil and surficial geologic information to determine where recharge areas exist. To determine the threat to groundwater quality, existing land use activities and their potential to lead to contamination should be evaluated (WAC 365-190-100). Critical aquifer recharge areas may be present and require protection in the shoreline jurisdiction but none has been identified in the cities at the time of this inventory and characterization report.

2.06 REACH 6 – GRAYS HARBOR SOUTH BANK

The Grays Harbor South Bank Reach (WRIA 22 – the Lower Chehalis Watershed) is approximately 603.4 acres in area. Land cover is comprised of 50 percent open water, 20 percent emergent herbaceous wetlands, 12 percent woody wetlands, 11 percent barren lands, two percent herbaceous, two percent low intensity development, two percent developed open space, and less than one percent of shrub/scrub, medium intensity development, and high intensity development. Ten percent of the Grays Harbor South Bank Reach is in public ownership.

2.06.01 SHORELINE CHARACTERISTICS

The Grays Harbor South Bank Reach runs adjacent to the southern bank of Aberdeen's shoreline along the Chehalis River as it spills into Grays Harbor. There is less development in this reach than the North Bank, but there are still modifications and armoring present throughout the shoreline.

2.06.02 LAND USE

Grays Harbor South Bank Reach is zoned primarily for Industrial use. The current land use patterns found in the Grays Harbor South Bank Reach are provided in Table 2-13 below.

Table 2-13. Current Land Use Patterns for the Grays Harbor South Bank Reach.

Current Land Use Patterns	Percentage of Reach
Industrial	90.4%
Vacant/Undeveloped	4.7%
Residential	2.7%
Transportation/Communication/Utilities	1%
Commercial	0.6%
Cultural/Entertainment/Recreational	0.4%
Manufacturing	0.1%
Parks/Open Space	0.1%

Land Cover	Percentage of Reach
Open Water	49.9%
Emergent Herbaceous Wetlands	19.8%
Woody Wetlands	12.3%
Barren Lands	10.6%
Herbaceous	2.4%
Low Intensity Development	2.3%
Developed Open Space	2.2%
Shrub/Scrub	0.4%
Medium Intensity Development	0.1%
High Intensity Development	0.1%

The zoning designations from AMC Title 17 – Zoning found in the Grays Harbor South Bank Reach are provided in Table 2-14 below.

Table 2-14. Current Zoning Designations for the Grays Harbor South Bank Reach.

Description	Symbol	Typical Uses	Percentage of Reach
Industrial	I	Manufacturing, light manufacturing, processing, light processing, light assembly, fabricating, and light fabrication and industrial activities all within a building; equipment, heavy equipment sales, repair and rentals, auto and truck rental, repair and servicing within a building, exterior storage of goods and equipment, shipping terminals, truck terminals, materials movement facilities, and docks, wharfs, marine terminals, and contractors yards; warehousing, indoor and outdoor storage, wholesale sales, industrial sales, building and industrial material retail sales, and retail sales accessory to a related permitted or conditional use; kennels and animal hospitals; service stations; laboratories and industrial research facilities.	89.1%
Single Family Residential	RS	Single-family dwellings; mobile homes; home day care.	6.6%
Light Industrial	LI	Light manufacturing, light processing, light assembly and light fabrication; warehousing, wholesale sales, industrial sales, building and industrial material retail sales, retail sales accessory to a related permitted or conditional use; equipment, auto and truck rental, repair and servicing within a building; laboratories and industrial research facilities; restaurants accessory to a permitted use; truck terminals, shipping terminals, docks and contractors yards.	2%

Description	Symbol	Typical Uses	Percentage of Reach
Commercial/ Residential	CR	Personal and professional services and offices; retail sales within a building; single-family dwellings; multiple-family dwellings; duplexes and townhomes; hotels, motels, bed and breakfast inns, and meeting rooms and facilities; child care facilities; kennels and animal hospitals.	1.8%
General Commercial	CG	Retail sales; personal, professional and business services; financial services; offices; eating and drinking establishments; food processing and baking for retail sales on premises; automobile repair services within a building and service stations; equipment repair and servicing within a building; recycling drop boxes; parking lots and parking structures; parks, recreation centers, public buildings, colleges and other public and semipublic uses.	0.5%

2.06.03 EXISTING PUBLIC ACCESS

There is no existing public access to shorelines in the Grays Harbor South Bank Reach.

2.06.04 SHORELINE MODIFICATIONS

The south shore of Grays Harbor within the Aberdeen shoreline jurisdiction is not as intensely developed as the north shore, and it requires less shoreline armoring and modification. There are levee systems in place that protect the city from both riverine and marine floods. Tide gates placed throughout the reach are necessary to prevent marine or river inundation of developed areas during high water events. These gates are most likely at least a partial barrier to fish, though most stormwater infrastructure does not provide access to valuable habitat.

Table 2-15 lists the total length of dikes and levees for reaches where they are found in the available data, along with other shoreline modifications observed on aerial photographs in the course of doing reach functional assessments. Comprehensive information on shoreline modifications other than dikes and levees is not available for this reach.

Table 2-15. Grays Harbor South Bank Reach Shoreline Modifications.

Sum of Dike and Levee Length (feet)	Other Shoreline Modifications
3,385	500 feet of landfill
	6 tide gates
	1 partial road crossing blockage

2.06.05 ECOLOGICAL FUNCTIONS

The Grays Harbor South Bank Reach scored moderate on the functional assessment, due to similar impairments as the north bank. However, it is less developed and it retains important vegetative characteristics. Eelgrass (1.7 miles) and saltmarsh habitat (3.1 miles) extend throughout most of the reach's 3.3-mile-long estuarine shoreline. The reach's total length (11 miles) includes associated forested and shrub wetlands in the floodplain, which likely provide water quality and habitat functions.

The riparian areas in the reach are relatively well connected with other habitats such as Charley Creek, Newkah Creek, and forested upland areas outside the shoreline jurisdiction. Like the north bank, this reach is likely a key migration corridor for salmon. The area between the Cosmo Specialty Fiber settling ponds and the US-101 Bridge is likely a key habitat area for fish and other wildlife due to its undeveloped and well-vegetated condition, and the presence of significant LWD.

A. Geologically Hazardous Areas

Nearly half of the area within the Grays Harbor South Bank Reach is subject to moderate to high risk of liquefaction hazards based on the soil characteristics, and nearly half of the reach is within the mapped Cascadia Scenario 1A seismic hazard area. There are no landslide hazard areas mapped within the reach.

B. Flood Hazard Areas

Forty percent of the Grays Harbor South Bank Reach is within the 100-year floodplain.

C. Wetlands

There are approximately 328 acres of identified wetlands within the Grays Harbor South Bank Reach, comprising 54 percent of the reach.

D. Streams

There are no river or stream features within the Grays Harbor South Bank Reach that qualify as an instream habitat area. The shorelines within this reach are more closely associated with marine habitats and ecological processes, however, since the entire

shoreline jurisdiction is dominated by river and stream water features, there is a close ecological association with nearby instream habitats.

E. Other Fish and Wildlife Habitat Conservation Areas

The following fish have been identified within the Grays Harbor South Bank Reach, with their associated habitat type and length of documented presence listed below:

Fish Species	Habitat Type	Documented Presence
Coast Resident Cutthroat	Presence/Migration	195 ft.
Coho Salmon	Juvenile Rearing	214 ft.
Bull Trout	Presence/Migration	N/A
Chinook Salmon	Presence/Migration	N/A
Chum Salmon	Presence/Migration	N/A
Steelhead Trout	Presence/Migration	N/A

The Grays Harbor South Bank Reach is designated under the ESA as critical habitat for bull trout (75 FR 63898). The reach provides freshwater and marine foraging, migration, and overwintering habitat outside of the Hoh, Queets, and Quinault core areas where breeding populations occur.

Coastal resident trout use habitats in nearly all of the shoreline jurisdictions, and both the cutthroat and rainbow trout are WDFW designated priority species due to their recreational value.

Olympic mudminnow (*Novumbra hubbsi*) presence is not well documented throughout the cities' shoreline jurisdictions, however their range includes all the cities' freshwater shorelines. Their typical environment includes slow-moving streams, wetlands, ponds, ditches, or sloughs with muddy substrate, still or slow moving water, and areas with abundant aquatic vegetation. Wetland protection is considered essential for the conservation of the species (WDFW 2013b).

Forage fish spawning areas including sand lance, smelt, and herring spawning are mapped just outside of the Grays Harbor South Bank Reach, but they may indirectly support eelgrass and coastal nearshore habitat in the shoreline jurisdiction by providing water quality and rearing habitat for larvae and juvenile forage fish. Additionally, local studies, including site-specific investigations for individual project reviews, may result in the identification of known or potential spawning habitats that have not yet been identified and mapped.

Numerous species of groundfish and rockfish are state priority species and may be present in Grays Harbor. Marine shorelines in Grays Harbor are designated EFH for English sole (*Pleuronectes vetulus*) and black rockfish (*Sebastes melanops*). Although groundfish and rockfish are more likely to use habitat in the outer harbor and offshore areas due to their habitat preferences, their presence within the shoreline jurisdiction has been identified.

Bald eagles are present throughout the cities' shorelines and have been observed perching on natural and human-made structures throughout the shoreline jurisdiction.

Common loons (*Gavia immer*), a state sensitive species, are regularly observed foraging for fish in the cities' marines shorelines, including the Grays Harbor South Bank Reach. Other priority marine birds such as brown pelican (*Pelecanus occidentalis*), listed as endangered in the state, may occasionally enter the cities' shoreline areas during migration or foraging forays, although their presence is limited and regular concentrations are not mapped by WDFW.

F. Critical Aquifer Recharge Areas

Critical aquifer recharge areas have not been mapped in the cities. There are no known wellhead protection areas in the cities or their shoreline jurisdictions (WDOH 2014b). Where no specific studies have been done, the cities may use existing soil and surficial geologic information to determine where recharge areas exist. To determine the threat to groundwater quality, existing land use activities and their potential to lead to contamination should be evaluated (WAC 365-190-100). Critical aquifer recharge areas may be present and require protection in the shoreline jurisdiction but none has been identified in the cities at the time of this inventory and characterization report.

2.07 REACH 7 – NEWSKAH CREEK

The Newskah Creek Reach (WRIA 22 – the Lower Chehalis Watershed) is approximately 12 acres in area. Land cover is comprised of 53 percent woody wetlands, 31 percent emergent herbaceous wetlands, seven percent barren land, six percent shrub/scrub, four percent herbaceous, and less than one percent of low intensity development. Nearly 100 percent of the Newskah Creek Reach is in public ownership, with 69 percent of public land owned by the city of Aberdeen and 31 percent owned by the WDFW.

2.07.01 SHORELINE CHARACTERISTICS

The Newskah Creek Reach is located along the southwestern boundary of the city flows into the Grays Harbor South Bank Reach. The reach is zoned almost entirely industrial, but has seen very little development. The most prevalent use currently in the reach is the Bishop Athletic Complex, a large recreational area consisting of multiple soccer and ball fields.

2.07.02 LAND USE

The Newskah Creek Reach is primarily covered by a restored estuarine riparian area. The reach includes portions of the Bishop Athletic Complex. The 38-acre complex will include four full size soccer fields, two softball fields, and one full sized baseball field when completed.

The current land use patterns found in the Newskah Creek Reach are provided in Table 2-16 below.

Table 2-16. Current Land Use Patterns for the Newskah Creek Reach.

Current Land Use Patterns	Percentage of Reach
Parks/Open Space	69.2%
Industrial	30.8%

Land Cover	Percentage of Reach
Woody Wetlands	53.1%
Emergent herbaceous Wetlands	30.5%
Barren Land	6.8%
Shrub/Scrub	5.8%
Herbaceous	3.5%
Low Intensity Development	0.4%

The zoning designations from AMC Title 17 – Zoning found in the Newskah Creek Reach are provided in Table 2-17 below.

Table 2-17. Current Zoning Designations for the Newskah Creek Reach.

Description	Symbol	Typical Uses	Percentage of Reach
Industrial	I	Manufacturing, light manufacturing, processing, light processing, light assembly, fabricating, and light fabrication and industrial activities all within a building; equipment, heavy equipment sales, repair and	99.8%

Description	Symbol	Typical Uses	Percentage of Reach
		rentals, auto and truck rental, repair and servicing within a building, exterior storage of goods and equipment, shipping terminals, truck terminals, materials movement facilities, and docks, wharfs, marine terminals, and contractors yards; warehousing, indoor and outdoor storage, wholesale sales, industrial sales, building and industrial material retail sales, and retail sales accessory to a related permitted or conditional use; kennels and animal hospitals; service stations; laboratories and industrial research facilities.	
Single Family Residential	RS	Single-family dwellings; mobile homes; home day care.	0.2%

2.07.03 EXISTING PUBLIC ACCESS

There is no existing public access to shorelines in the Newskah Creek Reach.

2.07.04 SHORELINE MODIFICATIONS

A limited amount, or 610 feet, of riprap shoreline armoring is present in the Newskah Creek Reach, as observed on aerial photographs in the course of doing reach functional assessments. Comprehensive information on shoreline modifications other than dikes and levees is not available for this reach.

2.07.05 ECOLOGICAL FUNCTIONS

The Newskah Creek Reach scored high on the functional assessment. The only criteria with a low rank are related to water-quality concerns including temperature and bacteria. The stream is listed on the state 303(d) list as Category 2 for temperature, indicating evidence of a water-quality problem, but not enough to require a water-quality improvement project such as a total maximum daily load (TMDL). The stream is Category 4A for bacteria, meaning it has a pollution problem, but a TMDL is in place and being implemented to improve the water quality. These water-quality concerns suggest that water-quality functions may be impaired in the stream. However, the reach ranked higher for other criteria used to indicate water-quality functions.

The stream has natural surface water exchange and dilution patterns, and good coverage by emergent vegetation (31 percent) and woody wetland (53 percent) land cover types. Sixty percent of the reach is mapped as wetland in the NWI. The reach includes a restoration site in the floodplain and riparian buffer between the creek and the adjacent Bishop Athletic Complex. The floodplain side channel and LWD in the restored floodplain provide a complex habitat structure that supports a variety of species. Newkah Creek channel migration is dominated by marine flooding events that extend throughout the lower portions of the creek, including the reach in Aberdeen's shoreline jurisdiction. Few shoreline modifications (fill in 6 percent of the reach) and vegetated, undeveloped conditions indicate a high level of function in the reach.

A. *Geologically Hazardous Areas*

All of the area within the Newkah Creek Reach is subject to moderate to high risk of liquefaction hazards based on the soil characteristic. The entire extents of the reach are within the mapped Cascadia Scenario 1A seismic hazard area. There are no landslide hazard areas mapped within the reach.

B. *Flood Hazard Areas*

Nearly 75 percent of the Newkah River Reach is within the 100-year floodplain.

C. *Wetlands*

Approximately 7 acres of identified wetlands are found in the Newkah Creek Reach, comprising 60 percent of the total reach area.

D. *Streams*

Instream priority habitats exist within the Newkah Creek Reach, and serve as areas where a combination of physical, biological, and chemical processes and conditions interact to provide functional life history requirements for instream fish and wildlife resources.

E. *Other Fish and Wildlife Habitat Conservation Areas*

No fish or wildlife species have been directly identified within the Newkah Creek Reach, but ecological functions present throughout the reach certainly maintain natural processes that support fish and other wildlife.

Coastal resident trout use habitats in nearly all of the shoreline jurisdictions, and both the cutthroat and rainbow trout are WDFW designated priority species due to their recreational value.

Olympic mudminnow (*Novumbra hubbsi*) presence is not well documented throughout the cities' shoreline jurisdictions, however their range includes all the cities' freshwater shorelines. Their typical environment includes slow-moving streams, wetlands, ponds, ditches, or sloughs with muddy substrate, still or slow moving water, and areas with abundant aquatic vegetation. Wetland protection is considered essential for the conservation of the species (WDFW 2013b).

Bald eagles are present throughout the cities' shorelines and have been observed perching on natural and human-made structures throughout the shoreline jurisdiction.

F. Critical Aquifer Recharge Areas

Critical aquifer recharge areas have not been mapped in the cities. There are no known wellhead protection areas in the cities or their shoreline jurisdictions (WDOH 2014b). Where no specific studies have been done, the cities may use existing soil and surficial geologic information to determine where recharge areas exist. To determine the threat to groundwater quality, existing land use activities and their potential to lead to contamination should be evaluated (WAC 365-190-100). Critical aquifer recharge areas may be present and require protection in the shoreline jurisdiction but none has been identified in the cities at the time of this inventory and characterization report.

2.08 REACH 8 – WEDEKIND CONFLUENCE

The Wedekind Confluence Reach (WRIA 22 – the Lower Chehalis Watershed) is approximately 45.25 acres in area. Land cover is comprised of 29 percent developed open space, 28 percent emergent herbaceous wetlands, 2 woody wetlands, seven percent hay/pasture, six percent evergreen forest, four percent low intensity development, two percent deciduous forest, and two percent shrub/scrub. Nearly 90 percent of the Wedekind Confluence Reach is owned by the city of Aberdeen.

2.08.01 SHORELINE CHARACTERISTICS

The Wedekind Confluence Reach is located to the north-west of the Aberdeen at the convergence of Wedekind Creek and Wynoochee River. The majority of the reach is undeveloped and covered by forest and wetlands. The city has a water diversion facility located in this reach, which impacts the ecological functions of the shoreline.

2.08.02 LAND USE

Wedekind Confluence Reach is primarily forested and undisturbed riparian areas. The current land use patterns found in the Wedekind Confluence Reach are provided in Table 2-18 below.

Table 2-18. Current Land Use Patterns for the Wedekind Confluence Reach.

Current Land Use Patterns	Percentage of Reach
Transportation/Communication/Utilities	90.2%
Vacant/Undeveloped	9.7%
Cultural/Entertainment/Recreational	0.1%

Land Cover	Percentage of Reach
Developed Open Space	29.1%
Emergent Herbaceous Wetlands	28.4%
Woody Wetlands	21.4%
Hay/Pasture	7.4%
Evergreen Forest	5.5%
Low Intensity Development	4.3%
Deciduous Forest	2.2%
Shrub/Scrub	1.7%

The zoning designations from AMC Title 17 – Zoning found in the Wedekind Confluence Reach are provided in Table 2-19 below.

Table 2-19. Current Zoning Designations for the Wedekind Confluence Reach.

Description	Symbol	Typical Uses	Percentage of Reach
Industrial	I	Manufacturing, light manufacturing, processing, light processing, light assembly, fabricating, and light fabrication and industrial activities all within a building; equipment, heavy equipment sales, repair and rentals, auto and truck rental, repair and servicing within a building, exterior storage of goods and equipment, shipping terminals, truck terminals, materials movement facilities, and docks, wharfs, marine terminals, and	99.9%

Description	Symbol	Typical Uses	Percentage of Reach
		contractors yards; warehousing, indoor and outdoor storage, wholesale sales, industrial sales, building and industrial material retail sales, and retail sales accessory to a related permitted or conditional use; kennels and animal hospitals; service stations; laboratories and industrial research facilities.	
Single Family Residential	RS	Single-family dwellings; mobile homes; home day care.	0.1%

2.08.03 EXISTING PUBLIC ACCESS

There is no existing public access to shorelines in the Wedekind Confluence Reach.

2.08.04 SHORELINE MODIFICATIONS

Although not present within the reach itself, a water supply diversion dam on the Wynoochee River has caused upstream deposition, which has initiated significant river migration upstream from the dam. There are no other shoreline modifications in the reach.

2.08.05 ECOLOGICAL FUNCTIONS

The Wedekind Confluence Reach exhibits stream related hydrologic functions including flood protection and support of base flows. The reach scored moderate or high in most categories, with a relatively high rank overall on the functional assessment. Functions may be limited due to vegetation conditions and altered shoreline, primarily associated with the city's water diversion facility. The floodway, 100-year floodplain, and wetlands dominate the reach; and there is good connectivity between various habitats within and adjacent to the shoreline jurisdiction. Although the historical channel migration zone here is not formally mapped, it likely extends from Wynoochee Valley Road in the east to the valley wall in the west.

A. Geologically Hazardous Areas

Sixty-nine of the area within the Wedekind Confluence Reach is subject to moderate to high risk of liquefaction hazards based on the soil characteristics. There are no landslide hazard areas mapped within the reach. The entire extents of the reach are outside the mapped Cascadia Scenario 1A seismic hazard area.

B. Flood Hazard Areas

Ninety-three percent of the Wedekind Confluence Reach is within the 100-year floodplain.

C. Wetlands

Approximately 12 acres of identified wetlands are within the Wedekind Confluence Reach, comprising 26 percent of the reach's total area.

D. Streams

Instream priority habitats exist within the Wedekind Confluence Reach, and serve as areas where a combination of physical, biological, and chemical processes and conditions interact to provide functional life history requirements for instream fish and wildlife resources.

E. Other Fish and Wildlife Habitat Conservation Areas

The following fish have been identified within the Wedekind Confluence Reach, with their associated habitat type and length of documented presence listed below:

Fish Species	Habitat Type	Documented Presence
Bull Trout	Presence/Migration	1,628 ft.
Chinook Salmon	Spawning	1,628 ft.
Chum Salmon	Spawning	1,628 ft.
Coast Resident Cutthroat	Presence/Migration	3,610 ft.
Coho Salmon	Spawning	3,610 ft.
Steelhead Trout	Spawning	1,628 ft.
Steelhead Trout	Presence/Migration	1,628 ft.

Coastal resident trout use habitats in nearly all of the shoreline jurisdictions, and both the cutthroat and rainbow trout are WDFW designated priority species due to their recreational value.

Olympic mudminnow (*Novumbra hubbsi*) presence is not well documented throughout the cities' shoreline jurisdictions, however their range includes all the cities' freshwater shorelines. Their typical environment includes slow-moving streams, wetlands, ponds, ditches, or sloughs with muddy substrate, still or slow moving water, and areas with abundant aquatic vegetation. Wetland protection is considered essential for the conservation of the species (WDFW 2013b).

Harlequin duck priority habitat areas are mapped in within the Wedekind Confluence Reach. There are approximately 45 acres of Harlequin Duck habitat located in this reach.

F. Critical Aquifer Recharge Areas

Critical aquifer recharge areas have not been mapped in the cities. There are no known wellhead protection areas in the cities or their shoreline jurisdictions (WDOH 2014b). Where no specific studies have been done, the cities may use existing soil and surficial geologic information to determine where recharge areas exist. To determine the threat to groundwater quality, existing land use activities and their potential to lead to contamination should be evaluated (WAC 365-190-100). Critical aquifer recharge areas may be present and require protection in the shoreline jurisdiction but none has been identified in the cities at the time of this inventory and characterization report.

2.09 REACH 9 – WISHKAH RIVER

The Wishkah River Reach (WRIA 22 – the Lower Chehalis Watershed) is approximately 211 acres in area. Land cover is comprised of 24 percent low intensity development, 17 percent woody wetlands, 13 percent developed open space, 13 percent barren land, 10 percent medium intensity development, seven percent emergent herbaceous wetlands, five percent evergreen forest, five percent high intensity development, four percent open water, and less than one percent deciduous forest and mixed forest. Six percent of the Wishkah River Reach is in public ownership. Public landowners include the city of Aberdeen, Grays Harbor County, and the Port of Grays Harbor.

2.09.01 SHORELINE CHARACTERISTICS

The Wishkah River Reach extends north through Aberdeen from the Chehalis River – Aberdeen Reach. There are multiple modifications present throughout the shoreline, which are related to the development intensity that occurs adjacent to the reach. Much of the land in the reach contains wetlands, which account for the majority of the vacant and undeveloped land.

2.09.02 LAND USE

Wishkah River Reach is mostly undeveloped land, platted land, and single-family households. The east shore of the Wishkah River contains a significant segment of undeveloped, forested shorelands.

The current land use patterns found in the Wishkah River Reach are provided in Table 2-20 below.

Table 2-20. Current Land Use Patterns for the Wishkah River Reach.

Current Land Use Patterns	Percentage of Reach
Vacant/Undeveloped	56.2%
Residential	25.6%
Commercial	10.1%
Public Services	6.5%
Parks/Open Space	0.7%
Transportation/Communication/Utilities	0.5%
Industrial	0.2%
Manufacturing	0.2%

Land Cover	Percentage of Reach
Low Intensity Development	23.7%
Woody Wetlands	16.9%
Developed Open Space	13.4%
Barren Land	12.8%
Medium Intensity Development	10.1%
Emergent Herbaceous Wetlands	7.3%
Evergreen Forest	5.4%
High Intensity Development	5.3%
Open Water	3.8%
Deciduous Forest	0.7%
Mixed Forest	0.6%

The zoning designations from AMC Title 17 – Zoning found in the Wishkah River Reach are provided in Table 2-26 below.

Table 2-21. Current Zoning Designations for the Wishkah River Reach.

Description	Symbol	Typical Uses	Percentage of Reach
Multiple Family Residential	RM	Duplexes and townhomes; multiple-family dwellings; single-family dwellings; home day care and mini day care; mobile homes.	54.7%
Single Family	RS	Single-family dwellings; mobile	28.6%

Description	Symbol	Typical Uses	Percentage of Reach
Residential		homes; home day care.	
Waterfront Development	WD	Light manufacturing, fabrication and repair within a building; commercial marine uses including fuel service, docks, wharfs, shipyards, ways, passenger and ferry terminals; wholesale and retail sales within a building, and warehousing; personal, professional, financial and business services; farmers' markets; truck and equipment rental, repair and servicing within a building; eating and drinking establishments, outdoor cafes and restaurants, hotels, motels, meeting rooms facilities, convention centers; food processing and baking for retail sales on premises; multiple-family dwellings, residences in the upper floors of buildings, townhouses and residential cluster developments; child care facilities; public and semi-public uses, and related support services; kennels and animal hospitals; service stations.	13.6%
Light Industrial	LI	Light manufacturing, light processing, light assembly and light fabrication; warehousing, wholesale sales, industrial sales, building and industrial material retail sales, retail sales accessory to a related permitted or conditional use; equipment, auto and truck rental, repair and servicing within a building; laboratories and industrial research facilities; restaurants accessory to a permitted use; truck terminals, shipping terminals, docks and contractors yards.	1.8%
General Commercial	CG	Retail sales; personal, professional and business services; financial	1.3%

Description	Symbol	Typical Uses	Percentage of Reach
		services; offices; eating and drinking establishments; food processing and baking for retail sales on premises; automobile repair services within a building and service stations; equipment repair and servicing within a building; recycling drop boxes; parking lots and parking structures; parks, recreation centers, public buildings, colleges and other public and semipublic uses.	

2.09.03 EXISTING PUBLIC ACCESS

There is no existing public access to shorelines in the Wishkah River Reach.

2.09.04 SHORELINE MODIFICATIONS

The Wishkah River Reach has limited bulkhead armoring and multiple tide gates present throughout the shoreline. Table 2-22 lists shoreline modifications observed on aerial photographs in the course of doing reach functional assessments. Comprehensive information on shoreline modifications other than dikes and levees is not available for this reach.

Table 2-22. Wishkah River Reach Shoreline Modifications.

Shoreline Modifications
368 feet of wooden bulkhead
17 tide gates
1 partial road crossing blockage

2.09.05 ECOLOGICAL FUNCTIONS

Functions in The Wishkah River Reach are moderate based on the functional assessment, partly due to numerous docks, piling, bridge structures, bulkheads, tide gates, altered vegetation, and development throughout the reach. Channel and flow configuration is simple, and lacks LWD, limiting some of the hydrologic and habitat functions of the reach. The reach scored moderate in most categories, but stream channel and vegetation conditions impair some functions. Low-intensity development (24 percent of the reach) and medium-intensity development (10 percent) is spread throughout the reach.

There are significant areas of wetland (40 percent of the reach is mapped as wetland in the NWI), primarily in the northern portion of the lower segment of the reach. The wetlands are within the floodplain between the stream channel and Wishkah Road on the west side of the stream, and between the channel and Thomas Street on the east side of the stream. The channel migration zone of the Wishkah River reach has not been formally mapped, but it likely extends beyond the channel in the upstream portions of the reach where the floodplain wetlands are located. However, the historical channel migration zone does not extend into presently developed areas. The floodplain wetlands exhibit conditions to support a variety of functions provided by this reach, while more developed areas may provide relatively less function. The reach provides important habitat for a variety priority salmon and trout.

A. Geologically Hazardous Areas

Sixty-six percent of the area within the Wishkah River Reach is subject to moderate to high risk of liquefaction hazards based on the soil characteristics. Nearly 90 percent of the reach is within the mapped Cascadia Scenario 1A seismic hazard area. There are no landslide hazard areas mapped within the reach.

B. Flood Hazard Areas

The Wishkah River Reach has 80 percent of its total area within the 100-year floodplain.

C. Wetlands

Approximately 84 acres of identified wetlands exist within the Wishkah River Reach, comprising 40 percent of the reach's total area.

