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SHORELINE RESTORATION PLAN

City of Ilwaco Shoreline Master Program

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SHORELINE RESTORATION PLAN

CITY OF ILWACO SHORELINE MASTER PROGRAM

1 INTRODUCTION

1.1 Background & Purpose

As part of a comprehensive Shoreline Master Program (SMP) update, as elaborated on in the SMP Guidelines (Washington Administrative Code [WAC] 173-26), local jurisdictions are required to plan for the restoration of impaired shoreline functions. Such planning “should be designed to achieve overall improvements in shoreline ecological function over time, when compared to the status upon adoption of the master program” (WAC 173-26-201(2)(f)). The purpose of this Shoreline Restoration Plan is to plan for the restoration of impaired shorelines for the City of Ilwaco (City or Ilwaco). Some of the potential restoration actions described in this document may not be specifically applicable within Ilwaco; however, such potential restoration actions may apply to areas within the surrounding area and result in improvements to shoreline ecological functions within the City.

As defined in the SMP Guidelines, “restoration” means the reestablishment or upgrading of impaired ecological shoreline processes or functions. The SMP Guidelines indicate that restoration may be accomplished through measures including, but not limited to, revegetation, removal of intrusive shoreline structures, and removal or treatment of toxic materials. However, restoration does not imply a requirement for returning the shoreline area to aboriginal or pre-European settlement conditions (WAC 173-26-020(31)).

Importantly, this Shoreline Restoration Plan is a **non-regulatory** component of the City’s SMP update. This Shoreline Restoration Plan represents a vision for **voluntary** restoration to be implemented over time and result in ongoing improvements to shoreline ecological functions within Ilwaco. While some of the opportunities identified in this Shoreline Restoration Plan may concern private property, the City does not intend to require restoration on private property or to commit private property for restoration purposes without the willing cooperation and participation of affected landowners.

Presently, the restoration opportunities identified in this Shoreline Restoration Plan are conceptual. However, with City support and potential collaboration with one or more restoration partners, the conceptual restoration opportunities identified in this Shoreline Restoration Plan could be funded and implemented.

1.2 Uses

This Shoreline Restoration Plan could be used by agencies, interest groups, and property owners in the following ways:

- *Grant applications* – If grant applications require or recommend inclusion in a publicly vetted and approved plan, the identification of programs and projects in this Shoreline Restoration Plan may facilitate obtaining grant funding.
- *Information resource* – Sections 4.1 and 4.2 identify several agencies and organizations that are actively involved in shoreline restoration, conservation, and protection in the Ilwaco area. These organizations could be consulted by property owners or other parties considering undertaking a restoration action.
- *Mitigation* – In situations that require off-site mitigation, this Shoreline Restoration Plan could provide ideas to maximize the regional impact of the mitigation.

2 GOALS, POLICIES & OBJECTIVES

The goal of this Shoreline Restoration Plan is achieve overall improvements in shoreline ecological function over time, when compared to existing conditions.

The City's SMP includes the following related policies for shoreline habitat and natural systems enhancement (i.e. restoration) projects:

- *Policy 1* – Shoreline habitat and natural system enhancement projects should be fostered.
- *Policy 2* – Shoreline habitat and natural system enhancement projects should address legitimate restoration needs and priorities, and implement City-approved restoration plans, such as the City's Shoreline Restoration Plan.

The following objectives provide more detail of how the City and potential restoration partners might work to achieve a net improvement in shoreline ecological functions:

- *Objective 1* – Protect natural shoreline ecological processes and functions, and restore those processes and functions that have been altered.
- *Objective 2* – Maintain biodiversity and conserve unique, fragile, and valuable species and habitats.

3 SHORELINE ISSUES & POTENTIAL RESTORATION ACTIONS

This chapter begins with Section 3.1, which provides a brief overview of Ilwaco’s shorelines based on the Shoreline Analysis Report for Shorelines in the City of Ilwaco: Columbia River, Wallacut River, Black Lake, and Pacific Ocean (Shoreline Analysis Report; The Watershed Company 2015). Sections 3.2, 3.3, and 3.4 then discuss shoreline issues and potential restoration actions for freshwater, estuarine, and marine shorelines, respectively. Each of these sections begins with a table that identifies shoreline issues and potential restoration actions. These tables were compiled based on previously prepared scientific documents. Following the tables, each section also includes a reach-specific discussion of shoreline issues and potential restoration opportunities.

3.1 Context

The Shoreline Analysis Report provides a detailed look at shoreline ecosystem conditions, including climate, geology, key species and habitats, and major land use changes. In Ilwaco, the Columbia River, Wallacut River, Black Lake, and Pacific Ocean qualify as Shorelines of the State. The City’s proposed shoreline jurisdiction covers approximately 291 acres of upland shorelands spread across approximately 8.2 miles of shoreline. The approximate upland extent of shoreline jurisdiction in Ilwaco is shown in Appendix A (the same geographic area as all reaches combined).