D. Streams

Instream priority habitats exist within the Wishkah River Reach, and serve as areas where a combination of physical, biological, and chemical processes and conditions interact to provide functional life history requirements for instream fish and wildlife resources.

E. Other Fish and Wildlife Habitat Conservation Areas

The following fish have been identified within the Wishkah River Reach, with their associated habitat type and length of documented presence listed below:

Fish Species	Habitat Type	Documented Presence
Bull Trout	Presence/Migration	10,438 ft.
Chinook Salmon	Juvenile Rearing	10,438 ft.
Chum Salmon	Spawning	10,438 ft.
Coast Resident Cutthroat	Presence/Migration	10,839 ft.

Fish Species	Habitat Type	Documented Presence
Coho Salmon	Juvenile Rearing	10,438 ft.
Coho Salmon	Spawning	401 ft.
Largemouth Bass	Presence/Migration	10,839 ft.
Steelhead Trout	Presence/Migration	10,438 ft.

The Wishkah River Reach is designated under the ESA as critical habitat for bull trout (75 FR 63898). The reach provides freshwater and marine foraging, migration, and overwintering habitat outside of the Hoh, Queets, and Quinault core areas where breeding populations occur.

Coastal resident trout use habitats in nearly all of the shoreline jurisdictions, and both the cutthroat and rainbow trout are WDFW designated priority species due to their recreational value.

Olympic mudminnow (*Novumbra hubbsi*) presence is not well documented throughout the cities' shoreline jurisdictions, however their range includes all the cities' freshwater shorelines. Their typical environment includes slow-moving streams, wetlands, ponds, ditches, or sloughs with muddy substrate, still or slow moving water, and areas with abundant aquatic vegetation. Wetland protection is considered essential for the conservation of the species (WDFW 2013b).

Bald eagles are present throughout the cities' shorelines and have been observed perching on natural and human-made structures throughout the shoreline jurisdiction.

F. Critical Aquifer Recharge Areas

Critical aquifer recharge areas have not been mapped in the cities. There are no known wellhead protection areas in the cities or their shoreline jurisdictions (WDOH 2014b). Where no specific studies have been done, the cities may use existing soil and surficial geologic information to determine where recharge areas exist. To determine the threat to groundwater quality, existing land use activities and their potential to lead to contamination should be evaluated (WAC 365-190-100). Critical aquifer recharge areas may be present and require protection in the shoreline jurisdiction but none has been identified in the cities at the time of this inventory and characterization report.

2.10 REACH 10 – CHEHALIS RIVER - COSMOPOLIS

The Chehalis River - Cosmopolis Reach (WRIA 22 – the Lower Chehalis Watershed) is approximately 255 acres in area. Land cover is comprised of 41 percent open water, 35 percent woody wetlands, 12 percent emergent herbaceous wetlands, seven percent low intensity development, two percent barren land, two percent developed open space, one percent high intensity development, and one percent medium intensity development. Over half, or 63 percent, of the Chehalis River – Cosmopolis Reach is in public ownership. The largest public landowner is the Port of Grays Harbor.

2.10.01 SHORELINE CHARACTERISTICS

The Chehalis River – Cosmopolis Reach cuts through the northeastern portion of the city and creates the northern and southern banks of the city. The southern bank has a higher development intensity related to the location of the majority of the city, while the northern bank is largely undeveloped.

2.10.02 LAND USE

The Chehalis River is zoned Heavy Commercial and Industrial Flood Hazard. Cosmo Specialty Fibers is a large mill within the reach. The remainder of the reach is mostly open water and wetlands. A WDFW boat launch is located in the reach, and it provides public access to the shoreline.

The current land use patterns found in the Chehalis River - Cosmopolis Reach are provided in Table 2-23 below.

Table 2-23. Current Land Use Patterns for the Chehalis River - Cosmopolis Reach.

Current Land Use Patterns	Percentage of Reach
Parks/Open Space	43.9%
Industrial	26.2%
Vacant/Undeveloped	22.1%
Manufacturing	4.1%
Commercial	3.5%
Public Services	0.2%

Land Cover	Percentage of Reach
Open Water	40.9%
Woody Wetlands	34.6%
Emergent herbaceous Wetlands	11.9%

Land Cover	Percentage of Reach
Low Intensity Development	6.7%
Barren Land	1.7%
Developed Open Space	1.6%
High Intensity Development	1.4%
Medium Intensity Development	1.3%

The zoning designations from Cosmopolis Municipal Code (CMC) Title 18 – Zoning found in the Chehalis River Reach are provided in Table 2-24 below.

Table 2-24. Current Zoning Designations for the Chehalis River - Cosmopolis Reach.

Description	Symbol	Typical Uses	Percentage of Reach
Manufacturing	M	Lumber and wood products; Furniture and fixtures; Paper and allied products; Water transportation.	73.6%
Public Reserve	PR	Public buildings; Educational institutions and churches; Public libraries, art galleries and museums; Public parks, playgrounds, tennis courts, and other recreational uses; Golf courses and related facilities; Cemeteries.	18.3%
Waterfront Use	WUD	Retail and wholesale business; Professional and consumer services, offices, shops and clinics; Financial institutions; Restaurants, cafes, fast-food shops, taverns and lounges; Water access facility; Water enjoyment facility; Water-oriented facility; Water-related facility; Motels and hotels; Condominiums and townhouses.	8.1%

2.10.03 EXISTING PUBLIC ACCESS

Public access in the Chehalis River – Cosmopolis Reach include the Weyerhaeuser Boat Ramp along the south bank of the river, which includes one asphalt ramp, one gravel ramp, and fifty gravel parking spaces. The boat ramp is influenced by fluctuations in the river and tidal changes. A small park marking the Cosmopolis Treaty Grounds is located on the riverfront, and

includes a mural and small recreational structure. A bike and pedestrian trail also runs along the river.

2.10.04 SHORELINE MODIFICATIONS

A levee exists between the city and the Chehalis River approximately along the former Northern Pacific Railway alignment between the Weyerhaeuser property and the city limits. A portion of the levee near the center of the city appears to be armored with rock due to the proximity of the levee with the active channel. Within the Weyerhaeuser property, there also appears to be shoreline hardening to protect fill, and possibly fill placed to prevent inundation from the Chehalis River.

Table 2-25 lists the total length of dikes and levees for reaches where they are found in the available data, along with other shoreline modifications observed on aerial photographs in the course of doing reach functional assessments. Comprehensive information on shoreline modifications other than dikes and levees is not available for this reach.

Table 2-25. Chehalis River – Cosmopolis Reach Shoreline Modifications.

Sum of Dike and Levee Length (feet)	Other Shoreline Modifications
2,882	357 feet of landfill
	3 tide gates
	1 partial road crossing blockage

2.10.05 ECOLOGICAL FUNCTIONS

The Chehalis River – Cosmopolis Reach is evaluated separately in the functional assessment because of the unequal development intensity present along the north and south banks. The north bank scored high on the functional assessment, primarily because it is currently undeveloped and retains good vegetation structure and hydrologic functions. The subreach is dominated by forest and shrub wetland and is within the tidal surge plain of the Chehalis River, a regionally unique habitat area used by a variety of priority aquatic and shoreline dependent species including wood ducks and numerous salmon and trout species.

The subreach is rated low for the function of maintaining temperatures. It is unlikely that the forest in the subreach is significant enough to regulate water temperatures based on the limited density and coverage in the subreach, and the relatively large size of the Chehalis River in this location. The wetlands could provide a source of cool water to the extent that there are groundwater discharges, but this is uncertain within the subreach. The historical channel migration zone extends to the city limits throughout this subreach.

The south bank is comparatively more developed than the north bank and ranks moderate on the functional assessment. It is characterized partly by a levee and reduced and altered vegetation. The subreach is ranked low for most criteria. The reach ranked high for removing excessive nutrients and toxic compounds as indicated by no known water quality impairments on the 303(d) list.

Estuarine wetlands along the upstream (eastern) portion of the reach and forest wetlands in the surge plain along an unnamed slough provide key habitat and water-quality functions that are relatively unimpaired by development compared to other portions of the reach. The reach ranks moderate for functions related to flood and surge protection and shoreline bank protection. Due to levee construction and fill, the entire reach is disconnected permanently from the remainder of its historical channel migration zone, with the exception of 1,000 feet upstream of the unnamed slough. Upstream (east) of the slough, all area within the city limits is within the historical channel migration zone.

A. *Geologically Hazardous Areas*

Sixty-three percent of the area within the Chehalis River - Cosmopolis Reach is subject to moderate to high risk of liquefaction hazards based on the soil characteristics, and 56 percent of the reach is within the mapped Cascadia Scenario 1A seismic hazard area. There are no landslide hazard areas mapped within the reach.

B. *Flood Hazard Areas*

The Chehalis River - Cosmopolis Reach has 96 percent of its total area within the 100-year floodplain.

C. *Wetlands*

Approximately 108 acres of identified wetlands exist within the Chehalis River - Cosmopolis Reach, comprising 42 percent of the reach's total area.

D. *Streams*

Instream priority habitats exist within the Chehalis River - Cosmopolis Reach, and serve as areas where a combination of physical, biological, and chemical processes and conditions interact to provide functional life history requirements for instream fish and wildlife resources.

E. *Other Fish and Wildlife Habitat Conservation Areas*

The following fish have been identified within the Chehalis River - Cosmopolis Reach, with their associated habitat type and length of documented presence listed below:

Fish Species	Habitat Type	Documented Presence
Bull Trout	Presence/Migration	5,370 ft.
Chinook Salmon	Presence/Migration	16,111 ft.
Chum Salmon	Presence/Migration	5,370 ft.
Coast Resident Cutthroat	Presence/Migration	5,370 ft.
Coho Salmon	Presence/Migration	6,048 ft.
Steelhead Trout	Presence/Migration	10,741 ft.

The Chehalis River – Cosmopolis Reach is designated under the ESA as critical habitat for bull trout (75 FR 63898). The reach provides freshwater and marine foraging, migration, and overwintering habitat outside of the Hoh, Queets, and Quinault core areas where breeding populations occur.

Coastal resident trout use habitats in nearly all of the shoreline jurisdictions, and both the cutthroat and rainbow trout are WDFW designated priority species due to their recreational value.

Olympic mudminnow (*Novumbra hubbsi*) presence is not well documented throughout the cities' shoreline jurisdictions, however their range includes all the cities' freshwater shorelines. Their typical environment includes slow-moving streams, wetlands, ponds, ditches, or sloughs with muddy substrate, still or slow moving water, and areas with abundant aquatic vegetation. Wetland protection is considered essential for the conservation of the species (WDFW 2013b).

The lower estuarine waters of the Chehalis River are a common foraging area for harbor seals. Bald eagles are present throughout the cities' shorelines and have been observed perching on natural and human-made structures throughout the shoreline jurisdiction. Wood duck priority areas are mapped along the Chehalis River in Cosmopolis. There are approximately 52 acres of Wood Duck habitat in this reach.

F. Critical Aquifer Recharge Areas

Critical aquifer recharge areas have not been mapped in the cities. There are no known wellhead protection areas in the cities or their shoreline jurisdictions (WDOH 2014b).

Where no specific studies have been done, the cities may use existing soil and surficial geologic information to determine where recharge areas exist. To determine the threat to groundwater quality, existing land use activities and their potential to lead to contamination should be evaluated (WAC 365-190-100). Critical aquifer recharge areas may be present and require protection in the shoreline jurisdiction but none has been identified in the cities at the time of this inventory and characterization report.

2.11 REACH 11 – MILL CREEK

The Mill Creek Reach (WRIA 22 – the Lower Chehalis Watershed) is approximately 49 acres in area. Land cover is comprised of 68 percent woody wetlands, 14 percent developed open space, 10 percent low intensity development, five percent emergent herbaceous wetlands, two percent medium intensity development, and two percent high intensity development. Over 16 percent, or 9 acres, of the Mill Creek Reach is in public ownership, and is owned by the city of Cosmopolis.

2.11.01 SHORELINE CHARACTERISTICS

The Mill Creek Reach is located along the northwestern corner of Cosmopolis' city boundary and is comprised primarily of wetlands. The southern portion of the reach has seen some development extending into it from the city, but the majority is undeveloped. The reach has been extensively filled and modified to create a constructed channel and floodplain.

2.11.02 LAND USE

The Mill Creek Reach is zoned Multiple Use and Medium Density Residential. Mary's River lumberyard is the one commercial use within the reach, which is mostly open water and wetlands. The residential area is largely built out, and it would not likely see additional development. The current land use patterns found in the Mill Creek Reach are provided in Table 2-26 below.

Table 2-26. Current Land Use Patterns for the Mill Creek Reach.

Current Land Use Patterns	Percentage of Reach
Commercial	72.5%
Vacant/Undeveloped	13%
Residential	5.4%
Manufacturing	4.9%
Parks/Open Space	4%
Public Services	0.2%

Land Cover	Percentage of Reach
Woody Wetlands	67.8%
Developed Open Space	13.8%
Low Intensity Development	9.9%
Emergent Herbaceous Wetlands	5.2%

Land Cover	Percentage of Reach
Medium Intensity Development	1.7%
High Intensity Development	1.6%

The zoning designations from CMC Title 18 – Zoning found in the Mill Creek Reach are provided in Table 2-27 below.

Table 2-27. Current Zoning Designations for the Mill Creek Reach.

Description	Symbol	Typical Uses	Percentage of Reach
Multiple Use	MU	Retail and wholesale business; Professional and consumer services, offices, shops and clinics; Financial institutions; Entertainment facilities, except for drive-in theaters; Restaurants, cafes, fast-food shops, taverns and lounges; Automotive and marine repair shops and filling stations; Dry-cleaning and laundry facilities; Parks; Churches, private and commercial schools; Day care centers; Municipal buildings and utility buildings; Motels and hotels; Undertaking and funeral parlors; Warehousing in conjunction with a commercial use; Condominiums, townhouses, and multiple-family dwellings; Industrial supplies and services; Mini-warehouses; Single- or multi-family living units attached to or within approved businesses.	77.1%
Medium Density Residential	R57	One-family dwellings; two-family dwellings; Court apartments.	17.7%
Public Reserve	PR	Public buildings; Educational institutions and churches; Public libraries, art galleries and museums; Public parks, playgrounds, tennis courts, and other recreational uses; Golf courses and related facilities; Cemeteries.	4.2%
Low Density Residential	R100	One-family and two-family dwellings; Court apartments; Parks;	0.9%

Description	Symbol	Typical Uses	Percentage of Reach
		Golf courses.	

2.11.03 EXISTING PUBLIC ACCESS

A rail trail, the Basich Trailway, connects the city of Cosmopolis to Aberdeen through the Mill Creek Reach wetlands.

2.11.04 SHORELINE MODIFICATIONS

Mill Creek has been regulated by a USACE structure at its confluence with the Chehalis River. The tide gate at the Mill Creek confluence with the Chehalis River modifies natural geomorphic processes at this ecological hot spot. The tide gate is contained within the levee that is parallel to the Chehalis River shoreline. Additionally, one partial road crossing blockage was observed on aerial photographs in the course of doing reach functional assessments. Comprehensive information on shoreline modifications other than dikes and levees is not available for this reach.

2.11.05 ECOLOGICAL FUNCTIONS

The Mill Creek Reach ranks moderately on the functional assessment, primarily due to the presence of wetlands and quality vegetation cover in the northern portion of the reach. Eighty-seven percent of the reach is mapped as NWI wetland, entirely associated with the northern portion. Fill and shoreline modifications such as culvert crossings and tide gates may impair hydrologic and habitat functions, particularly in the heavily developed southern portion of the reach. Mill Creek likely once meandered throughout the city, prior to substantial fill, development, and channelization. Therefore, a channel migration zone is no longer present in this constructed channel and floodplain.

A. Geologically Hazardous Areas

All of the area within the Mill Creek Reach is subject to moderate to high risk of liquefaction hazards based on the soil characteristics, and 90 percent of the reach is within the mapped Cascadia Scenario 1A seismic hazard area. There are no landslide hazard areas mapped within the reach.

B. Flood Hazard Areas

The Mill Creek Reach has 48 percent of its total area within the 100-year floodplain.

C. Wetlands

Approximately 43 acres of identified wetlands exist within the Mill Creek Reach, comprising 87 percent of the reach's total area.

D. Streams

Instream priority habitats exist within the Mill Creek Reach, and serve as areas where a combination of physical, biological, and chemical processes and conditions interact to provide functional life history requirements for instream fish and wildlife resources.

E. Other Fish and Wildlife Habitat Conservation Areas

The following fish have been identified within the Mill Creek Reach, with their associated habitat type and length of documented presence listed below:

Fish Species	Habitat Type	Documented Presence
Coho Salmon	Spawning	2,444 ft.

Coastal resident trout use habitats in nearly all of the shoreline jurisdictions, and both the cutthroat and rainbow trout are WDFW designated priority species due to their recreational value. Although they remain undocumented within the Mill Creek Reach, it is possible that the reach is used for rearing and spawning due to the high concentration of coastal resident trout in the surrounding areas.

Olympic mudminnow (*Novumbra hubbsi*) presence is not well documented throughout the cities' shoreline jurisdictions, however their range includes all the cities' freshwater shorelines. Their typical environment includes slow-moving streams, wetlands, ponds, ditches, or sloughs with muddy substrate, still or slow moving water, and areas with abundant aquatic vegetation. Wetland protection is considered essential for the conservation of the species (WDFW 2013b).

Bald eagles are present throughout the cities' shorelines and have been observed perching on natural and human-made structures throughout the shoreline jurisdiction.

F. Critical Aquifer Recharge Areas

Critical aquifer recharge areas have not been mapped in the cities. There are no known wellhead protection areas in the cities or their shoreline jurisdictions (WDOH 2014b). Where no specific studies have been done, the cities may use existing soil and surficial geologic information to determine where recharge areas exist. To determine the threat to groundwater quality, existing land use activities and their potential to lead to contamination should be evaluated (WAC 365-190-100). Critical aquifer recharge areas

may be present and require protection in the shoreline jurisdiction but none has been identified in the cities at the time of this inventory and characterization report.

2.12 REACH 12 – EAST HOQUIAM RIVER

The East Hoquiam River Reach (WRIA 22 – the Lower Chehalis Watershed) is approximately 53 acres in area. Land cover is comprised of 43 percent woody wetlands, 15 percent low intensity development, 12 percent barren land, 11 percent open water, seven percent emergent herbaceous wetlands, six percent medium intensity development, four percent developed open space, two percent high intensity development, and less than one percent of shrub/scrub and mixed forest.

2.12.01 SHORELINE CHARACTERISTICS

The East Hoquiam River Reach is located to the north of the city and to the northeast of the East Fork Hoquiam River and Hoquiam River confluence. There is residential and industrial development currently in the reach, although the majority of the reach is identified as wetlands. There are small streams that snake through the reach and connect to the Hoquiam River Reach which provide limited ecological functions.

2.12.02 LAND USE

The East Hoquiam River Reach is primarily undeveloped. Nearly one quarter of land cover is industrial uses. The current land use patterns found in the East Hoquiam River Reach are provided in Table 2-28 below.

Table 2-28. Current Land Use Patterns for the East Hoquiam River Reach.

Current Land Use Patterns	Percentage of Reach
Vacant/Undeveloped	62.2%
Industrial	24.2%
Manufacturing	7.9%
Residential	5.7%

Land Cover	Percentage of Reach
Woody Wetlands	43%
Low Intensity Development	14.7%
Barren land	11.7%
Open Water	10.8%

Land Cover	Percentage of Reach
Emergent Herbaceous Wetlands	7.3%
Medium Intensity Development	6.4%
Developed Open Space	3.6%
High Intensity Development	2.3%
Shrub/Scrub	0.1%
Mixed Forest	0.1%

The zoning designations from Hoquiam Municipal Code (HMC) Chapter 10.03 found in the East Hoquiam River Reach are provided in Table 2-29 below. There are no publically owned lands in the East Hoquiam River Reach.

Table 2-29. Current Zoning Designations for the East Hoquiam River Reach.

Description	Symbol	Typical Uses	Percentage of Reach
High Density Residential	R2	Dwellings: duplex, manufactured, multi-family with five or more units, multi-family with four or less units, single-family; Family child care providers; Home occupations; Hospitals, medical and dental clinics; Manufactured home parks; Personal services; Restaurants, 20 seats or less.	68.4%
Industrial	I	Asphalt, rock crushing, and concrete batch plants; Automobile, heavy maintenance and repair shops; Automobile wrecking, towing, or junkyards; Contractor yards; Food processing; Freight terminals; Hospitals, medical and dental clinics; Industry, heavy; Industry, light and within a structure; Mini-storage facilities; Outdoor storage; Small engine sales, service and repair; Ship terminals, slips, and repair facilities; Truck and heavy equipment sales and services; Warehousing; Wholesale liquefied petroleum sales; Wholesale sales and product distribution centers.	31.6%

2.12.03 EXISTING PUBLIC ACCESS

There is no existing public access to shorelines in the East Hoquiam Reach.

2.12.04 SHORELINE MODIFICATIONS

Along the rivers throughout Hoquiam small rock revetments and “sugar dikes,” small berms or levees comprised of pushed-up native soil, are common. Abandoned piles, some of which may be creosote treated, are also common in the rivers. The information on the rivers throughout the city is limited and generally of poor quality. Shoreline modifications observed on aerial photographs in the course of doing reach functional assessments include 410 feet of wooden bulkhead and two tide gates. Comprehensive information on shoreline modifications other than dikes and levees is not available for this reach.

2.12.05 ECOLOGICAL FUNCTIONS

The East Hoquiam River Reach is ranked moderate on the functional assessment. A significant wetland area east of Broadway Avenue contains most of the wetlands in the reach (62 percent of the reach is mapped as wetland in the NWI). The wetland is bisected by a road and adjacent disturbed vegetation north of the houses along Broadway Villa Drive, but it contributes to shoreline functions in all three categories (hydrologic, water quality, and habitat) nonetheless. Depending on future development plans, the wetland could potentially benefit from vegetation planting to improve buffer conditions between the less impacted portion to the north and the housing development to the south.

The stream in this reach supports a variety of salmon and provides habitat for Chinook and chum spawning. For other salmon species, it is an important rearing area and migration route to spawning grounds further upstream outside the city limits. Although a channel migration zone was not formally mapped, it is likely that the East Hoquiam River historical channel migration zone extends from valley wall to valley wall, which encompasses much of the Woodlawn neighborhood. Hydrologic and habitat functions in the reach may be reduced by shoreline modifications including hard armoring along the east bank and piling along the channel.

A. Geologically Hazardous Areas

Nearly all, or 93 percent, of the area within the East Hoquiam River Reach is subject to moderate to high risk of liquefaction hazards based on the soil characteristics. Fifteen percent of the reach is within the mapped Cascadia Scenario 1A seismic hazard area. There are no landslide hazard areas mapped within the reach.

B. Flood Hazard Areas

The East Hoquiam River Reach has 61 percent of its total area within the 100-year floodplain.

C. Wetlands

Approximately 33 acres of identified wetlands exist within the East Hoquiam River Reach, comprising 62 percent of the reach's total area.

D. Streams

Instream priority habitats exist within the East Hoquiam River Reach, and serve as areas where a combination of physical, biological, and chemical processes and conditions interact to provide functional life history requirements for instream fish and wildlife resources.

E. Other Fish and Wildlife Habitat Conservation Areas

The following fish have been identified within the East Hoquiam River Reach, with their associated habitat type and length of documented presence listed below:

Fish Species	Habitat Type	Documented Presence
Chinook Salmon	Spawning	303 ft.
Chum Salmon	Spawning	303 ft.
Coast Resident Cutthroat	Presence/Migration	303 ft.
Coho Salmon	Juvenile Rearing	303 ft.
Coho Salmon	Presence/Migration	845 ft.
Steelhead Trout	Presence/Migration	303 ft.

Coastal resident trout use habitats in nearly all of the shoreline jurisdictions, and both the cutthroat and rainbow trout are WDFW designated priority species due to their recreational value.

Olympic mudminnow (*Novumbra hubbsi*) presence is not well documented throughout the cities' shoreline jurisdictions, however their range includes all the cities' freshwater shorelines. Their typical environment includes slow-moving streams, wetlands, ponds, ditches, or sloughs with muddy substrate, still or slow moving water, and areas with abundant aquatic vegetation. Wetland protection is considered essential for the conservation of the species (WDFW 2013b).

Bald eagles are present throughout the cities' shorelines and have been observed perching on natural and human-made structures throughout the shoreline jurisdiction.

F. Critical Aquifer Recharge Areas

Critical aquifer recharge areas have not been mapped in the cities. There are no known wellhead protection areas in the cities or their shoreline jurisdictions (WDOH 2014b). Where no specific studies have been done, the cities may use existing soil and surficial geologic information to determine where recharge areas exist. To determine the threat to groundwater quality, existing land use activities and their potential to lead to contamination should be evaluated (WAC 365-190-100). Critical aquifer recharge areas may be present and require protection in the shoreline jurisdiction but none has been identified in the cities at the time of this inventory and characterization report.

2.13 REACH 13 – FRY CREEK - HOQUIAM

The Fry Creek - Hoquiam Reach (WRIA 22 – the Lower Chehalis Watershed) is approximately 27 acres in area. Land cover is comprised of 53 percent low intensity development, 23 percent high intensity development, 23 percent medium intensity development, and less than one percent of developed open space, open water, emergent herbaceous wetland. Nearly 84 percent, or 23 acres of the Chehalis River Reach is in public ownership, and the Port of Grays Harbor owns 21 of these acres.

2.13.01 SHORELINE CHARACTERISTICS

The Fry Creek – Hoquiam Reach extends north on two divergent paths from the Grays Harbor Reach in the southeast portion of the city. The shoreline has been heavily modified in the past to accommodate the medium and high intensity development located within the reach.

2.13.02 LAND USE

The Fry Creek Reach is almost entirely covered by industrial uses. The current land use patterns found in the Fry Creek - Hoquiam Reach are provided in Table 2-30 below.

Table 2-30. Current Land Use Patterns for the Fry Creek - Hoquiam Reach.

Current Land Use Patterns	Percentage of Reach
Industrial	99.9%
Public Services	0.1%

Land Cover	Percentage of Reach
Low Intensity Development	53.3%
High Intensity Development	22.8%

Land Cover	Percentage of Reach
Medium Intensity Development	22.8%
Developed Open Space	0.8%
Open Water	0.2%
Emergent Herbaceous Wetlands	0.2%

The zoning designations from HMC Chapter 10.03 found in the Fry Creek - Hoquiam Reach are provided in Table 2-31 below.

Table 2-31. Current Zoning Designations for the Fry Creek - Hoquiam Reach.

Description	Symbol	Typical Uses	Percentage of Reach
Industrial	I	Asphalt, rock crushing, and concrete batch plants; Automobile, heavy maintenance and repair shops; Automobile wrecking, towing, or junkyards; Contractor yards; Food processing; Freight terminals; Hospitals, medical and dental clinics; Industry, heavy; Industry, light and within a structure; Mini-storage facilities; Outdoor storage; Small engine sales, service and repair; Ship terminals, slips, and repair facilities; Truck and heavy equipment sales and services; Warehousing; Wholesale liquefied petroleum sales; Wholesale sales and product distribution centers.	99.9%
General Commercial	C1	Automobile, heavy maintenance and repair shops; Automobile, RV, boat sales; Automobile service stations; Banks and financial services; Bars, cocktail lounges, and taverns; Contractor yards; Day care centers; Drive-through facilities; Farmers' market; Food processing; Freight terminals; Hospitals, medical and dental clinics; Industry, light and within a structure; Motels and hotels; Office and business parks;	0.1%

Description	Symbol	Typical Uses	Percentage of Reach
		Professional services; Restaurants; Retail sales; Truck and heavy equipment sales and services; Veterinary hospitals and kennels; Warehousing.	

2.13.03 EXISTING PUBLIC ACCESS

There is no existing public access to shorelines in the Fry Creek – Hoquiam Reach.

2.13.04 SHORELINE MODIFICATIONS

Along the rivers throughout Hoquiam small rock revetments and “sugar dikes,” small berms or levees comprised of pushed-up native soil, are common. Abandoned piles, some of which may be creosote treated, are also common in the rivers. The information on the rivers throughout the city is limited and generally of poor quality.

Table 2-32 lists the total length of dikes and levees for reaches where they are found in the available data, along with other shoreline modifications observed on aerial photographs in the course of doing reach functional assessments. Comprehensive information on shoreline modifications other than dikes and levees is not available for this reach.

Table 2-32. Fry Creek – Hoquiam Reach Shoreline Modifications.

Sum of Dike and Levee Length (feet)	Other Shoreline Modifications
2,303	257 feet of rip rap
	2 tide gates

2.13.05 ECOLOGICAL FUNCTIONS

The Fry Creek – Hoquiam Reach is ranked low on the functional assessment. The reach is highly modified from historical conditions by fill and channelization. Fry Creek likely once meandered throughout the city, prior to substantial fill, development, and channelization. Therefore, a channel migration zone is no longer present in this constructed channel and floodplain. The reach does not contain nearshore vegetation or significant wetlands except for a small amount (approximately 260 feet) that is more associated with the Grays Harbor shoreline (described below) than the Fry Creek stream reach. The dominant land cover (46 percent) is medium- and high-intensity development indicating significant impervious surface and poor vegetation conditions. These conditions affect reach functions in all three function categories. Coho salmon and cutthroat trout are documented in the reach. However, the habitat is of low

quality due to channel simplification and barriers that likely prevent migration into upstream portions of the watershed. There is a tide gate in the western Fry Creek channel. Many of the potential barriers, however, are in Aberdeen and outside of the shoreline jurisdiction.

A. Geologically Hazardous Areas

Nearly three-quarters of the area within the Fry Creek – Hoquiam Reach is subject to moderate to high risk of liquefaction hazards based on the soil characteristics. The entire reach is within the mapped Cascadia Scenario 1A seismic hazard area. There are no landslide hazard areas mapped within the reach.

B. Flood Hazard Areas

The Fry Creek - Hoquiam Reach has 12 percent of its total area within the 100-year floodplain.

C. Wetlands

Slightly over one acre of identified wetlands exists within the Fry Creek - Hoquiam Reach, comprising 5 percent of the reach's total area.

D. Streams

Instream priority habitats exist within the Fry Creek - Hoquiam Reach, and serve as areas where a combination of physical, biological, and chemical processes and conditions interact to provide functional life history requirements for instream fish and wildlife resources.

E. Other Fish and Wildlife Habitat Conservation Areas

The following fish have been identified within the Fry Creek - Hoquiam Reach, with their associated habitat type and length of documented presence listed below:

Fish Species	Habitat Type	Documented Presence
Coast Resident Cutthroat	Presence/Migration	1,731 ft.
Coho Salmon	Presence/Migration	1,731 ft.

Coastal resident trout use habitats in nearly all of the shoreline jurisdictions, and both the cutthroat and rainbow trout are WDFW designated priority species due to their recreational value.

Olympic mudminnow (*Novumbra hubbsi*) presence is not well documented throughout the cities' shoreline jurisdictions, however their range includes all the cities' freshwater shorelines. Their typical environment includes slow-moving streams, wetlands, ponds,

ditches, or sloughs with muddy substrate, still or slow moving water, and areas with abundant aquatic vegetation. Wetland protection is considered essential for the conservation of the species (WDFW 2013b).

Bald eagles are present throughout the cities' shorelines and have been observed perching on natural and human-made structures throughout the shoreline jurisdiction. There are approximately 20 acres of Peregrine Falcon habitat in this reach.

F. Critical Aquifer Recharge Areas

Critical aquifer recharge areas have not been mapped in the cities. There are no known wellhead protection areas in the cities or their shoreline jurisdictions (WDOH 2014b). Where no specific studies have been done, the cities may use existing soil and surficial geologic information to determine where recharge areas exist. To determine the threat to groundwater quality, existing land use activities and their potential to lead to contamination should be evaluated (WAC 365-190-100). Critical aquifer recharge areas may be present and require protection in the shoreline jurisdiction but none has been identified in the cities at the time of this inventory and characterization report.

2.14 REACH 14 – GRAYS HARBOR

The Grays Harbor Reach (WRIA 22 – the Lower Chehalis Watershed) is approximately 4,778 acres in area. Land cover is comprised of 36 percent open water, 26 percent emergent herbaceous wetlands, 19 percent barren land, six percent woody wetlands, four percent herbaceous, three percent developed open space, two percent low intensity development, one percent medium intensity development, and less than one percent high intensity development, deciduous forest, and shrub/scrub. Fifteen percent (731 acres) of the Grays Harbor Reach is in public ownership, with 569 acres of public land owned by the Port of Grays Harbor.

2.14.01 SHORELINE CHARACTERISTICS

The Grays Harbor Reach extends to the Hoquiam boundaries, but the harbor is connected to the Pacific Ocean outside of the city limits, creating an ecological diverse reach. The shoreline has experienced extensive fill and creation of a peninsula that is used by the Bowerman Airport. Adjacent to the north of the airport is the Bowerman Basin, which accounts for a large portion of the Grays Harbor National Wildlife Refuge. The Grays Harbor Reach also encompasses the Rennie Island shoreline.

2.14.02 LAND USE

The predominant land use in the Grays Harbor reach is Industrial and Transportation, Communication, and utilities. The current land use patterns found in the Grays Harbor Reach are provided in Table 2-33 below.

Table 2-33. Current Land Use Patterns for the Grays Harbor Reach.

Current Land Use Patterns	Percentage of Reach
Industrial	65.9%
Transportation/Communication/Utilities	30.1%
Vacant/Undeveloped	3.7%
Parks/Open Space	0.2%
Public Services	0.1%

Land Cover	Percentage of Reach
Open Water	35.9%
Emergent herbaceous Wetlands	26.2%
Barren Land	19.7%
Woody Wetlands	5.6%
Herbaceous	4.4%
Developed Open Space	3.4%
Low Intensity Development	2.4%
Medium Intensity Development	1.2%
High Intensity Development	0.7%
Deciduous Forest	0.6%
Shrub/Scrub	0.6%

The zoning designations from HMC Chapter 10.03 found in the Grays Harbor Reach are provided in Table 2-34 below.

Table 2-34. Current Zoning Designations for the Grays Harbor Reach.

Description	Symbol	Typical Uses	Percentage of Reach
Industrial	I	Asphalt, rock crushing, and concrete batch plants; Automobile, heavy maintenance and repair shops; Automobile wrecking, towing, or junkyards; Contractor yards; Food processing; Freight terminals;	45.6%

Description	Symbol	Typical Uses	Percentage of Reach
		Hospitals, medical and dental clinics; Industry, heavy; Industry, light and within a structure; Mini-storage facilities; Outdoor storage; Small engine sales, service and repair; Ship terminals, slips, and repair facilities; Truck and heavy equipment sales and services; Warehousing; Wholesale liquefied petroleum sales; Wholesale sales and product distribution centers.	
Natural Resources	NR	Parks, public; Recreational facilities; Timberland production.	42%
Low Density Residential	R1	Dwellings: duplex, manufactured, multi-family with four or less units, single-family; Family childcare providers; Home occupations.	6.3%
Waterfront Overlay District	WF-1	Community facilities; Dwellings, multi-family with five or more units; Dwellings, multi-family with four or less units; Dwellings, single-family; Marina facilities; Motels and hotels; Parks, public; Personal services; Places for religious worship; Professional services; Recreational facilities; Retail sales.	6.1%

2.14.03 EXISTING PUBLIC ACCESS

The Port of Grays Harbor Viewing Tower provides scenic views of the harbor and Rennie Island. A public boat launch is located adjacent to tower and has 10 gravel parking spaces on-site. Bowerman Basin, located just north of Bowerman Airport, provides excellent bird watching opportunities.

2.14.04 SHORELINE MODIFICATIONS

There has been extensive fill along the entire length of the Grays Harbor shoreline. This includes the formation of a new peninsula that now contains the Bowerman Airport. Formerly Moon Island, at the west end of the airport, was an island separated from the mainland by a shallow tidal channel (US Coast and Geodetic Survey 1911). In addition to the fill, most of the shoreline along Grays Harbor that has been modified has required some sort of protection.

This includes, but is not limited to the construction of levees, timber revetments, and placement of rock and other structural protection.

Table 2-35 lists the total length of dikes and levees for reaches where they are found in the available data, along with other shoreline modifications observed on aerial photographs in the course of doing reach functional assessments. Comprehensive information on shoreline modifications other than dikes and levees is not available for this reach.

Table 2-35. Grays Harbor Reach Shoreline Modifications.

Sum of Dike and Levee Length (feet) (a)	Other Shoreline Modifications (b)
18,494	32,044 feet of landfill
	14,196 feet of rip rap
	5 tide gates

2.14.05 ECOLOGICAL FUNCTIONS

The Grays Harbor Reach ranked moderate on the functional assessment, primarily due to habitat features that support numerous priority species, despite a wide range of shoreline modifications that reduce other functions of the shoreline in many respects. Shoreline functions vary widely between portions of the reach. Throughout much of the reach, functions are impaired by extensive shoreline armoring, levees, impervious surface, and relatively poor riparian vegetation. However, the Grays Harbor Reach includes large areas of priority habitat for shorebirds, waterfowl, and peregrine falcons, among other species.

A significant portion of the Grays Harbor National Wildlife Refuge occurs in this reach in the Bowerman Basin between Moon Island (Bowerman Airport) and the north shore along SR 109. In the Bowerman Basin, the wildlife refuge and the Port of Grays Harbor contain important habitat that also supports priority nearshore vegetation and dunegrass communities. Rennie Island and the north shore of Grays Harbor in the eastern portion of the reach also contain important nearshore and riparian vegetation communities. Estuarine wetlands, saltmarsh, and freshwater emergent wetlands are prevalent in Bowerman Bay and around Rennie Island, and provide functions related to sediment stabilization, bank protection, and habitat diversity for shoreline-dependent species. There is a forested wetland west of South Adam Street that likely provides water-quality functions and additional habitat functions. Wetlands are less common in the more developed areas, much of which are built on historical fill and not supporting shoreline functions to the same degree as less developed areas in the reach.

A. Geologically Hazardous Areas

Ten percent of the area within the Grays Harbor Reach is subject to moderate to high risk of liquefaction hazards based on the soil characteristics, and 11 percent of the reach is within the mapped Cascadia Scenario 1A seismic hazard area. There are no landslide hazard areas mapped within the reach.

B. Flood Hazard Areas

The Grays Harbor Reach has 46 percent of its total area within the 100-year floodplain.

C. Wetlands

Approximately 614 acres of identified wetlands exist within the Grays Harbor Reach, comprising 13 percent of the reach's total area.

D. Streams

No river or stream features within the Grays Harbor Reach qualify as instream habitat area. The shorelines within this reach are more closely associated with marine habitats and ecological processes, however, since the entire shoreline jurisdiction is dominated by river and stream water features, there is a close ecological association with nearby instream habitats.

E. Other Fish and Wildlife Habitat Conservation Areas

The following fish have been identified within the Grays Harbor Reach, with their associated habitat type and length of documented presence listed below:

Fish Species	Habitat Type	Documented Presence
Coast Resident Cutthroat	Presence/Migration	250 ft.
Coho Salmon	Spawning	250 ft.
Bull Trout	Presence/Migration	N/A
Chinook Salmon	Presence/Migration	N/A
Chum Salmon	Presence/Migration	N/A
Steelhead Trout	Presence/Migration	N/A

The Grays Harbor Reach is designated under the ESA as critical habitat for bull trout (75 FR 63898). The reach provides freshwater and marine foraging, migration, and overwintering habitat outside of the Hoh, Queets, and Quinault core areas where breeding populations occur.

Coastal resident trout use habitats in nearly all of the shoreline jurisdictions, and both the cutthroat and rainbow trout are WDFW designated priority species due to their recreational value.

Olympic mudminnow (*Novumbra hubbsi*) presence is not well documented throughout the cities' shoreline jurisdictions, however their range includes all the cities' freshwater shorelines. Their typical environment includes slow-moving streams, wetlands, ponds, ditches, or sloughs with muddy substrate, still or slow moving water, and areas with abundant aquatic vegetation. Wetland protection is considered essential for the conservation of the species (WDFW 2013b).

Numerous species of groundfish and rockfish are state priority species and may be present in Grays Harbor. Marine shorelines in Grays Harbor are designated EFH for English sole (*Pleuronectes vetulus*) and black rockfish (*Sebastes melanops*). Although groundfish and rockfish are more likely to use habitat in the outer harbor and offshore areas due to their habitat preferences, their presence within the shoreline jurisdiction has been identified.

The Grays Harbor estuary is used by green sturgeon (*Acipenser medirostis*) and white sturgeon (*Acipenser transmontanus*) as migratory congregation area during the summer and fall. Green sturgeon is listed as threatened under the ESA, and it utilizes the reach for rearing, feeding, and holding. No sturgeon spawning is thought to occur in Grays Harbor.

Grays Harbor Estuary is a common foraging area for harbor seals. The reach also supports a variety of other marine mammals, although they are usually observed in the outer harbor outside of the shoreline jurisdiction rather than within it. Stellar sea lions (*Eumetopias jubatus*), southern resident killer whales (*Orcinus orca*), humpback whales (*Megaptera novaeangliae*), which are federally listed species, and gray whales (*Eschrichtius robustus*), which are designated sensitive in Washington state, have been observed offshore and in the outer harbor. Occurrences of these species would be rare in the inner harbor and cities' shorelines.

Bald eagles are present throughout the cities' shorelines and have been observed perching on natural and human-made structures throughout the shoreline jurisdiction. They have also been observed near nesting sites throughout Grays Harbor, including on Rennie Island. Priority areas for peregrine falcons are designated along much of the Grays Harbor marine shoreline in Hoquiam. Common loons (*Gavia immer*), a state sensitive species, are regularly observed foraging for fish in the cities' marines

shorelines, including the Grays Harbor Reach. Other priority marine birds such as brown pelican (*Pelecanus occidentalis*), listed as endangered in the state, may occasionally enter the cities' shoreline areas during migration or foraging forays, although their presence is limited and regular concentrations are not mapped by WDFW.

The estuary area between State Route 109 and Bowerman Airport in Hoquiam is designated as priority area for waterfowl concentrations.

Although the species is not listed as sensitive, threatened, or endangered, great blue herons are a species strongly associated with shorelines, and breeding areas are designated priority areas in Washington State. An active heron rookery is located on Rennie Island.

There are approximately 2,386 acres of Peregrine Falcon habitat, 61 acres of Purple Martin habitat, 717 acres of Shorebird Concentration habitat, and 679 acres of Waterfowl Concentration habitat located within this reach.

F. Critical Aquifer Recharge Areas

Critical aquifer recharge areas have not been mapped in the cities. There are no known wellhead protection areas in the cities or their shoreline jurisdictions (WDOH 2014b). Where no specific studies have been done, the cities may use existing soil and surficial geologic information to determine where recharge areas exist. To determine the threat to groundwater quality, existing land use activities and their potential to lead to contamination should be evaluated (WAC 365-190-100). Critical aquifer recharge areas may be present and require protection in the shoreline jurisdiction but none has been identified in the cities at the time of this inventory and characterization report.

2.15 REACH 15 – HOQUIAM RIVER

The Hoquiam River Reach (WRIA 22 – the Lower Chehalis Watershed) is approximately 273 acres in area. Land cover is comprised of 37 percent open water, 21 percent low intensity development, 11 percent medium intensity development, 10 percent developed open space, five percent barren land, five percent high intensity development, five percent woody wetlands, three percent emergent herbaceous wetlands, two percent evergreen forest, and one percent herbaceous. A small amount (seven percent and 18 acres) of the Hoquiam River Reach is in public ownership.

2.15.01 SHORELINE CHARACTERISTICS

The Hoquiam River Reach extends to the north in the eastern portion of Hoquiam. The development intensity along the reach varies by shoreline, with the eastern bank having less development than the western bank. There are more modifications present along the western bank, which coincides with the industrial uses and development intensity.

2.15.02 LAND USE

The primary land use in the Hoquiam River reach is industrial followed by residential, undeveloped, and commercial, as shown in Table 2-36.

Table 2-36. Current Land Use Patterns for the Hoquiam River Reach.

Current Land Use Patterns	Percentage of Reach
Industrial	48.2%
Residential	13.7%
Vacant/Undeveloped	13.1%
Commercial	11.1%
Public Services	8.6%
Cultural/Entertainment/Recreational	2.3%
Parks/Open Space	1.7%
Transportation/Communication/Utilities	1%
Manufacturing	0.3%

Land Cover	Percentage of Reach
Open Water	36.5%
Low Intensity Development	20.8%
Medium Intensity Development	10.9%
Developed Open Space	9.8%
Barren Land	5.4%
High Intensity Development	5.1%
Woody Wetlands	5%
Emergent Herbaceous Wetlands	3%
Evergreen Forest	2.3%
Herbaceous	1.2%

The zoning designations from HMC Chapter 10.03 found in the Hoquiam River Reach are provided in Table 2-37 below.

Table 2-37. Current Zoning Designations for the Hoquiam River Reach.

Description	Symbol	Typical Uses	Percentage of Reach
Waterfront Overlay District	WF-1	Community facilities; Dwellings, multi-family with five or more units; Dwellings, multi-family with four or less units; Dwellings, single-family; Marina facilities; Motels and hotels; Parks, public; Personal services; Places for religious worship; Professional services; Recreational facilities; Retail sales.	37.4%
Industrial	I	Asphalt, rock crushing, and concrete batch plants; Automobile, heavy maintenance and repair shops; Automobile wrecking, towing, or junkyards; Contractor yards; Food processing; Freight terminals; Hospitals, medical and dental clinics; Industry, heavy; Industry, light and within a structure; Mini-storage facilities; Outdoor storage; Small engine sales, service and repair; Ship terminals, slips, and repair facilities; Truck and heavy equipment sales and services; Warehousing; Wholesale liquefied petroleum sales; Wholesale sales and product distribution centers.	21.5%
High Density Residential	R2	Dwellings: duplex, manufactured, multi-family with five or more units, multi-family with four or less units, single-family; Family child care providers; Home occupations; Hospitals, medical and dental clinics; Manufactured home parks; Personal services; Restaurants, 20 seats or less.	16.3%
General Commercial	C1	Automobile, heavy maintenance and repair shops; Automobile, RV, boat sales; Automobile service stations; Banks and financial	16%

Description	Symbol	Typical Uses	Percentage of Reach
		services; Bars, cocktail lounges, and taverns; Contractor yards; Day care centers; Drive-through facilities; Farmers' market; Food processing; Freight terminals; Hospitals, medical and dental clinics; Industry, light and within a structure; Motels and hotels; Office and business parks; Professional services; Restaurants; Retail sales; Truck and heavy equipment sales and services; Veterinary hospitals and kennels; Warehousing.	
Downtown Commercial	C2	Automobile, RV, boat sales; Automobile service stations; Banks and financial services; Bars, cocktail lounges, and taverns; Bed and breakfast inns; Day care centers; Dwellings, multi-family with five or more units; Dwellings, multi-family with four or less units; Farmer's market; Food processing; Hospitals, medical and dental clinics; Motels and hotels; Parks, public; Recreational facilities; Restaurants; Retail sales.	4.9%
Pedestrian Overlay District		Automobile, RV, boat sales; Automobile service stations; Banks and financial services; Bars, cocktail lounges, and taverns; Bed and breakfast inns; Day care centers; Farmer's market; Food processing; Hospitals, medical and dental clinics; Motels and hotels; Parks, public; Recreational facilities; Restaurants; Retail sales.	3.2%
Natural Resources	NR	Parks, public; Recreational facilities; Timberland production.	0.8%

2.15.03 EXISTING PUBLIC ACCESS

The Eighth Street Landing provides 120 feet of public access to the Hoquiam River, and includes picnic tables, a shelter, and a boat dock for fishing and river access. Riverside Dike Park serves as an access point for hiking trails along the river.

2.15.04 SHORELINE MODIFICATIONS

Along the rivers throughout Hoquiam small rock revetments and “sugar dikes,” small berms or levees comprised of pushed-up native soil, are common. Abandoned piles, some of which may be creosote treated, are also common in the rivers. The information on the rivers throughout the city is limited and generally of poor quality.

Table 2-38 lists the total length of dikes and levees for reaches where they are found in the available data, along with other shoreline modifications observed on aerial photographs in the course of doing reach functional assessments. Comprehensive information on shoreline modifications other than dikes and levees is not available for this reach.

Table 2-38. Hoquiam River Reach Shoreline Modifications.

Sum of Dike and Levee Length (feet) (a)	Other Shoreline Modifications (b)
13,478	1,449 feet of landfill
	1,269 feet of rip rap
	13 tide gates
	4 partial road crossing blockages

2.15.05 ECOLOGICAL FUNCTIONS

The Hoquiam River Reach is evaluated separately in the functional assessment because of the unequal development intensity present along the west and east banks. The west subreach of the Hoquiam River is ranked low on the functional assessment, primarily due to extensive levees in the lower portion (most of which are armored and hard shorelines), as well as impervious surface and poor vegetative conditions. Due to levee construction and fill, the entire reach is disconnected permanently from nearly all of the remainder of its historical channel migration zone.

The east subreach of the Hoquiam River is comparatively less developed than the west subreach and therefore it likely provides a higher level of function. A moderate ranking on the functional assessment is due to healthy riparian vegetation conditions through much of the reach and less armoring. The levee is limited to the southern portion of the reach, while the northern portion has few shoreline modifications. However, due to levee construction and fill,

the entire reach is disconnected permanently from nearly all of the remainder of its historical channel migration zone. The reach has few wetlands present, which reduces the ecological functions provided by wetlands. The stream is used by a variety of salmon for rearing, spawning, and migration. It is also an important corridor to key habitat areas in the upper watershed outside the city limits.

A. Geologically Hazardous Areas

Approximately 60 percent of the area within the Hoquiam River Reach is subject to moderate to high risk of liquefaction hazards based on the soil characteristics, and 54 percent of the reach is within the mapped Cascadia Scenario 1A seismic hazard area. There are no landslide hazard areas within the reach.

B. Flood Hazard Areas

The Hoquiam River Reach has 84 percent of its total area within the 100-year floodplain.

C. Wetlands

Approximately 16 acres of identified wetlands exist within the Hoquiam River Reach, comprising 6 percent of the reach's total area.

D. Streams

Instream priority habitats exist within the Hoquiam River Reach, and serve as areas where a combination of physical, biological, and chemical processes and conditions interact to provide functional life history requirements for instream fish and wildlife resources.

E. Other Fish and Wildlife Habitat Conservation Areas

The following fish have been identified within the Hoquiam River Reach, with their associated habitat type and length of documented presence listed below:

Fish Species	Habitat Type	Documented Presence
Chinook Salmon	Presence/Migration	12,103 ft.
Chum Salmon	Spawning	12,103 ft.
Coast Resident Cutthroat	Presence/Migration	12,281 ft.
Coho Salmon	Juvenile Rearing	12,103 ft.
Coho Salmon	Presence/Migration	542 ft.
Steelhead Trout	Spawning	178 ft.
Steelhead Trout	Presence/Migration	12,103 ft.

Coastal resident trout use habitats in nearly all of the shoreline jurisdictions, and both the cutthroat and rainbow trout are WDFW designated priority species due to their recreational value.

Olympic mudminnow (*Novumbra hubbsi*) presence is not well documented throughout the cities' shoreline jurisdictions, however their range includes all the cities' freshwater shorelines. Their typical environment includes slow-moving streams, wetlands, ponds, ditches, or sloughs with muddy substrate, still or slow moving water, and areas with abundant aquatic vegetation. Wetland protection is considered essential for the conservation of the species (WDFW 2013b).

The lower estuarine waters of the Hoquiam River are a common foraging area for harbor seals. Bald eagles are present throughout the cities' shorelines and have been observed perching on natural and human-made structures throughout the shoreline jurisdiction. There are approximately two acres of Peregrine Falcon habitat and eight acres of Purple Martin habitat located in the reach.

F. Critical Aquifer Recharge Areas

Critical aquifer recharge areas have not been mapped in the cities. There are no known wellhead protection areas in the cities or their shoreline jurisdictions (WDOH 2014b). Where no specific studies have been done, the cities may use existing soil and surficial geologic information to determine where recharge areas exist. To determine the threat to groundwater quality, existing land use activities and their potential to lead to contamination should be evaluated (WAC 365-190-100). Critical aquifer recharge areas may be present and require protection in the shoreline jurisdiction but none has been identified in the cities at the time of this inventory and characterization report.

2.16 REACH 16 – LITTLE HOQUIAM RIVER

The Little Hoquiam River Reach (WRIA 22 – the Lower Chehalis Watershed) is approximately 165 acres in area. Land cover is comprised of 46 percent woody wetlands, 33 percent evergreen forest, six percent low intensity development, five percent developed open space, four percent deciduous forest, four percent emergent herbaceous wetlands, one percent medium intensity development, and less than one percent of shrub/scrub and open water. Approximately 32 percent, or 53 acres, of the Little Hoquiam River Reach is in public ownership.

2.16.01 SHORELINE CHARACTERISTICS

The Little Hoquiam River Reach is located directly to the north of the city, and flows into the Hoquiam River. Although the majority of the reach is zoned for residential uses, it remains largely undeveloped. There are few shoreline modifications that impact ecological functions present in this reach.

2.16.02 LAND USE

The predominant land uses in the Little Hoquiam River Reach are parks, open space, and undeveloped land. The current land use patterns found in the Little Hoquiam River Reach are provided in Table 2-39 below.

Table 2-39. Current Land Use Patterns for the Little Hoquiam River Reach.

Current Land Use Patterns	Percentage of Reach
Parks/Open Space	49.2%
Vacant/Undeveloped	44.6%
Public Services	2.9%
Residential	2.4%
Transportation/Communication/Utilities	0.7%
Commercial	0.2%

Land Cover	Percentage of Reach
Woody Wetlands	46.4%
Evergreen Forest	33%
Low Intensity Development	6.4%
Developed Open Space	5.4%
Deciduous Forest	3.7%
Emergent Herbaceous Wetlands	3.6%
Medium Intensity Development	1.1%
Shrub/Scrub	0.3%
Open Water	0.1%

The zoning designations from the HMC Chapter 10.03 found in the Little Hoquiam River Reach are provided in Table 2-40 below.

Table 2-40. Current Zoning Designations for the Little Hoquiam River Reach.

Description	Symbol	Typical Uses	Percentage of Reach
Low Density Residential	R1	Dwellings: duplex, manufactured, multi-family with four or less units, single-family; Family childcare providers; Home occupations.	81.2%
Natural Resources	NR	Parks, public; Recreational facilities; Timberland production.	17.3%
High Density Residential	R2	Dwellings: duplex, manufactured, multi-family with five or more units, multi-family with four or less units, single-family; Family child care providers; Home occupations; Hospitals, medical and dental clinics; Manufactured home parks; Personal services; Restaurants, 20 seats or less.	0.6%
Waterfront Overlay District	WF-1	Community facilities; Dwellings, multi-family with five or more units; Dwellings, multi-family with four or less units; Dwellings, single-family; Marina facilities; Motels and hotels; Parks, public; Personal services; Places for religious worship; Professional services; Recreational facilities; Retail sales.	0.6%
Industrial	I	Asphalt, rock crushing, and concrete batch plants; Automobile, heavy maintenance and repair shops; Automobile wrecking, towing, or junkyards; Contractor yards; Food processing; Freight terminals; Hospitals, medical and dental clinics; Industry, heavy; Industry, light and within a structure; Mini-storage facilities; Outdoor storage; Small engine sales, service and repair; Ship terminals, slips, and repair facilities; Truck and heavy equipment sales and services; Warehousing; Wholesale liquefied	0.4%

Description	Symbol	Typical Uses	Percentage of Reach
		petroleum sales; Wholesale sales and product distribution centers.	

2.16.03 EXISTING PUBLIC ACCESS

The Little Hoquiam Boat Launch provides public access to the Little Hoquiam River, and includes a paved launch lane and 10 parking spaces. The boat launch covers 120 feet of shoreline frontage.

2.16.04 SHORELINE MODIFICATIONS

Along the rivers throughout Hoquiam small rock revetments and “sugar dikes,” small berms or levees comprised of pushed-up native soil, are common. Abandoned piles, some of which may be creosote treated, are also common in the rivers. The information on the rivers throughout the city is limited and generally of poor quality.

There are over 1,300 feet of levee and four tide gates in the Little Hoquiam River Reach. Comprehensive information on shoreline modifications other than dikes and levees is not available for this reach.

2.16.05 ECOLOGICAL FUNCTIONS

The Little Hoquiam River scored the highest on the functional assessment among reaches in Hoquiam. Most of the reach is in the floodplain, well vegetated, and undeveloped, providing good habitat conditions for a variety of species. Twenty-three percent of the reach is mapped as wetland in the NWI. Land-cover data shows that forest and shrub wetlands cover 46 percent of the reach, indicating that additional wetlands may be present that are not mapped in the NWI, particularly along low-lying areas of the stream’s floodplain. The historical channel migration zone for the Little Hoquiam River extends from valley wall to valley wall, which for the lower portion of the reach is approximately between SR 109 and Endresen Road. The upper portion is wider, likely encompassing the mapped floodplain.

A. Geologically Hazardous Areas

Approximately 61 percent of the area within the Little Hoquiam River Reach is subject to moderate to high risk of liquefaction hazard, and 54 percent of the reach is within the mapped Cascadia Scenario 1A seismic hazard area. There are no landslide hazard areas mapped within the reach.

B. Flood Hazard Areas

The Little Hoquiam River Reach has 81 percent of its total area within the 100-year floodplain.

C. Wetlands

Approximately 38 acres of identified wetlands exist within the Little Hoquiam River Reach, comprising 23 percent of the reach's total area.