Ilwaco is located in Baker Bay, near the mouth of the Columbia River at the southern end of the Long Beach Peninsula. According to maps of Water Resource Inventory Areas (WRIAs), the City falls within the Willapa WRIA (24); however, practically, the City is located outside of the Willapa Watershed and immediately along the Columbia River estuary. Shoreline jurisdiction includes estuarine, marine, and freshwater shorelines and their associated shorelands.

Much of Ilwaco’s shoreline jurisdiction is undeveloped or has limited development. Undeveloped shorelines provide well-vegetated riparian and wetland habitats, as well

as productive salt marsh areas within Baker Bay. In total, jurisdiction includes 173.5 acres of wetlands and 134 acres of associated salt marsh. These areas support concentrations of shorebirds and waterfowl, bald eagles and marbled murrelets, and numerous anadromous and resident fish species.

3.2 Freshwater Issues & Potential Restoration Actions

Key habitats associated with freshwater shorelines in Ilwaco include wetlands, riparian areas, and upland forests. The Pacific County WRIA 24 Strategic Plan for Salmon Recovery (2001) and the Lower Columbia Salmon Recovery and Fish and Wildlife Subbasin Plan (2010) identify issues that occur throughout the Willapa Bay watershed. Those issues relevant to Ilwaco’s freshwater shorelines, as well as general types of restoration activities that may address those issues, are described below in Table 3-1.

Table 3-1. Issues and potential restoration actions for freshwater shorelines in the Ilwaco area.

Issues	Description	Potential Restoration Actions
High Priority, Near-term Issues & Actions		
Riparian habitat	Riparian habitat provides a number of ecological functions to freshwater systems, including protection of the water quality and habitat functions of Black Lake and freshwater portions of the Wallacut River. In Ilwaco’s shorelines, riparian areas may be reduced in size by urban and industrial development and have degraded stands relative to the naturally expected range of age classes and diversity and number of species.	<ul style="list-style-type: none"> • Plant native nearshore species including forested and scrub-shrub species in degraded areas, especially on the north and west sides of Black Lake. • Protect intact, mature riparian stands.
Freshwater wetlands	Freshwater wetlands provide important water quality, quantity and habitat functions. They provide habitat for a variety of waterfowl, wading birds, and shorebird species, as well as fish and native amphibians.	<ul style="list-style-type: none"> • Protect and restore existing freshwater wetlands.

Issues	Description	Potential Restoration Actions
Invasive species	Non-native, invasive species, including aquatic and terrestrial, both flora and fauna, are a concern along the freshwater shorelines of the City. Invasive species can form dense monocultures that limit ecological diversity. Noxious weeds are classified by the State Noxious Weed Board as any non-native, invasive plant that threatens agricultural crops, local ecosystems, fish and wildlife habitat, humans, or livestock. In Ilwaco, the City has been combating the invasive aquatic plant Brazilian elodea (<i>Egeria densa</i>), which has formed dense stands within Black Lake.	<ul style="list-style-type: none"> • Participate with Pacific County and the state in the research, control, and monitoring of invasive species, including both aquatic invasive species listed by the Washington State Department of Fish and Wildlife and noxious weeds listed by the Washington State Noxious Weed Control Board. • Develop an ecologically based lake management plan to control Brazilian elodea based on understanding of root causes (i.e. elevated nutrients from septics; introduction by boats). This may include integrated pest management measures and best management practices to control non-native, invasive species.
Medium Priority, Medium-term Issues & Actions		
Sensitive species	<p>Salmonid conservation drives much of the freshwater conservation and protection actions in the area. The hope is that salmonid conservation actions will in turn help to conserve other species and whole ecosystems.</p> <p>Marbled murrelets and spotted owls rely on mature forests for nesting. Marbled murrelets require nesting habitats in proximity to estuarine foraging habitats. Forest loss and fragmentation limits these species' habitat.</p>	<ul style="list-style-type: none"> • Salmonids will benefit from all of the restoration actions identified above. • Protect, maintain, and restore late-successional forests for marbled murrelets, spotted owls, bald eagles, and other migratory and resident species.

Black Lake Reach 11 offers important opportunities to protect the functions of Black Lake. Development along the west shore (Highway 101) has eliminated the majority of riparian vegetation protecting the lake. Degradation of riparian vegetation has also occurred along the north and south shores of the lake from development. Restoration should include actions to re-establish riparian vegetation along this reach. Riparian cover plays an important role in capturing sediment and other pollutants, such as phosphorous, which can trigger algal blooms and destabilize the lake ecosystem. Further, the lake is more susceptible to eutrophication events given its shallow water depth. Because the lake is experiencing an infestation of Brazilian elodea, it is important that management of the lake consider root causes of this infestation, including nutrient inputs (e.g. septics and agriculture) and lack of riparian vegetation.

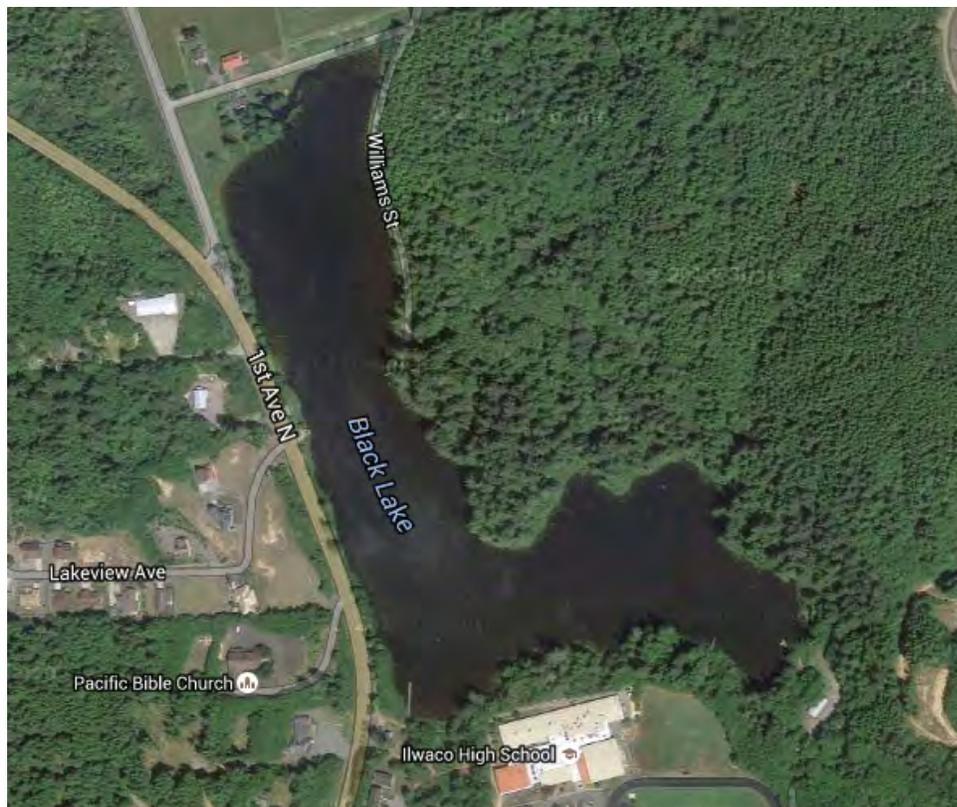


Figure 3-1. Opportunities exist for restoration of riparian vegetation at Black Lake, particularly on the west and north shores.

Reach 12 on the east side of the lake has a relatively intact riparian forest that adequately protects the functions of the lake from upland impacts within this reach. Most of Reach 12 is in City ownership as parkland. Restoration opportunities for riparian enhancement may be present along Williams Street.

3.3 Estuarine Issues & Potential Restoration Actions

Several plans and assessments have identified the issue of estuarine habitat loss in the Columbia River estuary (Kukulka and Jay 2003, Lower Columbia Fish Recovery Board 2010). Other key estuarine issues involve water quality, invasive species, and altered sediment transport conditions. Issues and potential restoration actions described for the Columbia River estuary in Table 3-2 are based the Shoreline Analysis Report, as well as recovery planning efforts, including the Washington Lower Columbia Salmon Recovery and Fish and Wildlife Subbasin Plan (Lower Columbia Fish Recovery Board 2010). This plan states that the estuary streams historically supported thousands of fall Chinook, chum, and coho. The priority actions identified by the plan, which are designed to restore these historic populations to “high levels of viability,” include:

- Restoring passage at tide gates, culverts, and other artificial barriers.
- Restoring estuary, floodplain, and riparian habitats.
- Addressing immediate risks with short-term habitat fixes.

Table 3-2. Issues and potential restoration actions for estuarine shorelines in the Ilwaco area.

Issues	Description	Potential Restoration Actions
High Priority, Near-term Issues & Actions		
Estuarine habitat	Dikes, levees, tide gates, and shoreline armoring block juvenile salmonids from accessing high-quality rearing habitat. Tide gates on the Wallacut River may block fish passage at certain flows. Dikes, levees, and tide gates also impair other critical functions of estuarine habitat. Estuarine wetlands and mudflats are important areas for primary production, nutrient cycling and export (detrital food chain), sediment and nutrient sinks (includes nutrient loss and transformation), wave/storm surge attenuation, and invertebrate (shellfish), fish and shorebird habitat.	<ul style="list-style-type: none"> • Remove dikes, levees, and tide gates and restore estuarine habitat through re-establishment of the natural range of tidal regimes. Secure grants to restore degraded estuarine habitat (e.g. Columbia/Wallacut River Reaches 7, 8 and 9) in a manner that protects existing development. Investigate removing or modifying tide gates on Wallacut River at Stringtown Road. • Protect intact estuarine habitats (e.g. Columbia River Reaches 1, 4, and 5; Columbia/Wallacut River Reach 7; Baker Bay salt marshes; and Wallacut River marshes). • Establish restoration targets based on anticipated sea level rise and resulting loss of existing habitat. • Develop a restoration management plan for Columbia/Wallacut River Reach 7 wetlands and forest habitat.
Nearshore riparian habitat	Nearshore riparian habitats provide a number of ecological functions to nearshore systems including protection of the water quality and habitat functions of estuarine mudflat, intertidal marsh, and sandy beach habitat in addition to contribution of nutrients to the detrital-based food chain and woody debris for habitat structure. In Ilwaco shorelines, riparian areas may be reduced in size by urban and industrial development and have degraded stands relative to the naturally expected range of age classes and diversity and number of species.	<ul style="list-style-type: none"> • Plant native nearshore species including forested and scrub-shrub species in degraded areas. • Protect areas of intact, mature riparian stands (e.g. Columbia River Reaches 1 and 4) through innovative measures, such as the transfer or purchase of development rights.