D. Streams

Instream priority habitats exist within the Little Hoquiam River Reach, and serve as areas where a combination of physical, biological, and chemical processes and conditions interact to provide functional life history requirements for instream fish and wildlife resources.

E. Other Fish and Wildlife Habitat Conservation Areas

The following fish have been identified within the Little Hoquiam River Reach, with their associated habitat type and length of documented presence listed below:

Fish Species	Habitat Type	Documented Presence
Coast Resident Cutthroat	Presence/Migration	17,307 ft.
Coho Salmon	Presence/Migration	17,307 ft.
Steelhead Trout	Spawning	17,307 ft.

Coastal resident trout use habitats in nearly all of the shoreline jurisdictions, and both the cutthroat and rainbow trout are WDFW designated priority species due to their recreational value.

Olympic mudminnow (*Novumbra hubbsi*) presence is not well documented throughout the cities' shoreline jurisdictions, however their range includes all the cities' freshwater shorelines. Their typical environment includes slow-moving streams, wetlands, ponds, ditches, or sloughs with muddy substrate, still or slow moving water, and areas with abundant aquatic vegetation. Wetland protection is considered essential for the conservation of the species (WDFW 2013b).

Bald eagles are present throughout the cities' shorelines and have been observed perching on natural and human-made structures throughout the shoreline jurisdiction.

F. Critical Aquifer Recharge Areas

Critical aquifer recharge areas have not been mapped in the cities. There are no known wellhead protection areas in the cities or their shoreline jurisdictions (WDOH 2014b). Where no specific studies have been done, the cities may use existing soil and surficial geologic information to determine where recharge areas exist. To determine the threat to groundwater quality, existing land use activities and their potential to lead to contamination should be evaluated (WAC 365-190-100). Critical aquifer recharge areas may be present and require protection in the shoreline jurisdiction but none has been identified in the cities at the time of this inventory and characterization report.

3 REASONABLY FORESEEABLE DEVELOPMENT

According to the SMP Guidelines, the CIA should evaluate the reasonably foreseeable future development and use of the shoreline that is likely to occur based upon the proposed shoreline environment designations within the planning period. The planning period for the SMP is 20 years. Information in this section is drawn primarily from the SIC prepared for the cities.

3.01 REACH 1 – ABERDEEN LAKE

The Aberdeen Lake Reach consists of Aberdeen Lake (52 acres). The area is used for recreation and serves as a destination for fishing, swimming, and boating. Future development within this reach not related to the city's current use of the park is unlikely.

The proposed environmental designation of Urban Conservancy dictates the permitted actions within the Aberdeen Lake Reach. The purpose of the Urban Conservancy environment is to protect and restore ecological functions of open space, floodplain, and other sensitive lands where they exist in urban and developed settings, while allowing a variety of compatible uses.

3.01.01 PATTERNS OF SHORELINE ACTIVITY

The Aberdeen Lake Reach contains six parcels, as shown in Table 3-1. Of these parcels, four are vacant. All six parcels are protected from development by public or conservation group ownership, conservation easements, or similar mechanisms.

Table 3-1. Vacant and Developed Parcels in the Aberdeen Lake Reach.

Aberdeen Lake	Number of Parcels	Area in Acres
Vacant	4	53.2
Developed	2	526.8
Total	6	580.0

3.01.02 RESIDENTIAL DEVELOPMENT

The Aberdeen Lake Reach contains no residential parcels.

3.01.03 COMMERCIAL, INDUSTRIAL, AND UTILITY DEVELOPMENT

The Aberdeen Lake Reach contains six parcels zoned I (Industrial), as shown in Table 3-2. Of these parcels, four are vacant. The industrial zoning designation reflects the presence of the dam. All of the parcels within the reach are in public ownership that is used for recreational purposes.

Table 3-2. Vacant and Developed Commercial Parcels in the Aberdeen Lake Reach.

Aberdeen Lake	Number of Parcels	Area in Acres
Vacant	4	53.2
Developed	2	526.8
Total	6	580.0

3.01.04 WATERFRONT DEVELOPMENT

The Aberdeen Lake Reach contains no parcels zoned Waterfront Development.

3.01.05 RECREATIONAL DEVELOPMENT

Substantial recreational development is unlikely in this reach. Rather, it should be assumed that the existing recreational opportunities will continue.

3.01.06 SHORELINE STABILIZATION

A delta has formed at Lake Aberdeen, resulting from the accumulated sediment from the construction of a dam at the upstream end of the reservoir.

3.01.07 DEVELOPMENT BY SHORELINE ENVIRONMENT DESIGNATION

There are four vacant parcels totaling 53.2 acres intersecting the shoreline jurisdiction, as shown in Table 3-3. All the vacant parcels in this reach are under public ownership and the Urban Conservancy Shoreline Environment Designation, minimizing possible development.

Table 3-3. Development Potential by Shoreline Environment Designation in the Aberdeen Lake Reach.

Shoreline Environment Designation	Number of Vacant Parcels	Area in Acres
Urban Conservancy	4	53.2
Total	4	53.2

3.02 REACH 2 – CHARLEY CREEK

The Charley Creek Reach consists entirely of Industrial zoned land. The majority of this reach is undeveloped forested wetland and riparian areas.

The proposed environmental designations of High Intensity and Urban Conservancy dictate the permitted actions within the Charley Creek Reach. The purpose of the High Intensity environment is to provide for high intensity water-oriented commercial, transportation, and industrial uses while protecting existing ecological functions and restoring ecological functions in areas that have been previously degraded.

The purpose of the Urban Conservancy environment is to protect and restore ecological functions of open space, floodplain, and other sensitive lands where they exist in urban and developed settings, while allowing a variety of compatible uses.

3.02.01 PATTERNS OF SHORELINE ACTIVITY

The Charley Creek Reach contains five parcels, as shown in Table 3-4. Of these parcels, two are vacant. No parcels are protected from development by public or conservation group ownership, conservation easements, or similar mechanisms.

Table 3-4. Vacant and Developed Parcels in the Charley Creek Reach.

Charley Creek	Number of Parcels	Area in Acres
Vacant	2	8.0
Developed	3	23.8
Total	5	31.8

3.02.02 RESIDENTIAL DEVELOPMENT

The Charley Creek Reach contains no residential parcels.

3.02.03 COMMERCIAL, INDUSTRIAL, AND UTILITY DEVELOPMENT

The Charley Creek Reach contains five parcels zoned I (Industrial), as shown in Table 3-2. Of these parcels, two are vacant.

Table 3-5. Vacant and Developed Commercial Parcels in the Charley Creek Reach.

Charley Creek	Number of Parcels	Area in Acres
Vacant	2	8.0
Developed	3	23.8
Total	5	31.8

3.02.04 WATERFRONT DEVELOPMENT

The Charley Creek Reach contains no parcels zoned for waterfront development.

3.02.05 RECREATIONAL DEVELOPMENT

The Charley Creek Reach contains no parcels zoned for recreational development.

3.02.06 SHORELINE STABILIZATION

Additional shoreline stabilization in the Charley Creek Reach is unlikely.

3.02.07 DEVELOPMENT BY SHORELINE ENVIRONMENT DESIGNATION

There are two vacant parcels totaling eight acres intersecting the shoreline jurisdiction, as shown in Table 3-6. Both vacant parcels are designated as High Intensity shoreline environments.

Table 3-6. Development Potential by Shoreline Environment Designation in the Charley Creek Reach.

Shoreline Environment Designation	Number of Vacant Parcels	Area in Acres
High Intensity	2	8.0
Total	2	8.0

3.03 REACH 3 – CHEHALIS RIVER - ABERDEEN

The Chehalis River - Aberdeen Reach zoning consists of Industrial (79 acres), Single Family Residential (26 acres), Waterfront Development (21 acres), Commercial/Residential (2 acres), Light Industrial (1 acres) and General Commercial (1 acre). Industrial areas in this reach are largely developed and it will remain industrial use unless changes in the adopted zoning code are made.

The proposed environmental designations of High Intensity and Urban Conservancy dictate the permitted actions within the Chehalis River - Aberdeen Reach. The purpose of the High Intensity environment is to provide for high intensity water-oriented commercial, transportation, and industrial uses while protecting existing ecological functions and restoring ecological functions in areas that have been previously degraded.

The purpose of the Urban Conservancy environment is to protect and restore ecological functions of open space, floodplain, and other sensitive lands where they exist in urban and developed settings, while allowing a variety of compatible uses.

3.03.01 PATTERNS OF SHORELINE ACTIVITY

The Chehalis River – Aberdeen Reach contains 213 parcels, as shown in Table 3-7. Of these parcels, 169 are vacant. Forty-seven parcels are protected from development by public or conservation group ownership, conservation easements, or similar mechanisms.

Table 3-7. Vacant and Developed Parcels in the Chehalis River - Aberdeen Reach.

Chehalis River - Aberdeen	Number of Parcels	Area in Acres
Vacant	169	184.3
Developed	44	61.8
Total	213	246.1

3.03.02 RESIDENTIAL DEVELOPMENT

The Chehalis River - Aberdeen Reach contains 123 parcels zoned either RS or RM (Single Family Residential or Multiple Family Residential), as shown in Table 3-8. Of these parcels, 107 are vacant. The vacant parcels are located in a large wetland associated with Mill Creek. Future development will have to comply with the critical areas regulations found in SMP Appendix 2.

Table 3-8. Vacant and Developed Residential Parcels in the Chehalis River - Aberdeen Reach.

Chehalis River - Aberdeen	Number of Parcels	Area in Acres
Vacant	107	45.6
Developed	16	3.8
Total	123	49.4

3.03.03 COMMERCIAL, INDUSTRIAL, AND UTILITY DEVELOPMENT

As shown in Table 3-9, the Chehalis River - Aberdeen contains 71 parcels zoned CG, CR, I, or LI (General Commercial, Commercial/Residential, Industrial, or Light Industrial). Of these parcels,

55 are vacant. Several large undeveloped parcels are the site of former Weyerhaeuser mill operations. There is potential for new commercial or industrial development to locate on the vacated properties.

Table 3-9. Vacant and Developed Commercial Parcels in the Chehalis River - Aberdeen Reach.

Chehalis River - Aberdeen	Number of Parcels	Area in Acres
Vacant	55	127.7
Developed	16	34.1
Total	71	161.8

3.03.04 WATERFRONT DEVELOPMENT

The Chehalis River - Aberdeen Reach contains 19 parcels zoned WD (Waterfront Development), as shown in Table 3-10. Of these parcels, seven are vacant.

Table 3-10. Vacant and Developed Waterfront Development Parcels in the Chehalis River - Aberdeen Reach.

Chehalis River - Aberdeen	Number of Parcels	Area in Acres
Vacant	7	10.3
Developed	12	23.9
Total	19	34.2

3.03.05 RECREATIONAL DEVELOPMENT

There are existing recreational opportunities within this reach. Plans for this reach are unknown at this time.

3.03.06 SHORELINE STABILIZATION

Shoreline stabilization data for this reach is limited. It is not possible to forecast changes to shoreline modifications at this time.

3.03.07 DEVELOPMENT BY SHORELINE ENVIRONMENT DESIGNATION

There are 168 vacant parcels totaling 184.2 acres intersecting the shoreline jurisdiction, as shown in Table 3-11. Development potential exists in both the Urban Conservancy and High Intensity shoreline environment designations. Several of the parcels that are listed as vacant have had mill-related structures removed. Redevelopment on these parcels will depend on economic factors.

Table 3-11. Development Potential by Shoreline Environment Designation in the Chehalis River - Aberdeen Reach.

Shoreline Environment Designation	Number of Vacant Parcels	Area in Acres
Urban Conservancy	116	46.7
High Intensity	52	137.5
Total	168	184.2

3.04 REACH 4 – FRY CREEK - ABERDEEN

The Fry Creek - Aberdeen Reach zoning consists of Industrial (18 acres) and Light Industrial (3 acres). The area is highly developed; and due to limited industrial land within the city, it will likely remain in this designation.

The proposed environmental designation of High Intensity dictates the permitted actions within the Fry Creek - Aberdeen Reach. The purpose of the High Intensity environment is to provide for high intensity water-oriented commercial, transportation, and industrial uses while protecting existing ecological functions and restoring ecological functions in areas that have been previously degraded.

3.04.01 PATTERNS OF SHORELINE ACTIVITY

The Fry Creek - Aberdeen Reach contains 11 parcels, as shown in Table 3-12. Of these parcels, eight are vacant. Seven parcels are owned by the Port of Grays Harbor and Washington State Department of Transportation (WSDOT).

Table 3-12. Vacant and Developed Parcels in the Fry Creek - Aberdeen Reach.

Fry Creek - Aberdeen	Number of Parcels	Area in Acres
Vacant	8	8.0
Developed	3	112.2
Total	11	120.2

3.04.02 RESIDENTIAL DEVELOPMENT

The Fry Creek - Aberdeen Reach contains no residential parcels.

3.04.03 COMMERCIAL, INDUSTRIAL, AND UTILITY DEVELOPMENT

The Fry Creek - Aberdeen Reach contains 11 parcels zoned I, or LI (Industrial, or Light Industrial), as shown in Table 3-13. Of these parcels, eight are vacant. In this instance, the vacant parcels contain no structures but contain active port-related uses.

Table 3-13. Vacant and Developed Commercial Parcels in the Fry Creek - Aberdeen Reach.

Fry Creek - Aberdeen	Number of Parcels	Area in Acres
Vacant	8	8.0
Developed	3	112.2
Total	11	120.2

3.04.04 WATERFRONT DEVELOPMENT

The Fry Creek – Aberdeen Reach contains no parcels zoned Waterfront Development.

3.04.05 RECREATIONAL DEVELOPMENT

Recreational development is unlikely in this reach due to the presence of port-related industrial uses.

3.04.06 SHORELINE STABILIZATION

Potential for shoreline stabilization construction or modification measures are unknown at this time.

3.04.07 DEVELOPMENT BY SHORELINE ENVIRONMENT DESIGNATION

There are eight vacant parcels totaling eight acres intersecting the shoreline jurisdiction, as shown in Table 3-14. Vacant parcels are currently used for the SR 520 Pontoon Construction and uses associated with Port of Grays Harbor Terminal 4. Continuing use or redevelopment should be expected.

Table 3-14. Development Potential by Shoreline Environment Designation in the Fry Creek - Aberdeen Reach.

Shoreline Environment Designation	Number of Vacant Parcels	Area in Acres
High Intensity	8	8.0
Total	8	8.0

3.05 REACH 5 – GRAYS HARBOR NORTH BANK

The Grays Harbor North Bank Reach zoning consists of Industrial (46 acres) and Light Industrial (16 acres). Unless changes in the adopted zoning code are made, this area will likely remain as industrial.

The proposed environmental designation of High Intensity dictates the permitted actions within the Grays Harbor North Bank Reach. The purpose of the High Intensity environment is to provide for high intensity water-oriented commercial, transportation, and industrial uses while protecting existing ecological functions and restoring ecological functions in areas that have been previously degraded.

3.05.01 PATTERNS OF SHORELINE ACTIVITY

The Grays Harbor North Bank Reach contains 30 parcels, as shown in Table 3-15. Of these parcels, 17 are vacant. Five parcels are publicly owned.

Table 3-15. Vacant and Developed Parcels in the Grays Harbor North Bank Reach.

Grays Harbor North Bank	Number of Parcels	Area in Acres
Vacant	17	83.7
Developed	13	145.4
Total	30	229.1

3.05.02 RESIDENTIAL DEVELOPMENT

The Grays Harbor North Bank Reach contains one parcel zoned RS (Single Family Residential), as shown in Table 3-8. The parcel is already developed.

Table 3-16. Vacant and Developed Residential Parcels in the Grays Harbor North Bank Reach.

Grays Harbor North Bank	Number of Parcels	Area in Acres
Vacant	0	0
Developed	1	2.2
Total	1	2.2

3.05.03 COMMERCIAL, INDUSTRIAL, AND UTILITY DEVELOPMENT

The Grays Harbor North Bank Reach contains 30 parcels zoned I, or LI (Industrial, or Light Industrial), as shown in Table 3-17. Of these parcels, 17 are vacant. While some commercial capacity exists, most of the commercial, industrial, and utility land contains active port uses, including the Port of Grays Harbor Terminal 4.

Table 3-17. Vacant and Developed Commercial Parcels in the Grays Harbor North Bank Reach.

Grays Harbor North Bank	Number of Parcels	Area in Acres
Vacant	17	83.7
Developed	12	143.2
Total	29	226.9

3.05.04 WATERFRONT DEVELOPMENT

The Grays Harbor North Bank Reach contains no parcels zoned Waterfront Development.

3.05.05 RECREATIONAL DEVELOPMENT

Recreational development opportunities in this reach are limited.

3.05.06 SHORELINE STABILIZATION

Shoreline stabilization data for this reach is limited. It is not possible to forecast changes to shoreline modifications at this time.

3.05.07 DEVELOPMENT BY SHORELINE ENVIRONMENT DESIGNATION

There are 17 vacant parcels totaling 83.7 acres intersecting the shoreline jurisdiction, as shown in Table 3-13. As stated previously, there is capacity for development and/or redevelopment in this reach. New development will likely occur on Port of Grays Harbor property, and the extent of development will depend on economic factors.

Table 3-18. Development Potential by Shoreline Environment Designation in the Grays Harbor North Bank Reach.

Shoreline Environment Designation	Number of Vacant Parcels	Area in Acres
High Intensity	17	83.7
Total		

3.06 REACH 6 – GRAYS HARBOR SOUTH BANK

The Grays Harbor South Bank Reach zoning consists of Industrial (356 acres), Single Family Residential (27 acres), Light Industrial (8 acres), Commercial/Residential (7 acres), and General Commercial (2 acres). The area is predominately zoned for Industrial use, and much of the

undeveloped land within the reach falls into this designation. While the area has some residential development, the levee, existing public access, and estuarine wetlands present may deter additional development.

The proposed environmental designations of High Intensity and Shoreline Residential dictate the permitted actions within the Grays Harbor South Bank Reach. The purpose of the High Intensity environment is to provide for high intensity water-oriented commercial, transportation, and industrial uses while protecting existing ecological functions and restoring ecological functions in areas that have been previously degraded. The purpose of the Shoreline Residential environment is to accommodate residential development and appurtenant structures that are consistent with the Comprehensive Plan zoning designations. Additionally, the Shoreline Residential environment is meant to provide appropriate public access and recreational uses to waterways and wetlands within the reach.

3.06.01 PATTERNS OF SHORELINE ACTIVITY

The Grays Harbor South Bank Reach contains 134 parcels, as shown in Table 3-19. Of these parcels, 68 are vacant. Twenty-three parcels are owned by public agencies.

Table 3-19. Vacant and Developed Parcels in the Grays Harbor South Bank Reach.

Grays Harbor South Bank	Number of Parcels	Area in Acres
Vacant	68	468.3
Developed	66	68.1
Total	134	536.4

3.06.02 RESIDENTIAL DEVELOPMENT

The Grays Harbor South Bank Reach contains 81 parcels zoned either RS or RM (Single Family Residential or Multiple Family Residential), as shown in Table 3-20. Of these parcels, 26 are vacant. Future development within this reach will likely include residential development on vacant lots.

Table 3-20. Vacant and Developed Residential Parcels in the Grays Harbor South Bank Reach.

Grays Harbor South Bank	Number of Parcels	Area in Acres
Vacant	26	20.4
Developed	55	28.7
Total	81	49.1

3.06.03 COMMERCIAL, INDUSTRIAL, AND UTILITY DEVELOPMENT

As shown in Table 3-21, the Grays Harbor South Bank Reach contains 11 parcels zoned CG, CR, I, or LI (General Commercial, Commercial/Residential, Industrial, or Light Industrial). There are no vacant parcels. The Grays Harbor South Bank Reach contains detention ponds, which are located adjacent to Grays Harbor and limit future development.

Table 3-21. Vacant and Developed Commercial Parcels in the Grays Harbor South Bank Reach.

Grays Harbor South Bank	Number of Parcels	Area in Acres
Vacant	0	0
Developed	11	39.4
Total	11	39.4

3.06.04 WATERFRONT DEVELOPMENT

The Grays Harbor South Bank Reach contains no parcels zoned Waterfront Development.

3.06.05 RECREATIONAL DEVELOPMENT

There are no parcels zoned for recreational development, and potential recreational development is unknown at this time.

3.06.06 SHORELINE STABILIZATION

Shoreline stabilization data for this reach is limited. The banks of this reach are not as heavily modified as in the Grays Harbor North Bank Reach. It is not possible to forecast changes to shoreline modifications at this time.

3.06.07 DEVELOPMENT BY SHORELINE ENVIRONMENT DESIGNATION

There are 68 vacant parcels totaling 468.3 acres intersecting the shoreline jurisdiction, as shown in Table 3-13. Private development potential exists primarily in the Shoreline Residential

shoreline environment designation, however public development could occur in the High Intensity shoreline environment designation, particularly on Port of Grays Harbor owned land.

Table 3-22. Development Potential by Shoreline Environment Designation in the Grays Harbor South Bank Reach.

Shoreline Environment Designation	Number of Vacant Parcels	Area in Acres
Shoreline Residential	31	25.7
High Intensity	37	442.6
Total	68	468.3

3.07 REACH 7 – NEWSKAH CREEK

The Newskah Creek Reach zoning consists of Industrial designated land (12 acres). The area adjacent to the reach is currently being developed as an athletic center and as such, it will likely not see any future developments due to deed restrictions and conservation easements that protect it as a mitigation site for wetland impacts associated with utility work at Stafford Creek Prison.

The proposed environmental designation of Urban Conservancy dictates the permitted actions within the Newskah Creek Reach. The purpose of the Urban Conservancy environment is to protect and restore ecological functions of open space, floodplain, and other sensitive lands where they exist in urban and developed settings, while allowing a variety of compatible uses.

3.07.01 PATTERNS OF SHORELINE ACTIVITY

The Newskah River Reach contains three parcels, as shown in Table 3-23. Of these parcels, two are vacant. All three parcels are publicly owned.

Table 3-23. Vacant and Developed Parcels in the Newskah Creek Reach.

Newskah Creek	Number of Parcels	Area in Acres
Vacant	2	8.9
Developed	1	43.3
Total	3	52.2

3.07.02 RESIDENTIAL DEVELOPMENT

The Newskah Creek Reach does not contain residential parcels.

3.07.03 COMMERCIAL, INDUSTRIAL, AND UTILITY DEVELOPMENT

The Newkah Creek Reach contains three parcels zoned I(Industrial), as shown in Table 3-24. Of these parcels, two are vacant.

Table 3-24. Vacant and Developed Commercial Parcels in the Newkah Creek Reach.

Newkah Creek	Number of Parcels	Area in Acres
Vacant	2	8.9
Developed	1	43.3
Total	3	52.2

3.07.04 WATERFRONT DEVELOPMENT

The Newkah Creek Reach contains no parcels zoned Waterfront Development.

3.07.05 RECREATIONAL DEVELOPMENT

There are existing recreational opportunities within this reach. Plans for this reach are unknown at this time.

3.07.06 SHORELINE STABILIZATION

Shoreline stabilization data for this reach is limited. It is not possible to forecast changes to shoreline modifications at this time.

3.07.07 DEVELOPMENT BY SHORELINE ENVIRONMENT DESIGNATION

There are two vacant parcels totaling 8.9 acres intersecting the shoreline jurisdiction, as shown in Table 3-13. Development potential is limited due to deed restrictions and conservation easements that protect it as a mitigation site for wetland impacts associated with utility work at Stafford Creek Prison, as stated above.

Table 3-25. Development Potential by Shoreline Environment Designation in the Newkah Creek Reach.

Shoreline Environment Designation	Number of Vacant Parcels	Area in Acres
Urban Conservancy	2	8.9
Total	2	8.9

3.08 REACH 8 – WEDEKIND CONFLUENCE

The Wedekind Confluence Reach zoning consists of Industrial (39 acres). This reach, at the confluence of the Wynoochee River and Wedekind Creek, has little expected development other than maintenance of the utility plant.

The proposed environmental designation of Urban Conservancy dictates the permitted actions within the Wedekind Confluence Reach. The purpose of the Urban Conservancy environment is to protect and restore ecological functions of open space, floodplain, and other sensitive lands where they exist in urban and developed settings, while allowing a variety of compatible uses.

3.08.01 PATTERNS OF SHORELINE ACTIVITY

The Wedekind Confluence Reach contains five parcels, as shown in Table 3-26. Of these parcels, two are vacant. Two parcels are protected from development by public or conservation group ownership, conservation easements, or similar mechanisms.

Table 3-26. Vacant and Developed Parcels in the Wedekind Confluence Reach.

Wedekind Confluence	Number of Parcels	Area in Acres
Vacant	2	13.0
Developed	3	187.1
Total	5	200.1

3.08.02 RESIDENTIAL DEVELOPMENT

The Wedekind Confluence Reach contains three parcels zoned either RS or RM (Single Family Residential or Multiple Family Residential), as shown in Table 3-27. Of these parcels, one is vacant. Future development is limited to a single lot approximately one half acre in size.

Table 3-27. Vacant and Developed Residential Parcels in the Wedekind Confluence Reach.

Wedekind Confluence	Number of Parcels	Area in Acres
Vacant	1	0.6
Developed	2	91.3
Total	3	91.9

3.08.03 COMMERCIAL, INDUSTRIAL, AND UTILITY DEVELOPMENT

The Wedekind Confluence Reach contains two parcels zoned I (Industrial), as shown in Table 3-28. Of these parcels, one is vacant and one is improved with a dam. Most of the reach is undevelopable land in public ownership that is used for recreational purposes.

Table 3-28. Vacant and Developed Commercial Parcels in the Wedekind Confluence Reach.

Wedekind Confluence	Number of Parcels	Area in Acres
Vacant	1	12.4
Developed	1	95.7
Total	2	108.1

3.08.04 WATERFRONT DEVELOPMENT

The Wedekind Confluence Reach contains no parcels zoned Waterfront Development.

3.08.05 RECREATIONAL DEVELOPMENT

There are existing recreational opportunities within this reach. Plans for this reach are unknown at this time.

3.08.06 SHORELINE STABILIZATION

This reach contains a dam and further shoreline stabilization measures are unlikely.

3.08.07 DEVELOPMENT BY SHORELINE ENVIRONMENT DESIGNATION

There are two vacant parcels totaling 13 acres intersecting the shoreline jurisdiction, as shown in Table 3-29. As stated previously in this section, future development in this reach is very limited.

Table 3-29. Development Potential by Shoreline Environment Designation in the Wedekind Confluence Reach.

Shoreline Environment Designation	Number of Vacant Parcels	Area in Acres
Urban Conservancy	2	13.0
Total	2	13.0

3.09 REACH 9 – WISHKAH RIVER

The Wishkah River Reach zoning consists of Multiple Family Residential (73 acres), Single Family Residential (38 acres) and Waterfront Development (18 acres), Light Industrial (2 acres) and General Commercial (2 acres).

The proposed environmental designations of High Intensity, Shoreline Residential, and Urban Conservancy dictate the permitted actions within the Wishkah River Reach.

The purpose of the High Intensity environment is to provide for high intensity water-oriented commercial, transportation, and industrial uses while protecting existing ecological functions and restoring ecological functions in areas that have been previously degraded.

The purpose of the Shoreline Residential environment is to accommodate residential development and appurtenant structures that are consistent with the Comprehensive Plan zoning designations. Additionally, the Shoreline Residential environment is meant to provide appropriate public access and recreational uses to waterways and wetlands within the reach.

The purpose of the Urban Conservancy environment is to protect and restore ecological functions of open space, floodplain, and other sensitive lands where they exist in urban and developed settings, while allowing a variety of compatible uses.

3.09.01 PATTERNS OF SHORELINE ACTIVITY

The Wishkah River Reach contains 404 parcels, as shown in Table 3-30. Of these parcels, 202 are vacant. Thirty-seven parcels are publicly owned.

Table 3-30. Vacant and Developed Parcels in the Wishkah River Reach.

Wishkah River	Number of Parcels	Area in Acres
Vacant	202	112.1
Developed	202	93.5
Total	404	205.6

3.09.02 RESIDENTIAL DEVELOPMENT

The Wishkah River Reach contains 264 parcels zoned either RS or RM (Single Family Residential or Multiple Family Residential), as shown in Table 3-31. Of these parcels, 115 are vacant. Future residential development within this reach will likely include infill on vacant parcels scattered throughout the reach.

Table 3-31. Vacant and Developed Residential Parcels in the Wishkah River Reach.

Wishkah River	Number of Parcels	Area in Acres
Vacant	115	99.7
Developed	149	80.4
Total	264	180.1

3.09.03 COMMERCIAL, INDUSTRIAL, AND UTILITY DEVELOPMENT

The Wishkah River Reach contains 13 parcels zoned CG or LI (General Commercial or Light Industrial), as shown in Table 3-32. Of these parcels, none is vacant. Commercial development in this reach is limited to redevelopment.

Table 3-32. Vacant and Developed Commercial Parcels in the Wishkah River Reach.