Issues	Description	Potential Restoration Actions
Water quality	Water quality impairments within the City's watershed affect water quality conditions in the Columbia River estuary. Estuarine areas are also vulnerable to marine-based contaminants. Creosote piles and boat repair/maintenance (marine paints, discharge of effluents, bilges) represent a long-term source of pollutants. For example, bacterial pollutants from boat effluent discharges in marinas are a significant issue and can negatively affect shellfish operations in the estuary.	<ul style="list-style-type: none"> • Protect and restore riparian forests and estuarine marshes. • Implement best management practices within the City's watershed to limit contaminant impacts. • Remove or replace creosote piles. • Implement and/or improve ongoing best management practices to control bacterial contamination and other pollutants (e.g. toxic organics and heavy metals from boat operations and maintenance in the marina).
Medium Priority, Medium-term Issues & Actions		
Invasive species	Non-native, invasive flora and fauna alter estuarine conditions. Frequent shipping traffic provides a common vector for the introduction of new species into the Columbia River estuary. New Zealand mudsnail is present in the estuary and could affect food supply of native rainbow trout (Vinson and Baker 2008).	<ul style="list-style-type: none"> • Participate with Pacific County and the state in the research, control, and monitoring of invasive species, including both aquatic invasive species listed by the Washington State Department of Fish and Wildlife, especially the New Zealand mudsnail, and noxious weeds listed by the Washington State Noxious Weed Control Board.
Sediment transport and disposal	Flow regulation has resulted in a flattening of the hydrologic curve for the Lower Columbia River, and a decrease in the sediment supply to the Columbia River littoral cell from the Columbia River (Sherwood et al. 1990, Templeton and Jay 2013). The construction of jetties, land use practices, in-filling, and sedimentation have resulted in changes to the tidal prism and sedimentation patterns. Ongoing dredging for navigation in the Lower Columbia River amounts to approximately three to five million cubic yards per year.	<ul style="list-style-type: none"> • Coordinate and work with the Lower Columbia Fish Recovery Board, US Army Corps of Engineers, Columbia River dam operators and Pacific County in their efforts to adjust the timing, magnitude, and frequency of flows (especially spring freshets) entering the estuary and plume to better reflect the natural hydrologic cycle, improve access to habitats, and provide better transport of coarse sediments and nutrients in the estuary, plume, and littoral cell. • Use dredged materials beneficially, with regard to the impact of material disposal. • Interstate coordination of disposal should ensure equitable distribution of sediment that supports sediment transport processes to the Washington Coast. • Continue to develop projects identified by the Lower Columbia Solutions Group in the Columbia River Sediment Management Plan.

Issues	Description	Potential Restoration Actions
Sensitive species	By blocking light, overwater structures limit growth of submerged aquatic vegetation and alter trophic relationships and foraging behavior of fish. Piles and pile dikes alter currents and sedimentation processes.	<ul style="list-style-type: none"> Remove or modify pilings and pile dikes that have low economic value when removal or modification would benefit juvenile salmonids and improve ecosystem health.
	Predation on juvenile salmonids in the Lower Columbia River and estuary has increased as a result of anthropogenic habitat changes that have increased predator populations, such as northern pikeminnow or Caspian terns.	<ul style="list-style-type: none"> Implement methods to reduce predation mortality on migrating salmonids.
	Habitat loss in the Columbia River Basin is considered a key threat to several federally threatened species (e.g. eulachon, green sturgeon, Pacific lamprey).	<ul style="list-style-type: none"> Coordinate and work with Pacific County and the Lower Columbia Fish Recovery Board to identify and protect known habitats for sensitive species in the estuary and tidal freshwater portion of the Lower Columbia River.

Estuarine habitat is present along and within the southern boundary of Ilwaco. Marina development and ongoing dredging and maintenance actions in Columbia River Reaches 2 and 3 have significantly degraded the estuarine habitat within the marina footprint and therefore limit any potential restoration actions. Existing control of pollutant discharges from marina activities, including toxics (such as paints, fuel and oil), heavy metals and effluent from boats, will be continued and improved. Particular attention is required to address bacterial contamination from boats as it is classified as a Category 5 pollutant issue under Ecology's 305(d) listing.

Columbia River Reach 1 contains the largest area of intact salt marsh in the City (41.5 acres). It is presently buffered by an existing mature stand of Sitka spruce forest between 150 to 200 feet in width, which is critical to protecting and supporting the functions of the adjoining salt marsh. This nearshore riparian buffer is relatively intact, but is impacted by clearing from residences on the east end. There are potential actions that could be considered to protect the existing buffer, including transfer of development rights and securing grant monies to purchase undeveloped lots.



Figure 3-2. In Columbia River Reach 1, the ecological functions of Baker Bay salt marsh and tidal channels west of the Port of Ilwaco are essentially intact. Long-term protection of this area is recommended. (Source: Washington State Department of Ecology)

Columbia River Reaches 4 and 5 also contain similar nearshore riparian habitat to Reach 1, which protects adjoining salt marsh and mudflat habitat. Columbia River Reach 4, located northeast of the marina, has a nearshore riparian zone that buffers a 20-acre tidal marsh. As in Columbia River Reach 1, this riparian zone protects and sustains the functions of the adjoining salt marsh. The level of degradation of this shoreline riparian zone is higher relative to Columbia River Reach 1, with residential development present on the western end (32.7% of reach) and relatively undeveloped land to the east with several degraded areas within the riparian forest. Under current zoning, the riparian forest could be significantly degraded. The adjoining Columbia River Reach 5, however, is an intact nearshore forest that is essentially undeveloped. Approximately 30 percent of the reach is in government ownership; however, the entire area is zoned Recreation Residential and has potential for development. As with Columbia River Reach 1, there are potential actions that could be considered under this restoration plan to protect the existing buffer in Columbia River Reaches 4 and 5, including transfer of development rights and securing grant monies to purchase undeveloped residential lots.



Figure 3-3. Columbia River Reach 4 contains residential development on the west end (left side of photo) and intact nearshore riparian vegetation that adjoins salt marsh and mudflat habitat to the south. (Source: Washington State Department of Ecology)

Columbia River Reach 6 and Columbia/Wallacut River Reach 7 comprise the mouth of the Wallacut River along with adjoining intertidal salt marsh and mudflats. The river mouth and channel habitats provide important refuge habitat for salmonids in the Lower Columbia River, in addition to contributing to food chain support for the larger Columbia River estuarine ecosystem, including benthic, fish, and shorebird communities.

There are significant restoration opportunities in these reaches. Over 50 percent of Reach 6 is currently residentially developed, with the balance constituting floodplains and wetlands. In the residential areas, nearshore riparian vegetation has largely been eliminated; re-establishment of nearshore vegetation would provide needed protection of marsh and riverine ecosystems.



Figure 3-4. Residential development has impacted nearshore riparian habitat in Reach 6. (Source: Washington State Department of Ecology)

Columbia/Wallacut River Reach 7 contains 70 acres of tidal marsh. Previous ditching, berms and fill appear to have altered the historic tidal patterns within this reach. A comprehensive restoration plan for management of this area would identify the most appropriate restoration actions and measures. The majority of this area is owned by the Columbia Land Trust.



Figure 3-5. An older berm on the northern edge of Columbia/Wallacut River Reach 7 appears to alter the normal pattern of tidal exchange in this marsh. Additionally, the tide gates on Stringtown Road prevent upstream tidal influence to historic tidal wetlands.

Columbia/Wallacut River Reaches 8 and 9 also offer important restoration opportunities. These reaches are presently not subject to tidal influence due to a tide gate on the Wallacut River at Stringtown Road. Columbia/Wallacut River Reach 8, though primarily residential (44.1%), has 1.8 acres of former tidal wetlands that could be returned to tidal influence. Columbia/Wallacut River Reach 9 is comprised of a 36.9-acre remnant tidal marsh. Restoring tidal influence to this marsh would greatly improve performance of habitat and water quality functions.

3.4 Marine Issues & Potential Restoration Actions

Ilwaco's Pacific Coast reach comprises the only marine environment within the City's shoreline jurisdiction. Virtually all of the land in this reach is owned by Washington State Parks and is within the northern extent of Cape Disappointment State Park. Most of the habitat in this area is intact and primarily requires protection.

Ilwaco's Pacific Coast includes emergent and scrub/shrub interdunal wetlands that provide bank stabilization and upland nutrient filtration. The undeveloped shoreline supports shorebird concentrations and shellfish resources. The beach is part of the

Columbia River littoral cell (CRLC). The CRLC has been experiencing high rates of coastal erosion along sections that historically saw consistent beach accretion from sand transported out of the Columbia River. The Southwest Washington Coastal Erosion Study has been researching the causes and implications of the regional coastal erosion crises that have threatened the long-term viability of coastal communities.

Restoration opportunities primarily involve the removal of the invasive beachgrasses (*Ammophila spp.*) from dune habitat and replanting with native dune flora, and the restoration of grasslands that support the Oregon silverspot butterfly. These restoration efforts are primarily the responsibility of Washington State Parks; however, the City can provide assistance and support.

Table 3-3 describes key restoration issues and potential actions to address those issues for Pacific Coast shorelines. These issues are described in greater detail in the Shoreline Analysis Report, as well as the Willapa National Wildlife Refuge Comprehensive Conservation Plan (U.S. Fish and Wildlife Service 2011), the City of Long Beach Dune Management Report (City of Long Beach 2000), and the Climate Change Action Team Work Plan (Climate Change Action Team 2010). It is anticipated that our understanding of recommended actions may evolve over time as studies of littoral drift, sediment transport, and sediment deposition continue, and as the understanding of climate change impacts evolve. This evolving understanding will require adaptive responses.