Wishkah River	Number of Parcels	Area in Acres
Vacant	0	0
Developed	13	5.5
Total	13	5.5

3.09.04 WATERFRONT DEVELOPMENT

The Wishkah River Reach contains 40 parcels zoned WD (Waterfront Development), as shown in Table 3-33. All of the parcels are developed.

Table 3-33. Vacant and Developed Waterfront Development Parcels in the Wishkah River Reach.

Wishkah River	Number of Parcels	Area in Acres
Vacant	0	0
Developed	40	7.8
Total	40	7.8

3.09.05 RECREATIONAL DEVELOPMENT

There are no parcels zoned for recreational development, although there are existing recreational opportunities within this reach. Plans for this reach are unknown at this time.

3.09.06 SHORELINE STABILIZATION

Shoreline stabilization data for this reach is limited. It is not possible to forecast changes to shoreline modifications at this time.

3.09.07 DEVELOPMENT BY SHORELINE ENVIRONMENT DESIGNATION

There are 196 vacant parcels totaling 111.8 acres intersecting the shoreline jurisdiction, as shown in Table 3-34. Development potential exists primarily in the Shoreline Residential and High Intensity shoreline environment designations. Areas within the Urban Conservancy shoreline environment designation are dominated by wetlands, and development would have to comply with applicable critical areas regulations.

Table 3-34. Development Potential by Shoreline Environment Designation in the Wishkah River Reach.

Shoreline Environment Designation	Number of Vacant Parcels	Area in Acres
Urban Conservancy	28	70.3
Shoreline Residential	87	31.4
High Intensity	81	10.1
Total	196	111.8

3.10 REACH 10 – CHEHALIS RIVER - COSMOPOLIS

The Chehalis River - Cosmopolis Reach zoning consists of Manufacturing (101 acres), with some Public Reserve (25 acres), and Waterfront Use (11 acres). The north side of the river is largely undeveloped; however, it is almost entirely surge-plain wetlands and tidal channels making future development in this area unlikely.

The proposed environmental designations of High Intensity and Urban Conservancy dictate the permitted actions within the Chehalis River - Cosmopolis Reach.

The purpose of the High Intensity environment is to provide for high intensity water-oriented commercial, transportation, and industrial uses while protecting existing ecological functions and restoring ecological functions in areas that have been previously degraded.

The purpose of the Urban Conservancy environment is to protect and restore ecological functions of open space, floodplain, and other sensitive lands where they exist in urban and developed settings, while allowing a variety of compatible uses.

3.10.01 PATTERNS OF SHORELINE ACTIVITY

The Chehalis River - Cosmopolis Reach contains 40 parcels, as shown in Table 3-35. Of these parcels, 31 are vacant. Six parcels are publicly owned and may be protected from development by public or conservation group ownership, conservation easements, or similar mechanisms.

Table 3-35. Vacant and Developed Parcels in the Chehalis River - Cosmopolis Reach.

Chehalis River - Cosmopolis	Number of Parcels	Area in Acres
Vacant	31	229.6
Developed	9	38.1
Total	40	267.7

3.10.02 RESIDENTIAL DEVELOPMENT

The Chehalis River - Cosmopolis Reach contains no residential parcels.

3.10.03 COMMERCIAL, INDUSTRIAL, AND UTILITY DEVELOPMENT

The Chehalis River - Cosmopolis Reach contains 10 parcels zoned M or MU (Manufacturing or Multiple Use), as shown in Table 3-36. Of these parcels, eight are vacant. While some commercial and industrial capacity exists, most of the reach is associated with the Cosmo Specialty Fibers mill.

Table 3-36. Vacant and Developed Commercial Parcels in the Chehalis River-Cosmopolis Reach.

Chehalis River - Cosmopolis	Number of Parcels	Area in Acres
Vacant	8	191.9
Developed	2	35.8
Total	10	227.7

3.10.04 WATERFRONT DEVELOPMENT

The Chehalis River - Cosmopolis Reach contains 23 parcels zoned WA (Waterfront Use), as shown in Table 3-37. Of these parcels, 16 are vacant.

Table 3-37. Vacant and Developed Waterfront Development Parcels in the Chehalis River - Cosmopolis Reach.

Chehalis River - Cosmopolis	Number of Parcels	Area in Acres
Vacant	16	6.7
Developed	7	2.2
Total	23	8.9

3.10.05 RECREATIONAL DEVELOPMENT

The Chehalis River – Cosmopolis Reach contains three parcels zoned PR (Public Reserve), as shown in Table 3-38. Of these parcels, all are unimproved and contain a public park. Development potential is therefore limited.

Table 3-38. Vacant and Developed Public Reserve Parcels in the Chehalis River-Cosmopolis Reach.

Chehalis River - Cosmopolis	Number of Parcels	Area in Acres
Vacant	3	29.9
Developed	0	0
Total	3	29.9

3.10.06 SHORELINE STABILIZATION

It is not possible to forecast changes or additions to the exiting levee and shoreline armoring at this time.

3.10.07 DEVELOPMENT BY SHORELINE ENVIRONMENT DESIGNATION

There are 31 vacant parcels totaling 229.6 acres intersecting the shoreline jurisdiction, as shown in Table 3-39. Development potential exists primarily in the High Intensity shoreline environment designation. The Urban Conservancy shoreline designation contains undeveloped areas with wetlands that have a very low potential to develop.

Table 3-39. Development Potential by Shoreline Environment Designation in the Chehalis River – Cosmopolis Reach.

Shoreline Environment Designation	Number of Vacant Parcels	Area in Acres
Urban Conservancy	9	133.6
High Intensity	22	96.0
Total	31	229.6

3.11 REACH 11 – MILL CREEK

The Mill Creek Reach zoning consists of Mixed Use (33 acres), Medium Density Residential (8 acres), Public Reserve (2 acres), and Low Density Residential (0.5 acres). The Medium Density Residential area is largely built out, and it would likely not see any additional development. The area designated Mixed Use is covered by woody wetlands and may not be ideal for future development.

The proposed environmental designations of Shoreline Residential and Urban Conservancy dictate the permitted actions within the Mill Creek Reach.

The purpose of the Shoreline Residential environment is to accommodate residential development and appurtenant structures that are consistent with the Comprehensive Plan zoning designations. Additionally, the Shoreline Residential environment is meant to provide appropriate public access and recreational uses to waterways and wetlands within the reach.

The purpose of the Urban Conservancy environment is to protect and restore ecological functions of open space, floodplain, and other sensitive lands where they exist in urban and developed settings, while allowing a variety of compatible uses.

3.11.01 PATTERNS OF SHORELINE ACTIVITY

The Mill Creek Reach contains 69 parcels, as shown in Table 3-40. Of these parcels, 35 are vacant. Eleven parcels are publicly owned or protected from development.

Table 3-40. Vacant and Developed Parcels in the Mill Creek Reach.

Mill Creek	Number of Parcels	Area in Acres
Vacant	35	41.3
Developed	34	36.2
Total	69	77.5

3.11.02 RESIDENTIAL DEVELOPMENT

The Mill Creek Reach contains 49 parcels zoned either R100 or R57 (Low Density Residential or Medium Density Residential), as shown in Table 3-41. Of these parcels, 20 are vacant. Future development within this reach will be constrained by the presence of FEMA floodway and wetlands.

Table 3-41. Vacant and Developed Residential Parcels in the Mill Creek Reach.

Mill Creek	Number of Parcels	Area in Acres
Vacant	20	7.9
Developed	29	6.3
Total	49	14.2

3.11.03 COMMERCIAL, INDUSTRIAL, AND UTILITY DEVELOPMENT

The Mill Creek Reach contains 18 parcels zoned MU (Multiple Use), as shown in Table 3-42. Of these parcels, 14 are vacant. While some commercial capacity exists, future development within this reach will be constrained by the presence of FEMA floodway and wetlands.

Table 3-42. Vacant and Developed Commercial Parcels in the Mill Creek Reach.

Mill Creek	Number of Parcels	Area in Acres
Vacant	14	32.9
Developed	4	7.1
Total	18	40.0

3.11.04 RECREATIONAL DEVELOPMENT

The Mill Creek Reach contains two parcels zoned PR (Public Reserve), as shown in Table 3-2. These parcels contain public recreation amenities.

Table 3-43. Vacant and Developed Public Reserve Parcels in the Mill Creek Reach.

Mill Creek	Number of Parcels	Area in Acres
Vacant	1	0.5
Developed	1	22.8
Total	2	23.3

3.11.05 SHORELINE STABILIZATION

It is not anticipated that the extent of shoreline stabilization will increase in this reach.

3.11.06 DEVELOPMENT BY SHORELINE ENVIRONMENT DESIGNATION

There are 35 vacant parcels totaling 41.2 acres intersecting the shoreline jurisdiction, as shown in Table 3-44. Development potential in this reach is constrained by FEMA Floodway, 100-year floodplain, and wetlands.

Table 3-44. Development Potential by Shoreline Environment Designation in the Mill Creek Reach.

Shoreline Environment Designation	Number of Vacant Parcels	Area in Acres
Urban Conservancy	30	40.0
Shoreline Residential	5	1.2
Total	35	41.2

3.12 REACH 12 – EAST HOQUIAM RIVER

The East Hoquiam River Reach zoning consists of High Density Residential (29 acres) and Industrial (14 acres). This reach is relatively developed, and it includes one large plywood manufacturing plant. Future industrial development within this reach could occur south of the plywood manufacturing plant. The residential areas within this reach are built out; and as such, it is unlikely that there would be any high-density residential development in the future.

The proposed environmental designations of High Intensity and Shoreline Residential dictate the permitted actions within the East Hoquiam River Reach.

The purpose of the High Intensity environment is to provide for high intensity water-oriented commercial, transportation, and industrial uses while protecting existing ecological functions and restoring ecological functions in areas that have been previously degraded.

The purpose of the Shoreline Residential environment is to accommodate residential development and appurtenant structures that are consistent with the Comprehensive Plan zoning designations. Additionally, the Shoreline Residential environment is meant to provide appropriate public access and recreational uses to waterways and wetlands within the reach.

3.12.01 PATTERNS OF SHORELINE ACTIVITY

The East Hoquiam River Reach contains 31 parcels, as shown in Table 3-45. Of these parcels, 12 are vacant. No parcels are protected from development by public or conservation group ownership, conservation easements, or similar mechanisms.

Table 3-45. Vacant and Developed Parcels in the East Hoquiam River Reach.

East Hoquiam River	Number of Parcels	Area in Acres
Vacant	12	62.6
Developed	19	22.5
Total	31	85.1

3.12.02 RESIDENTIAL DEVELOPMENT

The East Hoquiam River Reach contains 25 parcels zoned either R1 or R2 (Low Density Residential or High Density Residential), as shown in Table 3-46. Of these parcels, seven are vacant. Future development within this reach will likely include residential infill development on vacant lots.

Table 3-46. Vacant and Developed Residential Parcels in the East Hoquiam River Reach.

East Hoquiam River	Number of Parcels	Area in Acres
Vacant	7	40.0
Developed	18	17.9
Total	25	57.9

3.12.03 COMMERCIAL, INDUSTRIAL, AND UTILITY DEVELOPMENT

The East Hoquiam River Reach contains six parcels zoned I (Industrial), as shown in Table 3-47. Of these parcels, five are vacant. Some commercial capacity exists on the southern portion of the reach.

Table 3-47. Vacant and Developed Commercial Parcels in the East Hoquiam River Reach.

East Hoquiam River	Number of Parcels	Area in Acres
Vacant	5	22.6
Developed	1	4.6
Total	6	27.2

3.12.04 RECREATIONAL DEVELOPMENT

There are no parcels zoned for recreational development. Plans for this reach are unknown at this time.

3.12.05 SHORELINE STABILIZATION

Shoreline stabilization data for this reach is limited. It is not possible to forecast changes to shoreline modifications at this time.

3.12.06 DEVELOPMENT BY SHORELINE ENVIRONMENT DESIGNATION

There are 12 vacant parcels totaling 62.6 acres intersecting the shoreline jurisdiction, as shown in Table 3-48. Development potential exists primarily in the High Intensity shoreline environment designation.

Table 3-48. Development Potential by Shoreline Environment Designation in the East Hoquiam Reach.

Shoreline Environment Designation	Number of Vacant Parcels	Area in Acres
Shoreline Residential	7	40.0
High Intensity	5	22.6
Total	12	62.6

3.13 REACH 13 – FRY CREEK - HOQUIAM

The Fry Creek - Hoquiam Reach zoning consists of Industrial (26 acres). This area is highly developed. Any future development within this reach would be industrial in nature as that is the most suitable land use for this reach.

The proposed environmental designation of High Intensity dictates the permitted actions within the Fry Creek - Hoquiam Reach. The purpose of the High Intensity environment is to provide for high intensity water-oriented commercial, transportation, and industrial uses while protecting existing ecological functions and restoring ecological functions in areas that have been previously degraded. The previously permitted and projected permitted actions within the reach are listed in Table 3-6 below.

3.13.01 PATTERNS OF SHORELINE ACTIVITY

The Fry Creek – Hoquiam Reach contains seven parcels, as shown in Table 3-49. Of these parcels, six are vacant. Five parcels are publicly owned.

Table 3-49. Vacant and Developed Parcels in the Fry Creek - Hoquiam Reach.

Fry Creek - Hoquiam	Number of Parcels	Area in Acres
Vacant	6	47.3
Developed	1	73.7
Total	7	121.0

3.13.02 RESIDENTIAL DEVELOPMENT

The Fry Creek - Hoquiam Reach does not contain any residential development.

3.13.03 COMMERCIAL, INDUSTRIAL, AND UTILITY DEVELOPMENT

The Fry Creek - Hoquiam Reach contains seven parcels zoned I (Industrial), as shown in Table 3-50. Of these parcels, six are listed as vacant. These parcels do not contain structures but they may be associated with existing development.

Table 3-50. Vacant and Developed Commercial Parcels in the Fry Creek - Hoquiam Reach.

Fry Creek - Hoquiam	Number of Parcels	Area in Acres
Vacant	6	47.3
Developed	1	73.7
Total	7	121.0

3.13.04 RECREATIONAL DEVELOPMENT

There is no recreational development in this reach, and future development potential is limited.

3.13.05 SHORELINE STABILIZATION

The Fry Creek channel is heavily modified. Future modification is unlikely.

3.13.06 DEVELOPMENT BY SHORELINE ENVIRONMENT DESIGNATION

There are six vacant parcels totaling 47.3 acres intersecting the shoreline jurisdiction, as shown in Table 3-51. Development or redevelopment potential exists in the High Intensity shoreline environment designation.

Table 3-51. Development Potential by Shoreline Environment Designation in the Fry Creek - Hoquiam Reach.

Shoreline Environment Designation	Number of Vacant Parcels	Area in Acres
High Intensity	6	47.3
Total	6	47.3

3.14 REACH 14 – GRAYS HARBOR

The Grays Harbor Reach zoning consists of Industrial (298 acres), Natural Resources (274 acres) and Low Density Residential (41 acres). Forty acres of this reach are included in the Waterfront Overlay District. While there is a significant portion of Natural Resource designated land within this reach, it is entirely on Rennie Island, which would likely not be subject to development.

pressure. The Industrial areas within this reach are largely built out and they include the airport and port activities. Any future development within this reach would likely be industrial in nature as that is the most suitable land use for this reach.

The proposed environmental designations of High Intensity and Urban Conservancy dictate the permitted actions within the Grays Harbor Reach.

The purpose of the High Intensity environment is to provide for high intensity water-oriented commercial, transportation, and industrial uses while protecting existing ecological functions and restoring ecological functions in areas that have been previously degraded.

The purpose of the Urban Conservancy environment is to protect and restore ecological functions of open space, floodplain, and other sensitive lands where they exist in urban and developed settings, while allowing a variety of compatible uses.

3.14.01 PATTERNS OF SHORELINE ACTIVITY

The Grays Harbor Reach contains 59 parcels, as shown in Table 3-52. Of these parcels, 46 are vacant. Twenty-three parcels are protected from development by public or conservation group ownership, conservation easements, or similar mechanisms.

Table 3-52. Vacant and Developed Parcels in the Grays Harbor Reach.

Grays Harbor	Number of Parcels	Area in Acres
Vacant	46	1,517.1
Developed	13	842.0
Total	59	2,359.1

3.14.02 RESIDENTIAL DEVELOPMENT

The Grays Harbor Reach contains 11 parcels zoned either R1 or R2 (Low Density Residential or High Density Residential), as shown in Table 3-53. Of these parcels, 10 are vacant. Future development is unlikely as the residential zoned parcels are part of the Grays Harbor National Wildlife Refuge.

Table 3-53. Vacant and Developed Residential Parcels in the Grays Harbor Reach.

Grays Harbor	Number of Parcels	Area in Acres
Vacant	10	383.9
Developed	1	19.9
Total	11	403.8

3.14.03 COMMERCIAL, INDUSTRIAL, AND UTILITY DEVELOPMENT

The Grays Harbor Reach contains 33 parcels zoned I (Industrial), as shown in Table 3-54. Of these parcels, 10 are vacant. While some commercial capacity exists, most of development will likely occur outside of the shoreline jurisdiction. Lots within this reach are large, allowing for flexible site design.

Table 3-54. Vacant and Developed Commercial Parcels in the Grays Harbor Reach.

Grays Harbor	Number of Parcels	Area in Acres
Vacant	23	291.2
Developed	10	805.9
Total	33	1,097.1

3.14.04 RECREATIONAL DEVELOPMENT

Recreational uses in this reach are passive and associated with the Grays Harbor National Wildlife Refuge.

3.14.05 SHORELINE STABILIZATION

Shoreline stabilization data for this reach is limited. It is not possible to forecast changes to shoreline modifications at this time.

3.14.06 DEVELOPMENT BY SHORELINE ENVIRONMENT DESIGNATION

There are 44 vacant parcels totaling 1,490 acres intersecting the shoreline jurisdiction, as shown in Table 3-55. Development and redevelopment potential exists primarily in the High Intensity shoreline environment designation.

Table 3-55. Development Potential by Shoreline Environment Designation in the Grays Harbor Reach.

Shoreline Environment Designation	Number of Vacant Parcels	Area in Acres
Urban Conservancy	17	767.5
High Intensity	27	722.3
Total	44	1,489.8

3.15 REACH 15 – HOQUIAM RIVER

The Hoquiam River Reach zoning consists of Industrial (48 acres), High Density Residential (37 acres), General Commercial (36 acres), Downtown Commercial (11 acres), and Natural Resources (2 acres). Eighty-four acres of this reach are included in the Waterfront Overlay District and seven acres are included in the Pedestrian Overlay District. Most of the land within this reach is developed. A few barren or platted areas exist, posing a potential for some development within this reach. However, due to the wetlands, this area may not be ideal for High Density development; and any other type of development would require changes in the adopted zoning code.

The proposed environmental designations of High Intensity, Shoreline Residential, and Urban Conservancy dictate the permitted actions within the Hoquiam River Reach.

The purpose of the High Intensity environment is to provide for high intensity water-oriented commercial, transportation, and industrial uses while protecting existing ecological functions and restoring ecological functions in areas that have been previously degraded.

The purpose of the Shoreline Residential environment is to accommodate residential development and appurtenant structures that are consistent with the Comprehensive Plan zoning designations. Additionally, the Shoreline Residential environment is meant to provide appropriate public access and recreational uses to waterways and wetlands within the reach.

The purpose of the Urban Conservancy environment is to protect and restore ecological functions of open space, floodplain, and other sensitive lands where they exist in urban and developed settings, while allowing a variety of compatible uses.

3.15.01 PATTERNS OF SHORELINE ACTIVITY

The Hoquiam River Reach contains 245 parcels, as shown in Table 3-56. Of these parcels, 114 are vacant. Thirty-six parcels are publicly owned.

Table 3-56. Vacant and Developed Parcels in the Hoquiam River Reach.

Hoquiam River	Number of Parcels	Area in Acres
Vacant	114	194.0
Developed	131	84.0
Total	245	278.0

3.15.02 RESIDENTIAL DEVELOPMENT

The Hoquiam River Reach contains 109 parcels zoned R2 (High Density Residential), as shown in Table 3-57. Of these parcels, 43 are vacant. Future development within this reach will likely include residential infill development.

Table 3-57. Vacant and Developed Residential Parcels in the Hoquiam River Reach.

Hoquiam River	Number of Parcels	Area in Acres
Vacant	43	68.0
Developed	66	27.8
Total	109	95.8

3.15.03 COMMERCIAL, INDUSTRIAL, AND UTILITY DEVELOPMENT

The Hoquiam River Reach contains XX parcels zoned C1, C2, or I (General Commercial, Downtown Commercial, or Industrial), as shown in Table 3-58. Of these parcels, 63 are vacant. Commercial capacity exists and is dependent on market factors.

Table 3-58. Vacant and Developed Commercial Parcels in the Hoquiam River Reach.

Hoquiam River	Number of Parcels	Area in Acres
Vacant	63	82.5
Developed	58	47.7
Total	121	130.2

3.15.04 RECREATIONAL DEVELOPMENT

There are existing recreational opportunities within this reach. Plans for this reach are unknown at this time.

3.15.05 SHORELINE STABILIZATION

Shoreline stabilization data for this reach is limited. It is not possible to forecast changes to shoreline modifications at this time.

3.15.06 DEVELOPMENT BY SHORELINE ENVIRONMENT DESIGNATION

There are 114 vacant parcels totaling 194 acres intersecting the shoreline jurisdiction, as shown in Table 3-59. Development potential exists primarily in the Shoreline Residential and High Intensity shoreline environment designations. Land within the Urban Conservancy shoreline environment designation is limited.

Table 3-59. Development Potential by Shoreline Environment Designation in the Hoquiam River Reach.

Shoreline Environment Designation	Number of Vacant Parcels	Area in Acres
Urban Conservancy	2	18.9
Shoreline Residential	39	67.8
High Intensity	73	107.3
Total	114	194.0

3.16 REACH 16 – LITTLE HOQUIAM RIVER

The Little Hoquiam River Reach zoning consists of Low Density Residential (98 acres), Natural Resources (21 acres), High Density Residential (1 acre), and Industrial (0.5 acres). Most of this reach is covered by heavy forests and wetlands and it would not likely see any development in the future.

The proposed environmental designations of Shoreline Residential, High Intensity, and Urban Conservancy dictate the permitted actions within the Little Hoquiam River Reach.

The purpose of the Shoreline Residential environment is to accommodate residential development and appurtenant structures that are consistent with the Comprehensive Plan zoning designations. Additionally, the Shoreline Residential environment is meant to provide appropriate public access and recreational uses to waterways and wetlands within the reach.

The purpose of the High Intensity environment is to provide for high intensity water-oriented commercial, transportation, and industrial uses while protecting existing ecological functions and restoring ecological functions in areas that have been previously degraded.

The purpose of the Urban Conservancy environment is to protect and restore ecological functions of open space, floodplain, and other sensitive lands where they exist in urban and developed settings, while allowing a variety of compatible uses.

3.16.01 PATTERNS OF SHORELINE ACTIVITY

The Little Hoquiam River Reach contains 34 parcels, as shown in Table 3-60. Of these parcels, 21 are vacant. Ten parcels are publicly owned.

Table 3-60. Vacant and Developed Parcels in the Little Hoquiam River Reach.

Little Hoquiam River	Number of Parcels	Area in Acres
Vacant	21	1,111.5
Developed	13	33.1
Total	34	1,144.6

3.16.02 RESIDENTIAL DEVELOPMENT

The Little Hoquiam River Reach contains 31 parcels zoned either R1 or R2 (Low Density Residential or High Density Residential), as shown in Table 3-61. Of these parcels, 19 are vacant. Future development within this reach will likely include residential infill on vacant lots.

Table 3-61. Vacant and Developed Residential Parcels in the Little Hoquiam River Reach.

Little Hoquiam River	Number of Parcels	Area in Acres
Vacant	19	606.5
Developed	12	32.3
Total	31	638.8

3.16.03 COMMERCIAL, INDUSTRIAL, AND UTILITY DEVELOPMENT

The Little Hoquiam River Reach contains one developed parcels zoned I (Industrial), as shown in Table 3-62. Future development is unlikely.

Table 3-62. Vacant and Developed Commercial Parcels in the Little Hoquiam River Reach.

Little Hoquiam River	Number of Parcels	Area in Acres
Vacant	0	0
Developed	1	0.8
Total	1	0.8

3.16.04 RECREATIONAL DEVELOPMENT

Plans for recreational development in this reach are unknown at this time.

3.16.05 SHORELINE STABILIZATION

Shoreline stabilization data for this reach is limited. It is not possible to forecast changes to shoreline modifications at this time.

3.16.06 DEVELOPMENT BY SHORELINE ENVIRONMENT DESIGNATION

There are 21 vacant parcels totaling 1,112 acres intersecting the shoreline jurisdiction, as shown in Table 3-13. Development potential exists primarily in the Shoreline Residential shoreline environment designation. Commercial forestry activities may occur in the Urban Conservancy designation, although any such activities would likely occur outside of the shoreline jurisdiction.

Table 3-63. Development Potential by Shoreline Environment Designation in the Little Hoquiam River Reach.

Shoreline Environment Designation	Number of Vacant Parcels	Area in Acres
Urban Conservancy	13	1,108.0
Shoreline Residential	8	3.5
Total	21	1,111.5

4 STATE, LOCAL, AND FEDERAL REGULATIONS

4.01 CITIES OF ABERDEEN, COSMOPOLIS, AND HOQUIAM SHORELINE MASTER PROGRAM

As discussed in Chapter 3, the CIA has been put together after consideration of reasonably foreseeable development and how this development could impact the functions and processes that are potentially at risk that were discussed in Chapter 2. In addition to the specific details provided in these chapters, this chapter provides a brief overview of the entire SMP and how it generally addresses the protection of ecological functions and processes from cumulative impacts. This chapter is intended to put the SMP regulations in context of the other regulations that apply to this area.

The SMP Guidelines include the following recommendations to help achieve no net loss of ecological functions:

- Restrict uses that are not water-dependent or preferred shoreline uses.
- Require that all future shoreline development, including water-dependent and preferred uses, be carried out in a manner that limits further degradation of the shoreline environment.
- Require buffers and setbacks. Vegetated buffers and building setbacks from those buffers reduce the impacts of development on the shoreline environment.
- Establish appropriate shoreline environment designations. The environment designations must reflect the findings of the SIC. A shoreline landscape that is relatively unaltered should be designated Urban Conservancy and protected from any use that would degrade the natural character of the shoreline.
- Establish strong policies and regulations. Policies and regulations will define what type of development can occur in each shoreline environment designation, determine the level of review required through the type of shoreline permit, and set up mitigation measures and restoration requirements.
- In all cases, require mitigation sequencing. The SMP must include regulations that require developers to follow mitigation sequencing: avoid impacts, minimize impacts,

rectify impacts, reduce impacts over time, compensate for impacts, monitor impacts, and take corrective measures.

Measures described in Sections 4.01.01 and 4.01.02 below would implement the above recommendations, helping the cities achieve no net loss of shoreline ecological functions.

The first level of protection provided by the SMP is the recognition of four different shoreline environment designation types in the cities: Aquatic, High Intensity, Shoreline Residential, and Urban Conservancy. These environment designations were assigned based primarily on existing and proposed land uses, which implicitly encompasses differing levels of ecological functions and different probabilities and potentials for improvements of ecological functions, as well as the location of critical areas and their buffers. Each environment designation's designated area is outlined below.

4.01.01 ENVIRONMENT DESIGNATIONS

New environment designations were developed based on a review of existing development patterns, biological and physical characteristics of the shoreline, and goals and aspirations of the communities as expressed through the city's Comprehensive Plan, and associated plans and regulations, and the SMP Guidelines (WAC 173-26-211). The four environment designations include either the upland property from the Ordinary High Water Mark (OHWM) or water areas lying waterward of the OHWM.

A. Aquatic

The Aquatic shoreline environment designation consists of all lands waterward of the OHWM. The Aquatic shoreline environment designation is assigned to protect, restore, and manage the unique characteristics and resources of the areas waterward of the OHWM. All lands waterward of the OHWM in the cities is in the Aquatic shoreline environment designation.

The Aquatic shoreline environment designation has not been assigned to any reaches in Aberdeen, Hoquiam, or Cosmopolis.

B. High Intensity

The High Intensity shoreline environment designation consists of shoreline areas that currently support high intensity uses related to commerce or are suitable for high intensity non-water water-oriented uses. The purpose of the High Intensity shoreline environment designation is to provide for high intensity non-water-oriented commercial uses while protecting existing ecological functions and restoring ecological functions in areas that have been previously degraded.

The High Intensity shoreline environment designation is assigned to the entirety of Reach 4: Fry Creek – Aberdeen, Reach 5: Grays Harbor North Bank, and Fry Creek – Hoquiam. It is also designated for portions of Reach 2: Charley Creek, Reach 3: Chehalis River – Aberdeen, Reach 6: Grays Harbor South Bank, Reach 9: Wishkah River, Reach 10: Chehalis River – Cosmopolis, Reach 12: East Hoquiam River, Reach 14: Grays Harbor, Reach 15: Hoquiam River, and Reach 16: Little Hoquiam River.