Table 3-3. Issues and potential restoration actions for marine shorelines in the Ilwaco area.

Issues	Description	Potential Restoration Actions
Medium Priority, Medium-term Issues & Actions		
Coastal dunes	Invasive, non-native beachgrasses (<i>Ammophila spp.</i>) planted to stabilize dune communities have changed dune morphology and native plant communities.	<ul style="list-style-type: none"> • Support Washington State Parks in their efforts to conserve and restore native dune flora and fauna in appropriate areas.
	Development in the coastal dunes can alter the volume and direction of surface water drainage. Minor shifts can affect wetland hydrology. The coastal aquifer is subject to changes from over-allocation.	<ul style="list-style-type: none"> • Support Washington State Parks in their efforts to preserve coastal dune habitats and high-quality wetlands. • Support Washington State Parks in their efforts to improve surface water management for dune areas.
	Interdunal wetlands support a diverse suite of plants and animals, including rare and endangered plants.	<ul style="list-style-type: none"> • Priority protection of interdunal wetlands, including protection of rare and endangered plant species.

Issues	Description	Potential Restoration Actions
Sensitive species	<p>Several sensitive species, including western snowy plovers, streaked horned lark, and pink sand verbena are found in the coastal dunes of Pacific County. These species can be adversely affected by development and invasive, non-native beachgrasses and human uses.</p>	<ul style="list-style-type: none"> • Manage dunes in undeveloped areas to promote historic habitats for sensitive species. • Support Washington State Parks in their efforts to conduct inventories, monitoring, research, and studies of sensitive species and coastal dune communities.
	<p>The federally threatened Oregon silverspot butterfly is now extirpated from Washington and is state- listed as endangered. No Oregon silverspot butterflies have been documented on the Long Beach Peninsula since 1990.</p>	<ul style="list-style-type: none"> • Support Washington State Parks in their efforts to restore grasslands to support sustainable populations of Oregon silverspot butterfly.
Sediment transport and disposal	<p>Columbia River dams alter the hydrology and limit transport of sediment to the estuary and to the Columbia River littoral cell. Construction of the jetties at the mouth of the Columbia River resulted in significant aggradation over several decades; however, the plume from the jetties has dissipated, and now the effect of reduced sediment transport from the dams poses an erosional threat to coastal shoreforms.</p>	<ul style="list-style-type: none"> • Coordinate and work with Pacific County and the Lower Columbia Fish Recovery Board to identify and pursue mechanisms to supplement the transport of sediment to the coast.
Sea level rise	<p>Sea level rise is expected to result in both rising sea levels and larger storm waves. The Pacific Coast shoreline and coastal dunes are susceptible to retreat as a result of these changes.</p>	<ul style="list-style-type: none"> • Work with Pacific County to help assess characteristics and impacts of climate change on coast ecosystems. • Coordinate and work with Pacific County and the Lower Columbia Fish Recovery Board to identify and pursue mechanisms to supplement the transport of sediment to the coast.
	<p>Groundwater levels would be expected to rise with sea level; this could result in salinity intrusion into coastal wells and result in failures of existing septic systems on the Long Beach Peninsula.</p>	<ul style="list-style-type: none"> • Identify any wells subject to seawater intrusion from sea level rise and manage accordingly. • Identify any sewer systems susceptible to sea level rise and manage to protect groundwater and surface water from potential bacterial contamination.

Issues	Description	Potential Restoration Actions
Marine debris	Environmental impacts associated with marine debris may include entanglement, trapping, ingestion, and habitat degradation.	<ul style="list-style-type: none"> • Coordinate and work with Pacific County and the Washington State Department of Fish and Wildlife to conduct outreach and implement policies to limit the likelihood of debris reaching marine resources. • Coordinate and work with Pacific County and the Washington State Department of Fish and Wildlife to monitor ocean areas for derelict gear and tsunami debris • Conduct beach and derelict gear clean-up activities.

4 IMPLEMENTATION

4.1 Potential Restoration Partners

Several agencies and organizations are actively involved in shoreline restoration, conservation, and protection in the Ilwaco area, and could be potential restoration partners for the City. These potential restoration partners and their local roles in shoreline protection and/or restoration are identified below.

4.1.1 Regional Agencies & Quasi-Governmental Organizations

Pacific County Lead Entity

The Pacific County Lead Entity selects high-quality, locally supported projects for consideration for funding by the Salmon Recovery Funding Board. The [Pacific County Conservation District](#) is under contract with Pacific County to serve as the Lead Entity for WRIA 24.

Key Documents:

- The [Pacific County Strategic Plan for Salmon Recovery \(2001\)](#) summarizes watershed needs and identifies a method for prioritizing restoration projects.

Lower Columbia Fish Recovery Board

The board was established by state statute (RCW 77.85.200) in 1998 to oversee and coordinate salmon and steelhead recovery efforts in the Lower Columbia River region. Representatives from the state legislature, city and county governments, Cowlitz Tribe, private property owners, hydro project operators, the environmental community, and citizens comprise the Lower Columbia Fish Recovery Board. The Lower Columbia Fish

Recovery Board Lead Entity area extends from the mouth of the Columbia River upstream to and including the Little White Salmon River.