C. Shoreline Residential

The Shoreline Residential shoreline environment designation consists of shoreline areas that are predominantly single-family residential development or are planned and platted for residential development. The Shoreline Residential shoreline environment designation is designed to provide for residential uses where necessary facilities for development can be provided. An additional purpose is to provide public access and recreational uses.

The Shoreline Residential shoreline environment designation is assigned to portions of Reach 6: Grays Harbor South Bank, Reach 9: Wishkah River, Reach 11: Mill Creek, Reach 12: East Hoquiam River, Reach 15: Hoquiam River, and Reach 16: Little Hoquiam River.

D. Urban Conservancy

The Urban Conservancy shoreline environment designation consists of those shorelines and shoreland areas that most closely match the following characteristics:

1. They are suitable for water-related or water-enjoyment uses;
2. Areas containing extensive forested and recreational uses;
3. They are open space, flood plain, wetland or wetland buffer, stream buffer or other sensitive areas that should not be more intensively developed;
4. They have the potential for development that is compatible with ecological restoration;
5. Areas with existing non-water dependent shoreline development that will not be expanded;
6. They have potential for ecological restoration;
7. Areas that retain important ecological functions, even though partially developed; or
8. Newly annexed areas where there is no designation.

The purpose of the Urban Conservancy shoreline environment designation is to protect and restore ecological functions of open space and other sensitive lands where they exist in urban and developed settings, while allowing a variety of water-oriented uses and uses consistent with effective environmental management. The designation will provide for ecological protection and rehabilitation in relatively undeveloped shoreline areas anticipated for or containing existing agricultural, recreation, and open space uses and limited development suitable to lands characterized by ecological and flood hazard constraints.

The Urban Conservancy shoreline environment designation is assigned to the entirety of Reach 1: Aberdeen Lake, Reach 7: Newkah Creek, and Reach 8: Wedekind Confluence. It is also designated for portions of Reach 2: Charley Creek, Reach 3: Chehalis River – Aberdeen, Reach 9: Wishkah River, Reach 10: Chehalis River – Cosmopolis, Reach 11: Mill Creek, Reach 14: Grays Harbor, Reach 15: Hoquiam River, and Reach 16: Little Hoquiam River.

4.01.02 GENERAL GOALS, POLICIES, AND REGULATIONS

The proposed SMP contains numerous policies, with supporting regulations intended to protect the ecological functions of the shoreline and maintain, at a minimum, the current level of function. Major sections of the proposed SMP are referenced and summarized in Table 4-1 below and in more detail in the Cumulative Impact Analysis tables in Chapter 8.

Table 4-1. Summary of Shoreline Master Program Policies and Regulations

SMP Chapter with SMP Goal, Policy, or Regulation	Purpose of SMP Provision	Key General Ecological Functions Protected
SMP Chapter 1: <i>Introduction</i>	Defines and maps the shoreline jurisdiction in the cities and establishes policies regarding the cities' shorelines of statewide significance.	All, with focus on preserving and enhancing shoreline ecological functions.
SMP Chapter 3: <i>Shoreline Environment Designations</i>	Defines and maps the environment designations of all the shorelines of the state in the cities. This chapter details policies and regulations specific to the four designated shoreline environment designations (High Intensity, Shoreline Residential, Urban Conservancy, and Aquatic).	All, with focus on preserving and enhancing shoreline ecological functions.

SMP Chapter with SMP Goal, Policy, or Regulation	Purpose of SMP Provision	Key General Ecological Functions Protected
	Specifically, the environments are the key to providing appropriate and specific regulations to ensure no net loss in both developed and undeveloped areas with high functions.	
SMP Chapter 4: <i>General Policies & Regulations</i>	<p>Sets forth the general policies and regulations applicable to uses, developments, and activities in the cities' shoreline jurisdiction.</p> <p>Specifically, it contains the requirement that all development and uses meet no net loss, and provides specific standards for areas such Archaeological and Historic Resources, Critical Areas, Environment Impacts, Flood Hazard Management, Public Access, Restoration, Vegetation Conservation, and Water Quality.</p>	All, with focus on no net loss, critical areas, vegetation and water quality and quantity.
SMP Chapter 5: <i>Specific Shoreline Use Policies & Regulations</i>	<p>Sets forth policies and regulations governing specific categories of uses and activities typically found in shoreline areas. The policies and regulations cover the following uses and activities: Agriculture, Aquaculture, Boating Facilities, Commercial Development, Forest Practices, Industrial Development,, Mining, Parking, Recreational Development, Residential Development, Signs, Transportation Facilities, and Utilities.</p> <p>Specifically, it contains the requirement that all specific shoreline uses meet no net loss.</p>	All, with specific focus on the unique aspects of specific uses that require specific and unique requirements to assure no net loss.
SMP Chapter 6: <i>Shoreline Modification Policies & Regulations</i>	Sets forth policies and regulations governing activities that modify shoreline areas. The policies and regulations cover the following: General Shoreline Modification Provisions, Breakwaters, Groins, Jetties, and Weirs, Clearing, Grading, and Fill, Dredging and Dredge Materials, In-Water Structures, Overwater Structures and Launching	All, with specific focus on the managing modifications to the physical form of the shoreline to assure no net

SMP Chapter with SMP Goal, Policy, or Regulation	Purpose of SMP Provision	Key General Ecological Functions Protected
	Facilities, and Shoreline Stabilization.	loss.
SMP Appendix 2: <i>Critical Areas Regulations</i>	Sets forth regulations governing protection of critical areas within the cities' shoreline jurisdiction.	All, with focus on no net loss, and protecting critical areas.

The cities will prepare an ordinance related to the adoption of the updated SMP. The ordinance will amend local regulations to reference the updated SMP, which contains new shoreline management regulations in accordance with the SMA and best available science. Revisions to the shoreline management policies and regulations were designed to improve protection of shoreline ecological functions and management of the resources identified in the SIC. The revised regulations strengthen protection of natural resources within the cities' shoreline jurisdiction in the following ways:

- The four new shoreline environment designations included in the proposed SMP and discussed above revise the existing environment designations previously adopted by cities. Based on the findings of the SIC, these shoreline environment designations more closely reflect current and proposed natural and developed conditions of the cities' shorelines.
- Provisions of the cities' Critical Areas Ordinances (CAOs) that are not consistent with the SMA, RCW Chapter 90.85, and supporting WAC chapters, do not apply in the shoreline jurisdiction. Critical Area Regulations included in SMP Appendix 2 meet current Ecology standards for critical area protection.
- Vegetation conservation is now required in the shoreline jurisdiction. In all shoreline areas, land clearing, grading, filling and alteration of natural drainage features and landforms is limited to the minimum necessary for development. Within all shoreline areas, tree removal is limited to the minimum necessary to accommodate proposed buildings, structures, and uses or to mitigate a hazard to life or property. Removal of trees in the shoreline jurisdiction is limited.

- New development requiring bulkheads or similar protection is discouraged. All new shoreline development are required to be located and designed to prevent or minimize the need for shoreline modification activities.
- New development on steep or unstable slopes shall be set back sufficiently to ensure that shoreline stabilization will not be needed during the life of the building or structure.
- New development on eroding shorelines shall be set back sufficiently to ensure that shoreline stabilization will not be needed during the life of the building or structure.

4.01.03 SHORELINE USE PROVISIONS

Permitted, conditional, and prohibited uses for areas within each shoreline designation are listed below in Table 4-2, Table 4-3, and Table 4-5.

Table 4-2. City of Aberdeen Permitted, Conditional, and Prohibited Uses

Shoreline Uses (2)	High Intensity	Shoreline Residential	Urban Conservancy	Aquatic (2)
Key: P = Permitted Use, C = Conditional Use, X = Prohibited				
Agriculture	X	P	P	X
Aquaculture	C	C	C	C
Boating Facilities	P	P	C	C
Commercial Development	P	X	X	X
Forest Practices	X	X	X	X
Industrial Development	P	X	X	X
Mining	C	X	X	X
Parking (3)	P	P	P	X
Recreational Development (4)				
Water-oriented	P	P	P	P (5)
Non-water-oriented	P	P	C	X
Paved trails	P	P	C	X
Unpaved trails	P	P	P	X
Residential Development (6)	P	P	P	X
Signs	P	P	P	X
Transportation Facilities				
New roads related to permitted shoreline uses	P	P	P	X
Bridges for motorized and non-motorized uses	C	C	C	C

Shoreline Uses (2)	High Intensity	Shoreline Residential	Urban Conservancy	Aquatic (2)
Expansion or relocation of existing roads	C	C	C	X
Utilities (Primary)				
Solid waste disposal or transfer sites	X	X	X	X
Other	C	C	C	C
Utilities (Accessory)				
On-site utility features serving a primary use	P	P	P	C

Notes:

- (1) Any use that would substantially degrade the ecological functions of the shoreline jurisdiction should not be allowed. In addition, development shall be subject to the allowed uses established by the underlying zoning.
- (2) Where a use would be located both upland and over-water, the more restrictive standards apply.
- (3) Parking is allowed as an accessory use to an approved use in SMP Section 5.12.02(B). Off-street parking lots or parking structures as a primary use are prohibited in all shoreline environments.
- (4) Concession stands, gift shops, and interpretive centers are permitted as accessory uses when limited to serving a related, permitted recreational use in the Shoreline Residential and Urban Conservancy designations.
- (5) Only water-dependent uses are permitted in the Aquatic designation.
- (6) Home occupations, as established by AMC 17.56.030: Home Occupations are incidental and accessory to a residential use. Use the 'Residential' use category to determine whether they are allowed in a particular shoreline environment designation.

Table 4-3. City of Cosmopolis Permitted, Conditional, and Prohibited Uses

Shoreline Uses (1)	High Intensity	Shoreline Residential	Urban Conservancy	Aquatic (2)
Key: P = Permitted Use, C = Conditional Use, X = Prohibited				

Shoreline Uses (1)	High Intensity	Shoreline Residential	Urban Conservancy	Aquatic (2)
Agriculture	X	X	X	X
Aquaculture	C	C	C	C
Boating Facilities	P	P	C	C
Commercial Development	P	X	X	X
Forest Practices	X	X	X	X
Industrial Development	P	X	X	X
Mining	X	X	X	X
Parking (3)	P	P	P	X
Recreational Development (4)				
Water-oriented	P	P	P	P (5)
Non-water-oriented	P	P	C	X
Paved trails	P	P	C	X
Unpaved trails	P	P	P	X
Residential Development (6)	P	P	P	X
Signs	P	P	P	X
Transportation Facilities				
New roads related to permitted shoreline uses	P	P	P	X
Bridges for motorized and non-motorized uses	C	C	C	C
Expansion or movement of existing roads	C	C	C	X
Utilities (Primary)				
Solid waste disposal or transfer sites	X	X	X	X
Other	C	C	C	C
Utilities (Accessory)				
On-site utility features serving a primary use	P	P	P	C

Notes:

- (1) Any use that would substantially degrade the ecological functions should not be allowed. In addition, development shall be subject to the allowed uses established by the underlying zoning.
- (2) Where a use would be located both upland and over-water, the more restrictive standards apply.

- (3) Parking is allowed as an accessory use to an approved use as noted in SMP Section 5.12.02(B). Off-street parking lots or parking structures as a primary use are prohibited in all shoreline environments.
- (4) Concession stands, gift shops, and interpretive centers are permitted as accessory uses when limited to serving a related, permitted recreational use in the Shoreline Residential and Urban Conservancy designations.
- (5) Only water-dependent uses are permitted in the Aquatic designation.

Table 4-4. City of Hoquiam Permitted, Conditional, and Prohibited Uses

Shoreline Uses (1)	High Intensity	Shoreline Residential	Urban Conservancy	Aquatic (2)
Key: P = Permitted Use, C = Conditional Use, X = Prohibited				
Agriculture (3)	X	X	X	X
Aquaculture	C	C	C	C
Boating Facilities	P	P	C	C
Commercial Development	P	X	X	X
Forest Practices	X	X	P	X
Industrial Development	P	X	X	X
Mining	X	X	X	X
Parking (4)	P	P	P	X
Recreational Development (5)				
Water-oriented	P	P	P	P (6)
Non-water-oriented	P	P	C	X
Paved trails	P	P	C	X
Unpaved trails	P	P	P	X
Residential Development (7)	P	P	P	X
Signs	P	P	P	X
Transportation Facilities				
New roads related to permitted shoreline uses	P	P	P	X
Bridges for motorized and non-motorized uses	C	C	C	C
Expansion or movement of existing roads	C	C	C	X
Utilities (Primary)				
Solid waste disposal or transfer	X	X	X	X

Shoreline Uses (1)	High Intensity	Shoreline Residential	Urban Conservancy	Aquatic (2)
sites				
Other	C	C	C	C
Utilities (Accessory)				
On-site utility features serving a primary use	P	P	P	C

- (1) Any use that would substantially degrade the ecological functions should not be allowed. In addition, development shall be subject to the allowed uses established by the underlying zoning.
- (2) Where a use would be located both upland and over-water, the more restrictive standards apply.
- (3) Applies only to new agricultural uses where they replace a non-agricultural uses.
- (4) Parking is allowed as an accessory use to an approved use as noted in SMP Section 5.12.02(B). Off-street parking lots or parking structures as a primary use are prohibited in all shoreline environments.
- (5) Concession stands, gift shops, and interpretive centers are permitted as accessory uses when limited to serving a related, permitted recreational use in the Shoreline Residential and Urban Conservancy designations.
- (6) Only water-dependent uses are permitted in the Aquatic designation.
- (7) Home occupations, as established by HMC 10.05.060: Home Occupations are incidental and accessory to a residential use. Use the 'Residential' use category to determine whether they are allowed in a particular shoreline environment designation.

4.01.04 SHORELINE MODIFICATION PROVISIONS

Shoreline modifications are generally related to construction of a physical element such as a dike, breakwater, dredged basin, or fill, but they can include other actions such as clearing, grading, application of chemicals, or significant vegetation removal. Shoreline modifications usually are undertaken in support of or in preparation for a shoreline use; for example, fill (shoreline modification) required for a cargo terminal (industrial use) or dredging (shoreline modification) to allow for a marina (boating facility use). See Table 6-1 of the Aberdeen, Hoquiam, and Cosmopolis SMP for allowable shoreline modification activities within each of the shoreline environments.

4.01.05 RESTORATION PLAN

The cities have identified several potential restoration opportunities that would assist in restoring shoreline processes and functions along the shorelines of the cities. Some of these opportunities are listed in Table 4-2. Detailed descriptions of the projects identified by the cities are included in the Restoration Plan.

Table 4-2. General Restoration Opportunities

Restoration Opportunities	Description
Stormwater Management and Planning	As part of the new NPDES Municipal Stormwater Permit, the County and the cities are required to bring their stormwater regulations up to date. This will support restoration efforts within the cities' shoreline jurisdiction and the implementation of stormwater and agricultural runoff treatment and control strategies throughout the watershed.
Restore Riparian Buffers	The cities should encourage private landowners to restore native riparian buffers and to manage streamside grazing. This may be completed through regulations or incentives that limit livestock grazing and vegetation disturbance in the cities' shoreline jurisdiction.
Volunteer Opportunities	The cities should work with existing volunteer groups, such as the Friends of Grays Harbor and The Nature Conservancy.

4.02 OTHER LOCAL PLANS AND REGULATIONS

Besides the SMP, other local plans and regulations that influence development activity in the shoreline are listed below.

4.02.01 COMPREHENSIVE PLAN

Aberdeen updated and amended its 1971 Comprehensive Plan in 2001. The 2001 Comprehensive Plan included several policies supporting the integration of the SMP and the Grays Harbor Estuary Management Plan (GHEMP) with the city's other policies and regulations as well as policies related to shoreline development. Some examples of these policies included establishing a Waterfront Development area to encourage the redevelopment of underutilized and vacant waterfront areas suitable for a mix of uses. The 2001 Comprehensive Plan

recognized unique opportunities provided by access to shorelines of statewide significance and included special provisions to encourage compatibility among these various uses. The Aberdeen 2001 Comprehensive Plan also addressed the development of aquaculture resources.

Cosmopolis adopted a Comprehensive Development Plan in the early 2000s. Similar to the Aberdeen Comprehensive Plan, it included several policies supporting the integration of the SMP and the GHEMP with the city's other policies and regulations as well as policies related to shoreline development, such as provisions for waterfront development and aquaculture. The Comprehensive Development Plan also noted that waterfront development within the city should be consistent with the Port of Grays Harbor's most current Industrial Properties Master Plan, WSDOT's most current Washington Coastal Corridor Master Plan, and the most current Revitalization Potentials on the Grays Harbor Waterfront report.

Hoquiam adopted a Comprehensive Plan in 2009. The city also adopted the Downtown Hoquiam Historic Preservation Plan in 2010 that addresses the preservation of structures within the shoreline jurisdiction along the Hoquiam River. As part of this SMP update, policies related to integration of the SMP with the city's Comprehensive Plan will likely be added to the Comprehensive Plan.

4.02.02 MUNICIPAL REGULATIONS

The city of Aberdeen provides development guidelines and public works standards that would be applicable to development in the shoreline jurisdiction, such as standards related to storm drainage and surface water in AMC Title 13. The city's storm and surface water management regulations are found in AMC 13.70 (Ordinance 6503, 2010). The next update to AMC 13.70 will be to respond to the 2013-18 Phase II Western Washington Municipal Stormwater Permit due June 30, 2018. In 1988, the city incorporated the GHEMP into its SMP.

The city of Cosmopolis provides development guidelines and public works standards that would be applicable to development in the shoreline jurisdiction, such as standards related to storm drainage and surface water in CMC Title 12. The city's storm drainage regulations are found in CMC 12.12 (Ordinance 1090, added 2000). It is not clear how the city regulates fill and grade activities, outside of SEPA review. The GHEMP was adopted under CMC 15.12 (Ordinance 882, added 1988); and if its regulations conflict with the adopted SMP, the more restrictive regulations will be followed.

The city of Hoquiam's storm and surface water management regulations are found in HMC 8.14 (Ordinance 05-24§1, 2005). The city regulates fill and grade activities via SEPA review.

4.02.03 CRITICAL AREAS REGULATIONS

The city of Aberdeen's critical areas regulations are found in AMC 14.100 and were last updated in 2009 (Ordinance 6474). AMC 14.100 addresses critical aquifer recharge areas, wetlands, frequently flooded areas, geologically hazardous areas, and fish and wildlife habitat conservations areas. The city updated its critical areas regulations in 2009. In general, protection of critical areas is provided through survey, analysis, and reporting requirements; regulating certain activities; requiring buffers, setbacks, and critical area tracks; and by requiring mitigation for unavoidable impacts.

In AMC 14.100.550, Type S Water, which are all waters that are defined as "shorelines of the state" under the jurisdiction of the SMA, are assigned buffers of 150 feet. The stream buffers for other types of streams range from 50 to 150 feet. In AMC 14.100.554, other types of fish and habitat conservation area buffers are based on type of area and, depending upon the type of area, recommendations by Washington Department of Fish and Wildlife (WDFW) PHS Program, site managers, or on a case-by-case basis with the city coordinating with the WDFW and other state, federal, or tribal experts.

According to the Department of Commerce, as of April 4, 2014, the city of Cosmopolis had not completed the required update of its CAO; and, from our records, the city does not have a CAO that designates or regulates critical areas.

The city of Hoquiam's critical areas regulations are found in HMC 11.06 (Ordinance 08.21§1, 2008). HMC 11.06 addresses wetlands, geologically hazardous areas, fish and wildlife habitat conservation areas, and frequently flooded areas. In HMC 11.06.260, Type S Waters are assigned buffers of 150 feet. The stream buffers for other types of streams range from 50 to 150 feet.

4.03 STATE REGULATIONS

Aside from the SMA, Washington state regulations most relevant to development in shorelines include the Aquatic Lands Act, Forest Practices Act (FPA), Hydraulic Code, SEPA, and Watershed Planning Act. Those regulations are summarized below.

A number of state agencies, such as Ecology, the WDFW, and the WDNR are involved in implementing these regulations. Ecology reviews all shoreline projects that require a shoreline permit, but has specific regulatory authority over shoreline conditional use permits and shoreline variances. Other agency reviews of shoreline developments are typically triggered by in-water or over-water work, discharges of fill or pollutants into the water, or substantial land clearing.

Depending on the nature of the proposed development, state regulations can play an important role in the design and implementation of a shoreline project, ensuring that impacts on shoreline functions and values are avoided, minimized, and/or mitigated.

4.03.01 AQUATIC LANDS ACT

In 1984, the Washington State Legislature passed what is commonly referred to as the Aquatic Lands Act (Chapter 79.105 through 79.135 RCW) and delegated to WDNR the responsibility to manage state-owned aquatic lands. The aquatic lands statutes (RCW 79.100 through 79.145) direct WDNR to manage aquatic lands to achieve a balance of public benefits, including public access, navigation and commerce, environmental protection, renewable resource use, and revenue generation when consistent with the other mandates. In addition, it also identifies water-dependent uses as priority uses for the transport of useful commerce.

If a proposed project requires the use of state-owned aquatic lands, the project may be required to obtain an Aquatic Use Authorization from WDNR and enter into a lease agreement. WDNR recommends that all proponents of a project waterward of the OHWM contact WDNR to determine whether the project will be located on state-owned aquatic lands, and, if so, to determine whether the land is available, whether the proposed use is appropriate, and how the project can be constructed to avoid or minimize impacts to aquatic resources.

4.03.02 FOREST PRACTICES ACT

The FPA (Chapter 76.09 RCW) regulates activities related to growing, harvesting, or processing timber. The FPA is implemented by the Forest Practices Rules, which are administered by the WDNR. The Forest Practices Rules establish standards for forest practices such as timber harvest, pre-commercial thinning, road construction, fertilization, and forest chemical application. The rules are designed to protect public resources such as water quality and fish habitat while maintaining a viable timber industry.

Forest practices are not regulated under the SMA unless the land is being converted to a use besides growing trees, or the commercial harvest is within 200 feet of a shoreline of statewide significance and exceeds the harvest limits established in the SMA. Conversions must comply with the provisions in the SMP for the new use.

4.03.03 HYDRAULIC CODE

Chapter 77.55 RCW, the Hydraulic Code, gives the WDFW the authority to review, condition, and approve or deny any construction activity that will use, divert, obstruct, or change the bed or flow of state waters. These activities include projects such as the installation or modification of piers, shoreline stabilization measures, culverts, and bridges. These types of projects must

obtain a hydraulic project approval from WDFW, which will contain conditions intended to prevent damage to fish and other aquatic life, and their habitats. In some cases, the project may be denied if significant impacts would occur that could not be adequately mitigated.

4.03.04 STATE ENVIRONMENTAL POLICY ACT

SEPA provides a way to identify possible environmental impacts that may result from governmental decisions. These decisions may be related to issuing permits for private projects, constructing public facilities, or adopting regulations, policies or plans. Information provided during the SEPA review process helps agency decision-makers, applicants, and the public understand how a proposal will affect the environment. This information can be used to change a proposal to reduce likely impacts, or to condition or deny a proposal when adverse environmental impacts are identified.

4.03.05 WATERSHED PLANNING ACT

The Watershed Planning Act of 1998 (Chapter 90.82 RCW) was passed to encourage local planning of local water resources, recognizing that there are citizens and entities in each watershed that have the greatest knowledge of both the resources and the aspirations of those who live and work in the watershed; and who have the greatest stake in the proper, long-term management of the resources.

4.04 FEDERAL REGULATIONS

Federal regulations most pertinent to development in the shorelines within the cities include the Clean Water Act, the Endangered Species Act (ESA), the Rivers and Harbors Act, and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Those regulations are summarized below. Other relevant federal regulations include the National Environmental Policy Act, Anadromous Fish Conservation Act, Clean Air Act, and Migratory Bird Treaty Act.

A variety of agencies, such as the US Army Corps of Engineers (USACE), National Marine Fisheries Service, and US Fish and Wildlife Service, are involved in implementing these regulations, with review of shoreline development typically triggered by in-water or over-water work, or discharges of fill or pollutants into the water. Depending on the nature of the proposed development, federal regulations can play an important role in the design and implementation of a shoreline project, ensuring that impacts to shoreline functions and values are avoided, minimized, and/or mitigated.

4.04.01 CLEAN WATER ACT

Two sections of the federal Clean Water Act are particularly relevant to regulating activity in shoreline areas: Section 402 and Section 404.

Section 402 required the United States Environmental Protection Agency (EPA) to develop and implement the National Pollutant Discharge Elimination System (NPDES) program. The NPDES program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Point sources are discrete conveyances such as pipes or man-made ditches. Municipal, industrial, and other facilities must obtain permits if their discharges go directly to surface waters. In Washington state, Ecology has been delegated the responsibility by EPA for managing implementation of this program.

Section 404 of the Clean Water Act provides the USACE, under oversight by the EPA, with the authority to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. Under Section 404, the extent of USACE jurisdiction extends to mean high water line. USACE must review and approve many activities in the shoreline, including, but not limited to, depositing fill, dredged, or excavated material in waters and/or adjacent wetlands; shoreline and wetland restoration projects; and culvert installation or replacement.

4.04.02 ENDANGERED SPECIES ACT

Section 9 of the ESA prohibits take of listed species. Take has been defined in Section 3 of the ESA as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The take prohibitions of the ESA apply to everyone, so any action of the cities that results in a take of listed fish or wildlife would be a violation of the ESA and expose the cities to risk of lawsuit. Per Section 7 of the ESA, USACE must consult with the NMFS and the US Fish and Wildlife Service on any projects that fall within USACE jurisdiction (e.g., Clean Water Act Section 404 or Rivers and Harbors Act Section 10 permits) that could affect species listed under the Endangered Species Act. These agencies ensure that the project includes impact minimization and compensation measures for protection of listed species and their habitats.

4.04.03 RIVERS AND HARBORS ACT

Section 10 of the Rivers and Harbors Act of 1899 provides USACE with the authority to regulate activities that may affect navigable waters of the United States. These waters are subject to the ebb and flow of the tide and/or are currently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. The Chehalis River is included in the list of federally designated navigable waters up to river mile 68.0. Under Section 10, the extent of USACE jurisdiction in navigable waterways extends to the mean high water line.

Proposals to construct new or modify existing in-water structures (including, but not limited to, piers, marinas, bulkheads, and breakwaters), to excavate or dredge, or to alter or modify the course, location, condition, or capacity of navigable waters must be reviewed and approved by USACE.

4.04.04 *COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT*

CERCLA, commonly known as Superfund, established requirements for closed and abandoned hazardous waste sites, established liability for releases of hazardous waste at such sites, and established a fund to provide for cleanup when no responsible party could be identified. The law authorizes two kinds of response actions:

- Short-term removals, for which actions may be taken to address releases or threatened releases requiring prompt response
- Long-term remedial response actions, which permanently and significantly reduce the dangers associated with releases or threats of releases of hazardous substances that are serious but not immediately life threatening. Such actions can be conducted only at sites listed on EPA's National Priorities List.

5 POTENTIAL IMPACTS OF DEVELOPMENT AND EFFECTS OF SMP

5.01 CUMULATIVE IMPACTS BY CITY

Tables 5-1 through 5-3 present the anticipated cumulative impacts on shoreline ecological functions within the shoreline management areas. Cumulative impacts were assessed through consideration of:

- Existing shoreline ecological functions
- Existing development and uses
- Reasonably foreseeable future development and uses that are likely to occur based on proposed shoreline environment designations
- Mitigating effects of SMP provisions and proposed restoration activities
- Incremental impacts
- Beneficial effects of other regulatory programs and restoration

Table 5-1. Cumulative Impacts on Shoreline Environment, City of Aberdeen.

Development Type	Existing Conditions	Shoreline Processes Affected	Potential Development	Potential Impacts on Functions or Processes	Effect of SMP Provisions	Other Regulatory Programs
Residential Development –Low Intensity	There are 122 developed parcels, 166 acres of low intensity single-family residential use development. Zone R-S.	Habitat: <ul style="list-style-type: none">• Sediment/bank stabilization and shoreline protection• Attenuation of wave energy• Physical space and conditions to support aquatic and shoreline dependent species and life history stages; reproduction; resting, hiding and migration• Provision and redistribution of woody debris and organic materials• Food production and delivery Water Quality: <ul style="list-style-type: none">• Removing excessive nutrients and toxic compounds• Sediment removal and stabilization It is expected that these effects will increase over time, unless recommendations made in the Restoration Plan (e.g., the establishment of a robust beach nourishment program) are followed.	There are 97 vacant parcels and 75 acres of developable land in low intensity in single-family residential zoning designations.	Habitat: <ul style="list-style-type: none">• Altered sediment transport and vegetation reestablishment patterns, and ultimately changing flow and wave patterns.• Altered beach substrate due to increased erosion and wave energy.• Removal of native vegetation required by shorebirds and other nearshore-dependent species.• Impervious surface installation.• Reduction of large woody debris and wrack. Water Quality: <ul style="list-style-type: none">• Removal of native vegetation and the buffering capacity it provides.• Increased impervious surfaces.• Potential for installation of pollutant-generating impervious surfaces within or near shoreline areas.• Shoreline modifications to protect new or existing structures.• Increased nutrient loading via planting of ornamental plants and lawns. It is expected that these impacts will increase over time, unless recommendations made in the Restoration Plan (e.g., the establishment of a robust beach nourishment program) are followed.	Vegetation Conservation: <ul style="list-style-type: none">• Type and amount of vegetation removal in the shoreline jurisdiction is regulated under SMP Section 4.08 and SMP Section 6.04.• Clearing and grading is limited to the minimum extent necessary. Shoreline Buffers: <ul style="list-style-type: none">• Shoreline buffers established in SMP Section 5.04 limit encroachment of development in shorelands. Critical Areas: <ul style="list-style-type: none">• Critical areas regulations contained in SMP Appendix 2 protect shoreline functions through critical area buffers, building setbacks, mitigation requirements, and other measures. Shoreline Stabilization: <ul style="list-style-type: none">• Shoreline stabilization is regulated in SMP Section 6.08.• New development must be located and designed to avoid the need for structural stabilization.• Structural shoreline stabilization measures are only allowed if non-structural measures are infeasible.	<ul style="list-style-type: none">• AMC Chapter 17.12 – Single-Family Residential District contains zoning regulations for low intensity residential zones.• AMC 13.70 – Storm and Surface Water Management
Residential Development – High Intensity	There are 101 developed parcels, 41 acres of high intensity residential use. Zone R-M.	Habitat: <ul style="list-style-type: none">• Sediment/bank stabilization and shoreline protection• Attenuation of wave energy• Physical space and conditions to support aquatic and shoreline dependent species and life history stages; reproduction; resting, hiding and migration• Provision and redistribution of woody debris and organic materials• Food production and delivery Water Quality: <ul style="list-style-type: none">• Removal of excessive nutrients and toxic compounds• Sediment removal and stabilization	There are 152 vacant parcels and 91 acres of developable land in high intensity residential zoning designations.	Habitat: <ul style="list-style-type: none">• Altered sediment transport and vegetation reestablishment patterns, and ultimately changing flow and wave patterns.• Altered beach substrate due to increased erosion and wave energy• Removal of native vegetation required by shorebirds and other nearshore-dependent species.• Impervious surface installation.• Reduction of large woody debris and wrack. Water Quality: <ul style="list-style-type: none">• Removal of native vegetation.• Increased impervious surfaces.• Potential for installation of pollutant-generating impervious surfaces within or	Vegetation Conservation: <ul style="list-style-type: none">• Type and amount of vegetation removal in the shoreline jurisdiction is regulated under SMP Section 4.08 and SMP Section 6.04.• Clearing and grading is limited to the minimum extent necessary. Shoreline Buffers: <ul style="list-style-type: none">• Shoreline buffers established in SMP Section 5.04 limit encroachment of development in shorelands. Critical Areas: <ul style="list-style-type: none">• Critical areas regulations contained in SMP Appendix 2 protect shoreline functions through critical area buffers, building setbacks, mitigation	<ul style="list-style-type: none">• AMC Chapter 17.16 – Multiple Family Residential District contains zoning regulations for high intensity residential zones.• AMC 13.70 – Storm and Surface Water Management

Development Type	Existing Conditions	Shoreline Processes Affected	Potential Development	Potential Impacts on Functions or Processes	Effect of SMP Provisions	Other Regulatory Programs
		It is expected that these effects will increase over time, unless recommendations made in the Restoration Plan (e.g., the establishment of a robust beach nourishment program) are followed.		<p>near shoreline areas.</p> <ul style="list-style-type: none"> Shoreline modifications to protect new or existing structures. Increased nutrient loading via planting of ornamental plants and lawns. <p>It is expected that these impacts will increase over time, unless recommendations made in the Restoration Plan (e.g., the establishment of a robust beach nourishment program) are followed.</p>	<p>requirements, and other measures.</p> <p>Shoreline Stabilization:</p> <ul style="list-style-type: none"> Shoreline stabilization is regulated in SMP Section 6.08. New development must be located and designed to avoid the need for structural stabilization. Structural shoreline stabilization measures are only allowed if non-structural measures are infeasible. 	
Commercial Development (CG, CR, WD zones)	There are 78 developed parcels, 45 acres of commercial parcels in the shoreline jurisdiction.	<p>Habitat:</p> <ul style="list-style-type: none"> Sediment/bank stabilization and shoreline protection Attenuation of wave energy Physical space and conditions to support aquatic and shoreline dependent species and life history stages; reproduction; resting, hiding and migration Provision and redistribution of woody debris and organic materials Food production and delivery <p>Water Quality:</p> <ul style="list-style-type: none"> Removal of excessive nutrients and toxic compounds Sediment removal and stabilization <p>It is expected that these effects will increase over time, unless recommendations made in the Restoration Plan (e.g., the establishment of a robust beach nourishment program) are followed.</p>	There are 122 vacant parcels, 37 acres of commercial parcels in the shoreline jurisdiction.	<p>Habitat:</p> <ul style="list-style-type: none"> Altered sediment transport and vegetation reestablishment patterns, and ultimately changing flow and wave patterns if armoring were to be placed. Removal of native vegetation required by shorebirds and other nearshore-dependent species. Impervious surface installation. <p>Water Quality:</p> <ul style="list-style-type: none"> Removal of native vegetation and wrack. Increased impervious surfaces. Potential for installation of pollutant-generating impervious surfaces within or near shoreline areas. Shoreline modifications to protect new or existing structures. Increased nutrient loading via planting of ornamental plants and lawns. Possible future accidental contamination depending on industrial or commercial activities 	<p>Vegetation Conservation:</p> <ul style="list-style-type: none"> Type and amount of vegetation removal in the shoreline jurisdiction is regulated under SMP Section 4.08 and SMP Section 6.04. Clearing and grading is limited to the minimum extent necessary. <p>Shoreline Buffers:</p> <ul style="list-style-type: none"> Shoreline buffers established in SMP Section 5.04 limit encroachment of development in shorelands. <p>Critical Areas:</p> <ul style="list-style-type: none"> Critical areas regulations contained in SMP Appendix 2 protect shoreline functions through critical area buffers, building setbacks, mitigation requirements, and other measures. <p>Shoreline Stabilization:</p> <ul style="list-style-type: none"> Shoreline stabilization is regulated in SMP Section 6.08. New development must be located and designed to avoid the need for structural stabilization. Structural shoreline stabilization measures are only allowed if non-structural measures are infeasible. 	<ul style="list-style-type: none"> AMC Chapter 17.36, Chapter 17.28, Chapter 17.40 AMC 13.70 – Storm and Surface Water Management Hydraulic Code (Chapter 77.55 RCW) and Hydraulic Code Rules (Chapter 220-660 WAC)
Industrial Development (I, LI, MI zones)	There are 38 developed parcels, 1,500 acres of industrial parcels in the shoreline jurisdiction.	<p>Habitat:</p> <ul style="list-style-type: none"> Sediment/bank stabilization and shoreline protection Attenuation of wave energy Physical space and conditions to support aquatic and shoreline dependent species and life history stages; reproduction; resting, hiding and migration Provision and redistribution of woody debris and organic materials 	There are 108 vacant parcels, 862 acres of industrial parcels in the shoreline jurisdiction.	<p>Habitat:</p> <ul style="list-style-type: none"> Altered sediment transport and vegetation reestablishment patterns, and ultimately changing flow and wave patterns if armoring were to be placed. Removal of native vegetation required by shorebirds and other nearshore-dependent species. Impervious surface installation. 	<p>Vegetation Conservation:</p> <ul style="list-style-type: none"> Type and amount of vegetation removal in the shoreline jurisdiction is regulated under SMP Section 4.08 and SMP Section 6.04. Clearing and grading is limited to the minimum extent necessary. <p>Shoreline Buffers:</p> <ul style="list-style-type: none"> Shoreline buffers established in SMP 	<ul style="list-style-type: none"> AMC Chapter 17.24, Chapter 17.44, Chapter 17.48 AMC 13.70 – Storm and Surface Water Management Hydraulic Code (Chapter 77.55 RCW) and Hydraulic Code Rules (Chapter 220-660 WAC)

Development Type	Existing Conditions	Shoreline Processes Affected	Potential Development	Potential Impacts on Functions or Processes	Effect of SMP Provisions	Other Regulatory Programs
		<ul style="list-style-type: none"> Food production and delivery <p>Water Quality:</p> <ul style="list-style-type: none"> Removal of excessive nutrients and toxic compounds Sediment removal and stabilization <p>It is expected that these effects will increase over time, unless recommendations made in the Restoration Plan (e.g., the establishment of a robust beach nourishment program) are followed.</p>		<p>Water Quality:</p> <ul style="list-style-type: none"> Removal of native vegetation and wrack. Increased impervious surfaces. Potential for installation of pollutant-generating impervious surfaces within or near shoreline areas. Shoreline modifications to protect new or existing structures. Increased nutrient loading via planting of ornamental plants and lawns. Possible future accidental contamination depending on industrial or commercial activities 	<p>Section 5.04 limit encroachment of development in shorelands.</p> <p>Critical Areas:</p> <ul style="list-style-type: none"> Critical areas regulations contained in SMP Appendix 2 protect shoreline functions through critical area buffers, building setbacks, mitigation requirements, and other measures. <p>Shoreline Stabilization:</p> <ul style="list-style-type: none"> Shoreline stabilization is regulated in SMP Section 6.08. New development must be located and designed to avoid the need for structural stabilization. Structural shoreline stabilization measures are only allowed if non-structural measures are infeasible. 	
Recreational Development	Recreational development is permitted within the WD, RS, and RM zones.	<p>Habitat:</p> <ul style="list-style-type: none"> Sediment/bank stabilization and shoreline protection Physical space and conditions to support aquatic and shoreline dependent species and life history stages; reproduction; resting, hiding and migration 	Future development is limited.	<p>Disturbance of nesting and rearing habitat for shorebirds.</p> <p>Future infestation of European beachgrass and other non-native species from non-motorized human disturbance and activity.</p>	<p>Vegetation Conservation:</p> <ul style="list-style-type: none"> Type and amount of vegetation removal in the shoreline jurisdiction is regulated under SMP Section 4.08 and SMP Section 6.04. Clearing and grading is limited to the minimum extent necessary. <p>Shoreline Buffers:</p> <ul style="list-style-type: none"> Shoreline buffers established in SMP Section 5.04 limit encroachment of development in shorelands. <p>Critical Areas:</p> <ul style="list-style-type: none"> Critical areas regulations contained in SMP Appendix 2 protect shoreline functions through critical area buffers, building setbacks, mitigation requirements, and other measures. <p>Shoreline Stabilization:</p> <ul style="list-style-type: none"> Shoreline stabilization is regulated in SMP Section 6.08. New development must be located and designed to avoid the need for structural stabilization. Structural shoreline stabilization measures are only allowed if non-structural measures are infeasible. 	<ul style="list-style-type: none"> AMC Title 17 – Zoning AMC 13.70 – Storm and Surface Water Management Hydraulic Code (Chapter 77.55 RCW) and Hydraulic Code Rules (Chapter 220-660 WAC)

Table 5-2. Cumulative Impacts on Shoreline Environment, City of Cosmopolis.

Development Type	Existing Conditions	Shoreline Processes Affected	Potential Development	Potential Impacts on Functions or Processes	Effect of SMP Provisions	Other Regulatory Programs
Residential Development –Low Intensity	There are 6 developed parcels, 1.5 acres of low intensity residential use. Zone R100.	<p>Habitat:</p> <ul style="list-style-type: none"> • Sediment/bank stabilization and shoreline protection • Attenuation of wave energy • Physical space and conditions to support aquatic and shoreline dependent species and life history stages; reproduction; resting, hiding and migration • Provision and redistribution of woody debris and organic materials • Food production and delivery <p>Water Quality:</p> <ul style="list-style-type: none"> • Removing excessive nutrients and toxic compounds • Sediment removal and stabilization <p>It is expected that these effects will increase over time, unless recommendations made in the Restoration Plan (e.g., the establishment of a robust beach nourishment program) are followed.</p>	There are no vacant parcels.	Effects are limited due to the lack of developable parcels.	<p>Vegetation Conservation:</p> <ul style="list-style-type: none"> • Type and amount of vegetation removal in the shoreline jurisdiction is regulated under SMP Section 4.08 and SMP Section 6.04. • Clearing and grading is limited to the minimum extent necessary. <p>Shoreline Buffers:</p> <ul style="list-style-type: none"> • Shoreline buffers established in SMP Section 5.04 limit encroachment of development in shorelands. <p>Critical Areas:</p> <ul style="list-style-type: none"> • Critical areas regulations contained in SMP Appendix 2 protect shoreline functions through critical area buffers, building setbacks, mitigation requirements, and other measures. <p>Shoreline Stabilization:</p> <ul style="list-style-type: none"> • Shoreline stabilization is regulated in SMP Section 6.08. • New development must be located and designed to avoid the need for structural stabilization. • Structural shoreline stabilization measures are only allowed if non-structural measures are infeasible. 	<ul style="list-style-type: none"> • CMC Chapter 18.16. • CMC Title 12 – Development Guidelines and Public Works Standards.
Residential Development – Medium Intensity	There are 23 developed parcels, 5 acres of medium intensity residential use.	<p>Habitat:</p> <ul style="list-style-type: none"> • Sediment/bank stabilization and shoreline protection • Attenuation of wave energy • Physical space and conditions to support aquatic and shoreline dependent species and life history stages; reproduction; resting, hiding and migration • Provision and redistribution of woody debris and organic materials • Food production and delivery <p>Water Quality:</p> <ul style="list-style-type: none"> • Removal of excessive nutrients and toxic compounds • Sediment removal and stabilization <p>It is expected that these effects will increase over time, unless recommendations made in</p>	There are 20 vacant parcels and 8 acres of developable land in medium intensity residential zoning designations.	<p>Habitat:</p> <ul style="list-style-type: none"> • Altered sediment transport and vegetation reestablishment patterns, and ultimately changing flow and wave patterns. • Altered beach substrate due to increased erosion and wave energy • Removal of native vegetation required by shorebirds and other nearshore-dependent species. • Impervious surface installation. • Reduction of large woody debris and wrack. <p>Water Quality:</p> <ul style="list-style-type: none"> • Removal of native vegetation. • Increased impervious surfaces. • Potential for installation of pollutant-generating impervious surfaces within or near shoreline areas. • Shoreline modifications to protect new or 	<p>Vegetation Conservation:</p> <ul style="list-style-type: none"> • Type and amount of vegetation removal in the shoreline jurisdiction is regulated under SMP Section 4.08 and SMP Section 6.04. • Clearing and grading is limited to the minimum extent necessary. <p>Shoreline Buffers:</p> <ul style="list-style-type: none"> • Shoreline buffers established in SMP Section 5.04 limit encroachment of development in shorelands. <p>Critical Areas:</p> <ul style="list-style-type: none"> • Critical areas regulations contained in SMP Appendix 2 protect shoreline functions through critical area buffers, building setbacks, mitigation requirements, and other measures. <p>Shoreline Stabilization:</p>	<ul style="list-style-type: none"> • CMC Chapter 18.20. • CMC Title 12 – Development Guidelines and Public Works Standards.

Development Type	Existing Conditions	Shoreline Processes Affected	Potential Development	Potential Impacts on Functions or Processes	Effect of SMP Provisions	Other Regulatory Programs
		the Restoration Plan (e.g., the establishment of a robust beach nourishment program) are followed.		<p>existing structures.</p> <ul style="list-style-type: none"> Increased nutrient loading via planting of ornamental plants and lawns. <p>It is expected that these impacts will increase over time, unless recommendations made in the Restoration Plan (e.g., the establishment of a robust beach nourishment program) are followed.</p>	<ul style="list-style-type: none"> Shoreline stabilization is regulated in SMP Section 6.08. New development must be located and designed to avoid the need for structural stabilization. Structural shoreline stabilization measures are only allowed if non-structural measures are infeasible. 	
Commercial Development (WA and MU zones)	There are 12 developed parcels, 10 acres of commercial parcels in the shoreline jurisdiction.	<p>Habitat:</p> <ul style="list-style-type: none"> Sediment/bank stabilization and shoreline protection Attenuation of wave energy Physical space and conditions to support aquatic and shoreline dependent species and life history stages; reproduction; resting, hiding and migration Provision and redistribution of woody debris and organic materials Food production and delivery <p>Water Quality:</p> <ul style="list-style-type: none"> Removal of excessive nutrients and toxic compounds Sediment removal and stabilization <p>It is expected that these effects will increase over time, unless recommendations made in the Restoration Plan (e.g., the establishment of a robust beach nourishment program) are followed.</p>	There are 30 vacant parcels, 40 acres of commercial parcels in the shoreline jurisdiction.	<p>Habitat:</p> <ul style="list-style-type: none"> Altered sediment transport and vegetation reestablishment patterns, and ultimately changing flow and wave patterns if armoring were to be placed. Removal of native vegetation required by shorebirds and other nearshore-dependent species. Impervious surface installation. <p>Water Quality:</p> <ul style="list-style-type: none"> Removal of native vegetation and wrack. Increased impervious surfaces. Potential for installation of pollutant-generating impervious surfaces within or near shoreline areas. Shoreline modifications to protect new or existing structures. Increased nutrient loading via planting of ornamental plants and lawns. Possible future accidental contamination depending on industrial or commercial activities. 	<p>Vegetation Conservation:</p> <ul style="list-style-type: none"> Type and amount of vegetation removal in the shoreline jurisdiction is regulated under SMP Section 4.08 and SMP Section 6.04. Clearing and grading is limited to the minimum extent necessary. <p>Shoreline Buffers:</p> <ul style="list-style-type: none"> Shoreline buffers established in SMP Section 5.04 limit encroachment of development in shorelands. <p>Critical Areas:</p> <ul style="list-style-type: none"> Critical areas regulations contained in SMP Appendix 2 protect shoreline functions through critical area buffers, building setbacks, mitigation requirements, and other measures. <p>Shoreline Stabilization:</p> <ul style="list-style-type: none"> Shoreline stabilization is regulated in SMP Section 6.08. New development must be located and designed to avoid the need for structural stabilization. Structural shoreline stabilization measures are only allowed if non-structural measures are infeasible. 	<ul style="list-style-type: none"> CMC Chapter 18.32 and CMC Chapter 18.34. CMC Title 12 – Development Guidelines and Public Works Standards.
Industrial Development (M zone)	There is 1 developed parcel, 35 acres of industrial parcels in the shoreline jurisdiction.	<p>Habitat:</p> <ul style="list-style-type: none"> Sediment/bank stabilization and shoreline protection Attenuation of wave energy Physical space and conditions to support aquatic and shoreline dependent species and life history stages; reproduction; resting, hiding and migration Provision and redistribution of woody debris and organic materials Food production and delivery 	There are 8 vacant parcels, 227 acres of industrial parcels in the shoreline jurisdiction. Development is severely limited by the presence of wetlands.	<p>Habitat:</p> <ul style="list-style-type: none"> Altered sediment transport and vegetation reestablishment patterns, and ultimately changing flow and wave patterns if armoring were to be placed. Removal of native vegetation required by shorebirds and other nearshore-dependent species. Impervious surface installation. <p>Water Quality:</p> <ul style="list-style-type: none"> Removal of native vegetation and wrack. 	<p>Vegetation Conservation:</p> <ul style="list-style-type: none"> Type and amount of vegetation removal in the shoreline jurisdiction is regulated under SMP Section 4.08 and SMP Section 6.04. Clearing and grading is limited to the minimum extent necessary. <p>Shoreline Buffers:</p> <ul style="list-style-type: none"> Shoreline buffers established in SMP Section 5.04 limit encroachment of development in shorelands. 	<ul style="list-style-type: none"> CMC Chapter 18.36. CMC Title 12 – Development Guidelines and Public Works Standards.

Development Type	Existing Conditions	Shoreline Processes Affected	Potential Development	Potential Impacts on Functions or Processes	Effect of SMP Provisions	Other Regulatory Programs
		<p>Water Quality:</p> <ul style="list-style-type: none"> Removal of excessive nutrients and toxic compounds Sediment removal and stabilization <p>It is expected that these effects will increase over time, unless recommendations made in the Restoration Plan (e.g., the establishment of a robust beach nourishment program) are followed.</p>		<ul style="list-style-type: none"> Increased impervious surfaces. Potential for installation of pollutant-generating impervious surfaces within or near shoreline areas. Shoreline modifications to protect new or existing structures. Increased nutrient loading via planting of ornamental plants and lawns. Possible future accidental contamination depending on industrial or commercial activities. 	<p>Critical Areas:</p> <ul style="list-style-type: none"> Critical areas regulations contained in SMP Appendix 2 protect shoreline functions through critical area buffers, building setbacks, mitigation requirements, and other measures. <p>Shoreline Stabilization:</p> <ul style="list-style-type: none"> Shoreline stabilization is regulated in SMP Section 6.08. New development must be located and designed to avoid the need for structural stabilization. Structural shoreline stabilization measures are only allowed if non-structural measures are infeasible. 	
Recreational Development	Recreational development is permitted within the residential and commercial designations.	<p>Habitat:</p> <ul style="list-style-type: none"> Sediment/bank stabilization and shoreline protection Physical space and conditions to support aquatic and shoreline dependent species and life history stages; reproduction; resting, hiding and migration 	Future development is possible in the WA and MU zoning designations.	<p>Disturbance of nesting and rearing habitat for shorebirds.</p> <p>Future infestation of European beachgrass and other non-native species from non-motorized human disturbance and activity.</p>	<p>Vegetation Conservation:</p> <ul style="list-style-type: none"> Type and amount of vegetation removal in the shoreline jurisdiction is regulated under SMP Section 4.08 and SMP Section 6.04. Clearing and grading is limited to the minimum extent necessary. <p>Shoreline Buffers:</p> <ul style="list-style-type: none"> Shoreline buffers established in SMP Section 5.04 limit encroachment of development in shorelands. <p>Critical Areas:</p> <ul style="list-style-type: none"> Critical areas regulations contained in SMP Appendix 2 protect shoreline functions through critical area buffers, building setbacks, mitigation requirements, and other measures. <p>Shoreline Stabilization:</p> <ul style="list-style-type: none"> Shoreline stabilization is regulated in SMP Section 6.08. New development must be located and designed to avoid the need for structural stabilization. Structural shoreline stabilization measures are only allowed if non-structural measures are infeasible. 	<ul style="list-style-type: none"> CMC Chapter 18.32 and CMC Chapter 18.34. CMC Title 12 – Development Guidelines and Public Works Standards. Hydraulic Code (Chapter 77.55 RCW) and Hydraulic Code Rules (Chapter 220-660 WAC)

Table 5-3. Cumulative Impacts on Shoreline Environment, City of Hoquiam.

Development Type	Existing Conditions	Shoreline Processes Affected	Potential Development	Potential Impacts on Functions or Processes	Effect of SMP Provisions	Other Regulatory Programs
Residential Development –Low Intensity	There are 12 developed parcels, 52 acres of low intensity residential use. Zone R-1.	Habitat: <ul style="list-style-type: none">• Sediment/bank stabilization and shoreline protection• Attenuation of wave energy• Physical space and conditions to support aquatic and shoreline dependent species and life history stages; reproduction; resting, hiding and migration• Provision and redistribution of woody debris and organic materials• Food production and delivery Water Quality: <ul style="list-style-type: none">• Removing excessive nutrients and toxic compounds• Sediment removal and stabilization It is expected that these effects will increase over time, unless recommendations made in the Restoration Plan (e.g., the establishment of a robust beach nourishment program) are followed.	There are 27 vacant parcels and 700 acres of developable land in low intensity in residential zoning designations.	Habitat: <ul style="list-style-type: none">• Altered sediment transport and vegetation reestablishment patterns, and ultimately changing flow and wave patterns.• Altered beach substrate due to increased erosion and wave energy.• Removal of native vegetation required by shorebirds and other nearshore-dependent species.• Impervious surface installation.• Reduction of large woody debris and wrack. Water Quality: <ul style="list-style-type: none">• Removal of native vegetation and the buffering capacity it provides.• Increased impervious surfaces.• Potential for installation of pollutant-generating impervious surfaces within or near shoreline areas.• Shoreline modifications to protect new or existing structures.• Increased nutrient loading via planting of ornamental plants and lawns. It is expected that these impacts will increase over time, unless recommendations made in the Restoration Plan (e.g., the establishment of a robust beach nourishment program) are followed.	Vegetation Conservation: <ul style="list-style-type: none">• Type and amount of vegetation removal in the shoreline jurisdiction is regulated under SMP Section 4.08 and SMP Section 6.04.• Clearing and grading is limited to the minimum extent necessary. Shoreline Buffers: <ul style="list-style-type: none">• Shoreline buffers established in SMP Section 5.04 limit encroachment of development in shorelands. Critical Areas: <ul style="list-style-type: none">• Critical areas regulations contained in SMP Appendix 2 protect shoreline functions through critical area buffers, building setbacks, mitigation requirements, and other measures. Shoreline Stabilization: <ul style="list-style-type: none">• Shoreline stabilization is regulated in SMP Section 6.08.• New development must be located and designed to avoid the need for structural stabilization.• Structural shoreline stabilization measures are only allowed if non-structural measures are infeasible.	<ul style="list-style-type: none">• HMC Chapter 10.03 – Zoning Districts contains zoning regulations for R-1 residential zones.• HMC Title 8 –Utilities
Residential Development – Medium Intensity	There are 85 developed parcels, 50 acres of medium intensity residential use. Zone R-2.	Habitat: <ul style="list-style-type: none">• Sediment/bank stabilization and shoreline protection• Attenuation of wave energy• Physical space and conditions to support aquatic and shoreline dependent species and life history stages; reproduction; resting, hiding and migration• Provision and redistribution of woody debris and organic materials• Food production and delivery Water Quality: <ul style="list-style-type: none">• Removal of excessive nutrients and toxic compounds• Sediment removal and stabilization	There are 49 vacant parcels and 88 acres of developable land in medium intensity residential zoning designations.	Habitat: <ul style="list-style-type: none">• Altered sediment transport and vegetation reestablishment patterns, and ultimately changing flow and wave patterns.• Altered beach substrate due to increased erosion and wave energy• Removal of native vegetation required by shorebirds and other nearshore-dependent species.• Impervious surface installation.• Reduction of large woody debris and wrack. Water Quality: <ul style="list-style-type: none">• Removal of native vegetation.• Increased impervious surfaces.• Potential for installation of pollutant-generating impervious surfaces within or	Vegetation Conservation: <ul style="list-style-type: none">• Type and amount of vegetation removal in the shoreline jurisdiction is regulated under SMP Section 4.08 and SMP Section 6.04.• Clearing and grading is limited to the minimum extent necessary. Shoreline Buffers: <ul style="list-style-type: none">• Shoreline buffers established in SMP Section 5.04 limit encroachment of development in shorelands. Critical Areas: <ul style="list-style-type: none">• Critical areas regulations contained in SMP Appendix 2 protect shoreline functions through critical area buffers, building setbacks, mitigation	<ul style="list-style-type: none">• HMC Chapter 10.03 – Zoning Districts contains zoning regulations for R-2 residential zones.• HMC Title 8 –Utilities