Key Documents:

- The Lower Columbia Salmon Recovery and Fish and Wildlife Subbasin Plan (May 2010). This plan describes the current status of listed Lower Columbia River salmon and steelhead populations, discusses threats and other factors affecting the listed species, establishes recovery goals and objectives, sets forth region-wide recovery strategies and measures, summarizes subbasin or watershed conditions and strategies, describes monitoring and research measures, discusses implementation processes, and provides recovery cost estimates.

[Washington Coast Sustainable Salmon Partnership](#)

The Washington Coast Sustainable Salmon Partnership (WCSSP) was formed in 2008 as a cooperative association of the coastal region's four salmon recovery Lead Entities. The WCSSP is organized under an interlocal agreement between counties, cities, tribes, and ports within the region.

Each year since 2013, the WCSSP, along with others in the region, has proposed the Washington Coast Restoration Initiative (WCRI) to the Washington State Legislature. The concept behind the WCRI is to dedicate funds to sustaining salmon runs in coastal Washington watersheds. In 2013, the WCRI resulted in approximately \$2 million in restoration funding from the legislature. In 2015, \$15 million in projects were proposed through the WCRI. Project funding depends on allocation of funds by the legislature.

Key Documents:

- The [Washington Coast Sustainable Salmon Plan \(2013\)](#) represents a unified approach to salmon recovery among the four Lead Entity groups on the Washington coast. The plan identifies the following five primary strategies: educate and involve the community to protect, restore, and maintain ecosystem values; protect and restore salmon habitat function; support hatchery and harvest practices consistent with wild salmon sustainability; use economic tools to protect, restore, and maintain ecosystem values; and improve regulatory effectiveness to achieve salmon sustainability. The strategy is based on the premise that ecosystem protection and restoration will help sustain resilient coastal salmonid populations.

Pacific County Marine Resource Committee

Pacific County Marine Resource Committee (PCMRC) is one of four coastal county Marine Resource Committees. Through the Washington State Department of Fish and Wildlife, the PCMRC is provided with grant funding to distribute to local groups who create projects achieving the set benchmarks for this program. These benchmarks include projects pertaining to: marine habitats, marine life, marine and fresh water quality, sound science, education and outreach, and coastal communities. Through their activities, the PCMRC coordinates with diverse partners, supporting creative and action-oriented solutions, and providing a platform for education and outreach on local issues.

Columbia River Estuary Study Taskforce

The Columbia River Estuary Study Taskforce (CREST), located in Astoria, Oregon, is a community organization specializing in environmental planning and habitat restoration for fish and wildlife. CREST offers expertise in project design, funding, management, implementation and monitoring with the goal to sustain the partnership between the natural ecosystem and the neighboring communities along the Columbia River estuary.

As a community organization, CREST's overall mandate is to provide leadership in environmental and resource planning for fish and wildlife habitat in the Columbia River estuary ecosystem. CREST's directives can be defined in three distinct categories: to lead and manage planning and habitat restoration projects on the Columbia River estuary; to offer critical expertise and a comprehensive source of data and information on the Columbia River estuary; and to offer information, guidance, and services to private landowners interested in contributing to habitat restoration and improved flood control protection on their own property.

4.1.2 State Agencies

Washington State Department of Ecology

The mission of the Washington State Department of Ecology (Ecology) is to protect, preserve, and enhance Washington's environment, and to promote the wise management of our air, land, and water for the benefit of current and future generations. Ecology is an active partner in monitoring and improving water quality conditions in accordance with Total Maximum Daily Loads throughout Pacific County.

Washington State Department of Fish and Wildlife

In addition to reviewing applications for in-water work and issuing Hydraulic Project Approvals, the Washington State Department of Fish and Wildlife (WDFW) develops management plans for Washington's Priority Habitats and Species. WDFW also leads

the state in resolving fish passage barrier problems through the Fish Passage Program, supporting public, state, and local agencies in their efforts to prioritize and fund fish passage barrier repairs across the state.

Washington State Department of Natural Resources

The Washington State Department of Natural Resources (DNR) owns and manages approximately five million acres of tidelands, forestlands, rangelands, and agriculture lands in Washington. DNR manages these lands for revenue, outdoor recreation, and habitat for native fish and wildlife.

DNR is responsible for managing forest practices in Washington through the Forest Practices Program. The Forest Practices Program and rules require the maintenance and restoration of aquatic and riparian habitat.

The Aquatic Restoration Program of DNR works to restore, enhance, create, and protect healthy ecological conditions in freshwater, saltwater and estuarine aquatic systems through partnerships with agencies and organizations. DNR provides funds, permit assistance, planning, and technical assistance for project partnerships.

Washington State Recreation & Conservation Office

The Washington State Recreation and Conservation Office manages grant programs to create outdoor recreation opportunities, protect high quality wildlife habitat and farmland, and aid salmon recovery.