Development Type	Existing Conditions	Shoreline Processes Affected	Potential Development	Potential Impacts on Functions or Processes	Effect of SMP Provisions	Other Regulatory Programs
		It is expected that these effects will increase over time, unless recommendations made in the Restoration Plan (e.g., the establishment of a robust beach nourishment program) are followed.		<p>near shoreline areas.</p> <ul style="list-style-type: none"> Shoreline modifications to protect new or existing structures. Increased nutrient loading via planting of ornamental plants and lawns. <p>It is expected that these impacts will increase over time, unless recommendations made in the Restoration Plan (e.g., the establishment of a robust beach nourishment program) are followed.</p>	<p>requirements, and other measures.</p> <p>Shoreline Stabilization:</p> <ul style="list-style-type: none"> Shoreline stabilization is regulated in SMP Section 6.08. New development must be located and designed to avoid the need for structural stabilization. Structural shoreline stabilization measures are only allowed if non-structural measures are infeasible. 	
Commercial Development (C-1 and C-2 zones)	There are 33 developed parcels, 48 acres of commercial parcels in the shoreline jurisdiction.	<p>Habitat:</p> <ul style="list-style-type: none"> Sediment/bank stabilization and shoreline protection Attenuation of wave energy Physical space and conditions to support aquatic and shoreline dependent species and life history stages; reproduction; resting, hiding and migration Provision and redistribution of woody debris and organic materials Food production and delivery <p>Water Quality:</p> <ul style="list-style-type: none"> Removal of excessive nutrients and toxic compounds Sediment removal and stabilization <p>It is expected that these effects will increase over time, unless recommendations made in the Restoration Plan (e.g., the establishment of a robust beach nourishment program) are followed.</p>	There are 40 vacant parcels, 356 acres of commercial parcels in the shoreline jurisdiction.	<p>Habitat:</p> <ul style="list-style-type: none"> Altered sediment transport and vegetation reestablishment patterns, and ultimately changing flow and wave patterns if armoring were to be placed. Removal of native vegetation required by shorebirds and other nearshore-dependent species. Impervious surface installation. <p>Water Quality:</p> <ul style="list-style-type: none"> Removal of native vegetation and wrack. Increased impervious surfaces. Potential for installation of pollutant-generating impervious surfaces within or near shoreline areas. Shoreline modifications to protect new or existing structures. Increased nutrient loading via planting of ornamental plants and lawns. Possible future accidental contamination depending on industrial or commercial activities. 	<p>Vegetation Conservation:</p> <ul style="list-style-type: none"> Type and amount of vegetation removal in the shoreline jurisdiction is regulated under SMP Section 4.08 and SMP Section 6.04. Clearing and grading is limited to the minimum extent necessary. <p>Shoreline Buffers:</p> <ul style="list-style-type: none"> Shoreline buffers established in SMP Section 5.04 limit encroachment of development in shorelands. <p>Critical Areas:</p> <ul style="list-style-type: none"> Critical areas regulations contained in SMP Appendix 2 protect shoreline functions through critical area buffers, building setbacks, mitigation requirements, and other measures. <p>Shoreline Stabilization:</p> <ul style="list-style-type: none"> Shoreline stabilization is regulated in SMP Section 6.08. New development must be located and designed to avoid the need for structural stabilization. Structural shoreline stabilization measures are only allowed if non-structural measures are infeasible. 	<ul style="list-style-type: none"> HMC Chapter 10.03 – Zoning Districts contains zoning regulations for C-1 and C-2 residential zones. HMC Title 8 –Utilities
Industrial Development (I zone)	There are 24 developed parcels, 825 acres of industrial parcels in the shoreline jurisdiction.	<p>Habitat:</p> <ul style="list-style-type: none"> Sediment/bank stabilization and shoreline protection Attenuation of wave energy Physical space and conditions to support aquatic and shoreline dependent species and life history stages; reproduction; resting, hiding and migration Provision and redistribution of woody debris and organic materials 	There are 57 vacant parcels, 408 acres of industrial parcels in the shoreline jurisdiction.	<p>Habitat:</p> <ul style="list-style-type: none"> Altered sediment transport and vegetation reestablishment patterns, and ultimately changing flow and wave patterns if armoring were to be placed. Removal of native vegetation required by shorebirds and other nearshore-dependent species. Impervious surface installation. 	<p>Vegetation Conservation:</p> <ul style="list-style-type: none"> Type and amount of vegetation removal in the shoreline jurisdiction is regulated under SMP Section 4.08 and SMP Section 6.04. Clearing and grading is limited to the minimum extent necessary. <p>Shoreline Buffers:</p> <ul style="list-style-type: none"> Shoreline buffers established in SMP 	<ul style="list-style-type: none"> HMC Chapter 10.03 – Zoning Districts contains zoning regulations for C1 and C2 residential zones. HMC Title 8 –Utilities Hydraulic Code (Chapter 77.55 RCW) and Hydraulic Code Rules (Chapter 220-660 WAC)

Development Type	Existing Conditions	Shoreline Processes Affected	Potential Development	Potential Impacts on Functions or Processes	Effect of SMP Provisions	Other Regulatory Programs
		<ul style="list-style-type: none"> Food production and delivery <p>Water Quality:</p> <ul style="list-style-type: none"> Removal of excessive nutrients and toxic compounds Sediment removal and stabilization <p>It is expected that these effects will increase over time, unless recommendations made in the Restoration Plan (e.g., the establishment of a robust beach nourishment program) are followed.</p>		<p>Water Quality:</p> <ul style="list-style-type: none"> Removal of native vegetation and wrack. Increased impervious surfaces. Potential for installation of pollutant-generating impervious surfaces within or near shoreline areas. Shoreline modifications to protect new or existing structures. Increased nutrient loading via planting of ornamental plants and lawns. Possible future accidental contamination depending on industrial or commercial activities. 	<p>Section 5.04 limit encroachment of development in shorelands.</p> <p>Critical Areas:</p> <ul style="list-style-type: none"> Critical areas regulations contained in SMP Appendix 2 protect shoreline functions through critical area buffers, building setbacks, mitigation requirements, and other measures. <p>Shoreline Stabilization:</p> <ul style="list-style-type: none"> Shoreline stabilization is regulated in SMP Section 6.08. New development must be located and designed to avoid the need for structural stabilization. Structural shoreline stabilization measures are only allowed if non-structural measures are infeasible. 	
Recreation and Resource Development (NR Zone)	Recreational development is permitted within the NR, C-1, C-2, and I zoning designations. It is a conditional use in R-1 and R-2 designations.	<p>Habitat:</p> <ul style="list-style-type: none"> Sediment/bank stabilization and shoreline protection Physical space and conditions to support aquatic and shoreline dependent species and life history stages; reproduction; resting, hiding and migration. 	There are 6 parcels and 1,066 acres of NR zoned land. Future development is limited.	<p>Disturbance of nesting and rearing habitat for shorebirds.</p> <p>Future infestation of European beachgrass and other non-native species from non-motorized human disturbance and activity.</p>	<p>Vegetation Conservation:</p> <ul style="list-style-type: none"> Type and amount of vegetation removal in the shoreline jurisdiction is regulated under SMP Section 4.08 and SMP Section 6.04. Clearing and grading is limited to the minimum extent necessary. <p>Shoreline Buffers:</p> <ul style="list-style-type: none"> Shoreline buffers established in SMP Section 5.04 limit encroachment of development in shorelands. <p>Critical Areas:</p> <ul style="list-style-type: none"> Critical areas regulations contained in SMP Appendix 2 protect shoreline functions through critical area buffers, building setbacks, mitigation requirements, and other measures. <p>Shoreline Stabilization:</p> <ul style="list-style-type: none"> Shoreline stabilization is regulated in SMP Section 6.08. New development must be located and designed to avoid the need for structural stabilization. Structural shoreline stabilization measures are only allowed if non-structural measures are infeasible. 	<ul style="list-style-type: none"> HMC Chapter 10.03 – Zoning Districts. HMC Title 8 –Utilities Hydraulic Code (Chapter 77.55 RCW) and Hydraulic Code Rules (Chapter 220-660 WAC)

6 NET EFFECT ON ECOLOGICAL FUNCTIONS

As described in the previous chapters, the proposed SMP provides a substantially increased level of protection to shoreline ecological functions relative to the existing SMP. On its own, the proposed SMP is expected to protect shorelines within the cities, resulting in no net loss of shoreline ecological function. In addition, the application of the SMP may improve ecological functions over time through restoration efforts and significant enhancement incentives in targeted areas, such as in the Urban Conservancy environment designation.

State and federal regulations, acting in concert with this SMP, will provide further assurances of improved shoreline ecological functions over time. Together with the implementation of the Shoreline Restoration Plan, the SMP is expected to begin to address the enhancement and restoration of shoreline functions in those areas where they are currently impaired.

6.01 EFFECTS OF SMP PROVISIONS

Despite a relatively limited potential or likelihood for significant development to occur in the near future, it is an overall goal of the SMP and SMP update process to ensure no net loss, as well as the long-term enhancement, of unique shoreline features, natural resources, and fish and wildlife habitat. It is also a specific objective to provide for no net loss of shoreline ecological function. The SIC identified four ecologic function categories including hydrologic, vegetation, hyporheic, and habitat.

Table 8-5 and Table 8-6 provide a summary of potential cumulative impacts to shoreline ecological function categories that are associated with reasonably foreseeable future development, and the elements that are included in the SMP which act as countermeasures toward ensuring no net loss of ecological function. Table 8-7 provides a summary of the SMP provisions, goals, policies, and regulations that support no net loss of ecological functions in the cities' shoreline jurisdiction. It also summarizes the effects of cumulative impacts on shoreline functions.

6.02 NET EFFECT

As describe above, the proposed SMP provides a substantial level of protection for shoreline ecological functions through strategies such as development setbacks and mitigation

requirements where impacts are not otherwise avoided, resulting in no net loss of ecological function. Additional protection and potential for enhancement of ecological functions is provided through consistency with the Shoreline Restoration Plan and other federal, state, and local laws and policies. Together, with implementation of the Shoreline Restoration Plan, the proposed SMP has high potential for improving ecological functions in areas of the shoreline jurisdiction where they are currently impaired. Therefore, the cumulative impacts of development in the shoreline jurisdiction are expected to result in no net loss of shoreline ecological functions.

6.03 UNANTICIPATED CUMULATIVE IMPACTS

In accordance with (WAC 173-26-201(3)(d)(iii)), the SMP has been developed to avoid or mitigate unanticipated or uncommon impacts that cannot be reasonably identified at this time. Impact avoidance and mitigation will occur during the cities' permit review process for future development in the shoreline jurisdiction. Conditional use permits will be required for development proposals or shoreline uses that are not classified or set forth in the SMP.

Mitigation sequencing will be applied during permit review to avoid new incremental impacts to shoreline ecological functions. To ensure mitigation sequencing is applied, the cities' critical areas regulations, which regulates wetlands, streams, fish and wildlife habitat areas, and other critical areas, was modified to reflect the requirements of the SMA and included as SMP Appendix 2.

Additionally, minimum criteria for review and approval of conditional use permits have been incorporated into the SMP administration provisions pursuant to WAC 173-27-210 and WAC 173-27-160. The criteria include the provision that

“the proposed use will cause no unreasonably adverse effects to the cities shoreline jurisdiction, will not result in a net loss of ecological functions, and will not be incompatible with the environment designation or zoning classification in which it is to be located.”

Additionally, it includes the criteria that

“...consideration of cumulative impacts resultant from the proposed use has occurred and has demonstrated that no substantial cumulative impacts are anticipated, consistent with WAC 173-27-160(2).”

6.04 CONCLUSION

The reasonable foreseeable future development and associated impacts on shoreline ecological functions, in conjunction with the cities' SMP provisions, goals, policies, and regulations; Shoreline Restoration Plan; and other existing laws, policies, and regulations beyond the SMP were reviewed and compared for this CIA. Together, they provide the basis for evaluating the net effect of both anticipated and unanticipated cumulative impacts of development on shoreline functions. Based on this CIA, the proposed SMP includes policies and regulations that will achieve no net loss of ecological functions as the SMP is implemented over time.

7 CONCLUSIONS REGARDING NO NET LOSS

The SMP update process has provided the opportunity to identify baseline environmental conditions, anticipate future impacts to shoreline resources, and provide restoration opportunities within the cities' shoreline jurisdiction. Changes to the SMP were informed by the best technical information gathered during the update process. The proposed SMP provides a new system of shoreline environment designations that establishes more uniform management of the cities' shorelines.

The system of shoreline environment designations and use regulations in the proposed SMP is consistent with the established land use pattern, as well as the land use vision planned for in the cities' comprehensive plan, zoning, and other long-range planning documents. Based on this consistency, it is unlikely that substantial changes in the type of shoreline land uses will occur in the future. Furthermore, the use of aquatic designations will provide a means for protecting and managing the resources that are unique to the aquatic environments.

The updated development standards and regulation of shoreline modifications provides more protection for shoreline processes. The updated standards and regulations are more restrictive of activities that would result in adverse impacts to the shoreline environment. In addition, the *Restoration Plan* developed as part of the SMP Update provides the cities with opportunities to improve or restore ecological functions that have been impaired because of past development activities. Furthermore, the proposed SMP is meant to compliment city, state, and federal efforts to protect shoreline functions and values.

The cities are required to monitor development under the proposed SMP to ensure no net loss. The *Restoration Plan* recommends that city staffs track all land use and development activity, including exemptions, within shoreline jurisdiction, and incorporate actions and programs of individual departments as well. It is suggested that city staffs assemble a report to coincide with Comprehensive Plan updates. Following the goals and objectives of the proposed SMP, the report could be used to determine whether implementation of the SMP is meeting the basic goal of no net loss of ecological functions relative to the baseline condition established in the SIC.

Based on assessment of these factors, the cumulative actions taken over time in accordance with the provisions outlined in the proposed SMP are not likely to result in a net loss of overall ecological functions from the existing baseline conditions within the cities' shoreline jurisdiction. An overall improvement in ecologic functions is expected in the cities' shoreline due to restoration efforts proposed along the shoreline with redevelopment and shoreline enhancement.

8 CUMULATIVE IMPACT ANALYSIS TABLES

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Table 8-1. Cumulative Impacts to the Shoreline Environment – Nutrient/Pollutant Delivery and Removal

Function: Water Quality

Resources at Risk: Waterways and their floodplains, riparian corridors and potential, undelineated wetlands

Shoreline Alterations Impacting Processes and Functions	Proposed Restoration/Protection Measures and Draft SMP Policies and Regulations	Non-Regulatory Measures
<p><u>Current Condition:</u> Existing impervious surfaces increase delivery of nutrients to waterways.</p> <p>Ditching, draining, and filling of wetlands and clearing of riparian has occurred previously within the cities.</p> <p><u>Degree of future cumulative impact:</u> New development may result in additional impervious surfaces and may result in further impacts to existing aquatic resources at risk including associated wetlands.</p> <p>Potential development of residential lots adjacent to the shoreline is small, so future impacts should be low.</p> <p>Nutrient/pollutant processes and water quality functions within the</p>	<p><u>Proposed Overall Measures:</u> Protect existing waterway resources and associated wetlands (including buffers) (SMP Appendix 2), and restore vegetated areas (SMP Section 4.08).</p> <p>If there is a conflict between the provisions of SMP and critical areas regulations in the shoreline jurisdiction, the provisions most protective of the shoreline jurisdiction shall apply, as determined by the cities (SMP Section 1.07).</p> <p>SMP Appendix 2 regulates critical areas such as critical aquifer recharge areas within the shoreline jurisdiction.</p> <p>All shoreline uses and activities shall utilize best management practices (BMPs) to minimize any increase in surface runoff and to control, treat and release surface water runoff so that receiving water quality is not adversely affected during both construction and operation (SMP Section 4.09).</p> <p>The SMP specifically addresses water quality in SMP Section 4.09: Water Quality.</p> <p>The cities' Comprehensive Plans addresses cooperation with the</p>	<p>Restore degraded wetlands.</p> <p>Restore degraded riparian areas through replanting with native species.</p> <p>The <i>Shoreline Restoration Plan</i> outlines the non-regulatory measures that will be available to the cities to help address these issues.</p>

Shoreline Alterations Impacting Processes and Functions	Proposed Restoration/ Protection Measures and Draft SMP Policies and Regulations	Non-Regulatory Measures
cities' shoreline may be impacted by existing roadways, septic systems, and potential expansions.	Grays Harbor County Health District to ensure pollutants from septic systems do not enter groundwater.	

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Table 8-2. Cumulative Impacts to the Shoreline Environment – Surface and Groundwater Flow

Function: Reducing downstream flooding and erosion (surface storage), aquifer recharge and storage

Resources at Risk: Waterways and their floodplains, riparian corridors and potential, undelineated wetlands

Shoreline Alterations Impacting Processes and Functions	Proposed Restoration/ Protection Measures and Draft SMP Policies and Regulations	Non-Regulatory Measures
<p><u>Current Condition:</u> Impervious areas and clearing decrease infiltration recharge, subsurface storage, and groundwater discharge to rivers and wetlands.</p> <p>Wetland fill, development in floodplain (including shoreline protective structures) reduces surface storage, overbank flooding and increased flooding frequency and duration.</p> <p><u>Degree of future cumulative impact:</u> New development will remove vegetated areas and increase impervious cover. Additional impacts to surface storage functions may occur from shoreline fill and encroachment.</p> <p>Potential development of residential lots adjacent to the shoreline is small, so future impacts should be low.</p> <p>Residential development is allowed in the High Intensity, Shoreline Residential, and Urban Conservancy shoreline designation areas adjacent to the waterways.</p>	<p><u>Proposed Overall Measures:</u> Minimize impacts to surface and groundwater processes by employing nonstructural approach to reducing downstream flooding and erosion. This would include protecting and restoring wetlands. Reference found in SMP Chapter 4.05.</p> <p>If there is a conflict between the provisions of SMP and critical areas regulations in the shoreline jurisdiction, the provisions most protective of the shoreline jurisdiction shall apply, as determined by the cities (SMP Section 1.07).</p> <p>SMP Section 4.03, SMP Section 4.05, and SMP Appendix 2 regulate frequently flooded areas.</p> <p>The SMP specifically addresses flood hazard reduction in SMP Section 4.05: Flood Hazard Management.</p>	<p>Restore degraded wetlands.</p> <p>Restore degraded floodplain and riparian areas through replanting with native species.</p> <p>The <i>Shoreline Restoration Plan</i> outlines the non-regulatory measures that will be available to the cities to help address these issues.</p>

Table 8-3. Cumulative Impacts to the Shoreline Environment – Sediment Transport

Function: Sediment delivery and removal from area water systems

Resources at Risk: Waterways and their floodplains, riparian corridors and potential, undelineated wetlands

Shoreline Alterations Impacting Processes and Functions	Proposed Restoration/Protection Measures and Draft SMP Policies and Regulations	Non-Regulatory Measures
<p><u>Current Condition:</u> Sediment delivery and removal processes have been affected by both natural and man-made factors.</p> <p>Development in the watershed has altered the process of sediment transport. Converting vegetation to roads and development has altered or accelerated sediment transport processes within the basin.</p> <p><u>Future Cumulative Impact:</u> Potential for further sediment delivery into water systems without protective vegetation due to land clearing and development upstream of the cities.</p> <p>Development may affect storage of surface waters in wetlands and floodplains in this basin, which in turn could affect flooding, and erosion functions within downstream shoreline areas along</p>	<p><u>Proposed Overall Measures:</u> Minimize the delivery of sediment from land alterations through retention of natural vegetation, protection of riparian corridors, application of a comprehensive erosion and sedimentation control program and measures and proper siting of development. References found in SMP Section 4.08 and SMP Section 6.04.</p> <p>SMP Appendix 2 regulates geologically hazardous areas in the shoreline jurisdiction.</p> <p>The SMP specifically addresses water quality in SMP Section 4.09: Water Quality.</p> <p>In SMP Section 6.04, land clearing, grading, and filling must be limited to the minimum necessary for development.</p>	<p>Create incentive programs to conserve and retain native vegetation and restore native vegetation where none is present.</p> <p>Programs such as on-site density transfers and conservation easements could help protect these areas.</p> <p>The <i>Shoreline Restoration Plan</i> outlines the non-regulatory measures that will be available to the cities to help address these issues.</p>

Shoreline Alterations Impacting Processes and Functions	Proposed Restoration/ Protection Measures and Draft SMP Policies and Regulations	Non-Regulatory Measures
waterways.		

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Table 8-4. Cumulative Impacts to the Shoreline Environment – Habitat Biodiversity

Function: Fish and wildlife habitat, food production and delivery

Resources at Risk: Waterways and their floodplains, riparian corridors and potential, undelineated wetlands

Shoreline Alterations Impacting Processes and Functions	Proposed Restoration/Protection Measures and Draft SMP Policies and Regulations	Non-Regulatory Measures
<p><u>Current Condition:</u> Important in-stream, riparian, and marine habitat is present in waterways.</p> <p>Habitat elements important to fish include riparian cover, passage for migration, clean water, and spawning habitat and forage habitat, and the availability of food sources.</p> <p>Habitat functions are altered with development, shoreline armoring, road construction, culvert installation, loss of riparian cover, and stream and riverbank modification.</p> <p>Alteration of scrubland habitat, loss of wetlands, streams, and rivers reduce the overall habitat for wildlife species, including mammals, amphibians, reptiles, waterfowl, birds and other wildlife species.</p>	<p><u>Proposed Overall Measures:</u> Protect and restore riparian habitat, aquatic habitat, and wetlands (SMP Section 4.03 and SMP Appendix 2).</p> <p>If there is a conflict between the provisions of SMP and shoreline jurisdiction critical areas regulations in the shoreline jurisdiction in SMP Appendix 2, the provisions most protective of the shoreline jurisdiction shall apply, as determined by the cities (SMP Section 1.07)</p> <p>SMP Section 4.03 and SMP Appendix 2 regulate critical fish and wildlife conservation areas within the shoreline jurisdiction.</p> <p>The SMP specifically addresses water quality in SMP Section 4.09: Water Quality.</p> <p>The SMP specifically addresses protection and restoration of native vegetation within the shoreline jurisdiction. In SMP Section 4.08: Vegetation Conservation and SMP Section 6.04: Clearing, Grading, and Fill, the purpose is to conserve vegetation in the shoreline jurisdiction, restrict clearing and grading to the</p>	<p>Restore degraded wetlands and the aquatic system.</p> <p>This includes restoring degraded riparian and aquatic habitat by planting with native species where possible and the addition of habitat features.</p> <p>The <i>Shoreline Restoration Plan</i> will outline the non-regulatory measures that will be available to the cities to help address these issues.</p>

Shoreline Alterations Impacting Processes and Functions	Proposed Restoration/ Protection Measures and Draft SMP Policies and Regulations	Non-Regulatory Measures
<p>Habitat connectivity is diminished as riparian cover is removed and culverts, bridges, bulkheads, riprap, filling, and dredging interrupt aquatic systems.</p> <p>Loss of habitat features such as banks with scrubland vegetation decreases wildlife cover, denning, perching, and nesting habitat.</p> <p><u>Future cumulative impacts:</u> Future impacts should be low if provisions of the SMP are followed.</p> <p>Any future development may affect habitat and water quality functions within the cities' shoreline.</p>	<p>minimum amount necessary, and control invasive weeds and non-native species.</p> <p>SMP Section 4.08.01 calls for the cities to protect and restore diversity of vegetation and habitat associated with shoreline areas.</p> <p>SMP Section 2 calls for all shoreline development to be located, designed, constructed, and managed to avoid disturbance of and minimize adverse impacts to wildlife resources, including spawning, nesting, rearing and habitat areas and migratory routes.</p>	

Table 8-5. Shoreline Function Impacts Associated with Residential or Commercial Development or Agriculture and SMP Counter Measures

Function Category	Potential Cumulative Impacts to Shoreline Functions	SMP Countermeasures
Hydrologic	<ul style="list-style-type: none"> Altered flows and water quality associated with increased impervious surface. 	<ul style="list-style-type: none"> Environment designations concentrate development in least sensitive areas. Limits parking facilities. Prohibits industry, forestry, and mining.
Vegetation	<ul style="list-style-type: none"> Reduced water quality from increase in pesticide and fertilizer. Increased risk of bank instability, increased erosion, and increased turbidity associated with vegetation clearing. 	<ul style="list-style-type: none"> Provides for minimum building and agriculture activity setbacks. Requires increased setbacks if necessary to protect functions. Mitigation standards for vegetation clearing. Requires BMPs and compliance with cities' stormwater management program for clearing and grading. Provision for vegetation conservation.
Hyporheic	<ul style="list-style-type: none"> Increased need for bank stabilization or protection structures could result in direct disturbance and alteration of the hyporheic zone, reducing the potential for water or sediments storage, and removal of nutrients or toxins, altered water temperatures, or other water quality conditions. Altered surface water and groundwater exchange due to agricultural practices. 	<ul style="list-style-type: none"> Prohibits high impact utilities and agriculture facilities, manure lagoons, confinement lots, and feeding operations. Requires building setbacks. Limits shoreline stabilization and encourages non-structural treatments. Prohibits the creation of new agricultural lands by diking, draining, or filling wetlands.
Habitat	<ul style="list-style-type: none"> Reduced habitat area or suitability for specific species. Reduced habitat complexity and habitat connectivity. 	<ul style="list-style-type: none"> Limits non-water oriented uses. Provides standards for restoration activities and consistency with the <i>Shoreline Restoration Plan</i>.

Table 8-6. Shoreline Function Impacts Associated with In-water and Overwater Structures or Shoreline Modifications and SMP Counter Measures

Function Category	Potential Cumulative Impacts to Shoreline Functions	SMP Countermeasures
Hydrologic	<ul style="list-style-type: none"> Altered hydraulics that affects habitat conditions or reduce potential for habitat formation. Altered movement of sediments. 	<ul style="list-style-type: none"> Limitations and standards for shoreline modifications including dredging, fill, shoreline stabilization.
Vegetation	<ul style="list-style-type: none"> Reduced riparian vegetation resulting in increased erosion, bank instability, and altered habitat. 	<ul style="list-style-type: none"> Requires BMPs and compliance with cities' stormwater management program for clearing and grading. Provision for vegetation conservation.
Hyporheic	<ul style="list-style-type: none"> Water quality impacts resulting from structures interfering with hyporheic flows. 	<ul style="list-style-type: none"> Limits shoreline stabilization and encourages non-structural treatments. Restricts gravel removal for flood management.
Habitat	<ul style="list-style-type: none"> Altered substrate composition due to hydrologic and wave energy impacts. Reduced habitat complexity and connectivity between terrestrial and aquatic environments. Increased shading or substrate alteration affecting plant growth, benthic community, and behavior of aquatic organisms. Altered ecological interactions. 	<ul style="list-style-type: none"> Provides provisions for boating facility design, including location, size, number, and operation standards. Limitations on aquaculture facilities. Provisions for in-stream habitat enhancement, vegetation conservation, and mitigation standards.

Table 8-7. Summary of Shoreline Master Program and Effects of Cumulative Impacts on Shoreline Functions

SMP Chapter containing goals, policies, or regulations, to protect ecological functions	Purpose of SMP Provision, Goals, Policy or Regulation	Summary of Cumulative Impacts Effects on Key Shoreline Functions ¹
SMP Chapter 2: <i>Shoreline Management Goals</i>	<ul style="list-style-type: none"> Establishes a framework upon which the more detailed SMP shoreline use environments, policies, regulations, and administrative procedures are based. Specifically, includes a conservation element to preserve natural resources and provide for no net loss of ecological function. 	<ul style="list-style-type: none"> Serves to protect all functions potentially affected by the SMP, future development, and shoreline restoration or enhancement activities.
SMP Chapter 3: <i>Shoreline Environment Designations</i>	<ul style="list-style-type: none"> Defines and maps the shoreline jurisdiction and environment designations of all the shorelines in the cities. Policies and regulations specific to the four designated shoreline environments (High Intensity, Shoreline Residential, Urban Conservancy, and Aquatic) are detailed in this chapter. The shoreline environments are the key to providing specific management policies and regulations to ensure no net loss in both developed and undeveloped areas with high functions. 	<ul style="list-style-type: none"> Protects all functions, with focus on preserving and enhancing existing shoreline ecological functions.
SMP Chapter 4: <i>General Policies & Regulations</i>	<ul style="list-style-type: none"> Sets forth the general policies and regulations that apply to uses, developments, and activities in all shoreline areas of the cities. Specifically, it contains the requirement that all development and uses meet no net loss, and include measures to mitigate environmental impacts. Provides specific standards for critical areas, environmental impacts, flood hazard reduction, restoration, shoreline modifications, vegetation conservation, and water quality to achieve no net loss. Requires periodic review of shoreline conditions to determine 	<ul style="list-style-type: none"> Protects all functions with focus on critical areas, riparian vegetation, and water quality and quantity. Provides standards for environmental impacts review and mitigation

SMP Chapter containing goals, policies, or regulations, to protect ecological functions	Purpose of SMP Provision, Goals, Policy or Regulation	Summary of Cumulative Impacts Effects on Key Shoreline Functions ¹
	whether other actions are necessary to ensure no net loss with the provisions in SMP Chapter 7: Administration.	
SMP Chapter 5: <i>Specific Shoreline Use Policies & Regulations</i>	<ul style="list-style-type: none"> • Sets forth policies and regulations governing specific categories of uses and activities typically found in shoreline areas. • For example, establishes minimum shoreline setbacks, prohibits industry and mining, and limits in-stream structures to fish habitat enhancements. 	<ul style="list-style-type: none"> • Protects all functions, with specific focus on the unique aspects of uses that require specific and unique requirements to assure no net loss.
SMP Chapter 6: <i>Shoreline Modification Policies & Regulations</i>	<ul style="list-style-type: none"> • Sets forth policies and regulations that apply to shoreline modifications. • Specifically regulates in-water structures and clearing and grading. 	<ul style="list-style-type: none"> • Protects all functions with focus on in-water uses and modifications.
SMP Appendix 2: <i>Critical Areas Regulations</i>	<ul style="list-style-type: none"> • Sets forth policies and regulations that apply to critical areas within the shoreline jurisdiction. • Critical areas regulations will apply to the shoreline jurisdiction associated with the cities' rivers and lakes. 	<ul style="list-style-type: none"> • Protects critical areas within the shoreline jurisdiction to assure no net loss.

¹ Key functions for the shoreline jurisdiction and specific reaches are described in the SIC.

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