Washington State Parks and Recreation Commission

The Seashore Conservation Area (SCA), covering much of the non-tribal, intertidal areas of the Pacific Coast, was established in 1967 and is overseen by the Washington State Parks and Recreation Commission (WSPRC). The purpose of the Seashore Conservation Area is to provide recreation, protect the environment, and conserve heritage and natural resources.

A primary goal of WSPRC's Natural Resources Program is to restore and protect the natural resources of parklands while preserving recreation potential. The program also frequently collaborates with a variety of stakeholders to evaluate salmon habitat conditions and restore impaired areas.

4.1.3 Federal Agencies

[US Army Corps of Engineers](#)

In addition to its project permitting responsibilities, the US Army Corps of Engineers is active in the area through its management of the Columbia River Dam system, which affects downstream estuarine and coastal processes, including sediment transport and fish migration. The effects of dam management on the Columbia River are mitigated through the Northwest Planning and Conservation Commission. Actions developed under the Columbia River Basin Fish and Wildlife Program are implemented by the US Army Corps of Engineers, among other agencies.

4.1.4 Non-Governmental Organizations

[Land Trusts & Conservancies](#)

Land trusts and conservancy organizations play an important role in shoreline natural resource conservation in the Ilwaco area. These organizations continue to acquire conservation easements and in-fee holdings, and to protect and restore significant shoreline areas. In addition, these organizations are active partners in restoration, research, and lands management.

Active land trusts and conservancies in the Ilwaco area include the following:

- [Columbia Land Trust](#)
- [The Nature Conservancy](#)

[Other Non-profit Organizations](#)

In addition to land trusts, other non-profit organizations are active in restoration, research, and outreach in the Ilwaco area. Non-profit organizations involved in shoreline conservation efforts in the area include the following, among others:

- [Trout Unlimited](#)
- [Washington Waterfowl Association](#)
- [Audubon Washington](#)
- [Wild Fish Conservancy](#)
- [Columbia Riverkeeper](#)

[Private Landowners](#)

Private landowners play an important role in future watershed conditions. Where private landowners are willing to voluntarily restore lands and manage them in such a way as to minimize potential impacts, these landowners help conserve ecosystem conditions in the City.

4.2 Funding Mechanisms

A variety of funding opportunities are available to support the protection and restoration of shorelines in the City and surrounding areas. Potential public funding sources are identified in Table 4-1; potential private funding sources are listed in Table 4-2. Funding sources other than those listed in these two tables may also exist. It should be noted that public funding is dependent on appropriations from state and federal governments.

Table 4-1. Potential public funding sources for restoration and protection of shoreline ecological functions.

Agency	Grant Name	Description
US Fish and Wildlife Service	Cooperative Endangered Species Conservation Fund (Section 6 of the Endangered Species Act)	Grants to states to participate in a wide array of voluntary conservation projects for candidate, proposed, and listed species.
	Partners for Fish and Wildlife Restoration	Technical assistance and cost-share incentives to private landowners to restore fish and wildlife habitats.
Washington State Department of Ecology	Clean Water State Revolving Fund	Funds water quality infrastructure and projects to control non-point source pollution.
Washington State Department of Ecology (continued)	Coastal Protection Fund / Terry Husseman Grants	Funding to: restore or enhance environmental, recreational, archaeological, or aesthetic resources; investigate the long-term effects of oil spills; and develop and implement aquatic land geographic information systems.
	Floodplains by Design	Funding for projects that restore floodplain habitat and reduce flooding risks.
Washington State Department of Fish and Wildlife	Aquatic Lands Enhancement Account Grants	Funding to buy, protect, and restore aquatic lands habitat and to provide public access to the shoreline.
Washington State Department of Natural Resources	Family Forest Fish Passage Program	Assists private forestland owners in replacing culverts and other stream crossing structures.
Washington State Recreation and Conservation Office	Land and Water Conservation Fund	Funding to preserve and develop outdoor recreation resources, including parks, trails, and wildlife lands.
	Salmon Recovery Funding Board Grants	Funds projects that protect and restore salmon habitat.
	Washington Wildlife and Recreation Program	Provides funding for land protection and outdoor recreation, including park acquisition and development, habitat conservation, farmland preservation, and construction of outdoor recreation facilities.
Bonneville Power Administration	Bonneville Power Administration	Funding for habitat projects to mitigate impacts of dam operations.

Agency	Grant Name	Description
National Oceanic and Atmospheric Administration Restoration Center	Community-based Restoration Program	Invests funding and technical expertise in high-priority habitat restoration projects.

Table 4-2. Potential private funding sources for restoration and protection of shoreline ecological functions.

Group	Grant Focus
FishAmerica Foundation	In partnership with the National Oceanic and Atmospheric Administration Restoration Center, provides grants for community-based restoration of marine and anadromous fish species.
National Fish and Wildlife Foundation	Provides funding on a competitive basis to projects that sustain, restore and enhance the nation's fish, wildlife, plants and their habitats.
The Burning Foundation	Protection of threatened rivers, forests, and native fish populations.
The Konsgaard-Goldman Foundation	Forest protection and initiatives addressing climate change in Washington State.
The Northwest Fund for the Environment	Protection and restoration of aquatic ecosystems.

4.3 Timeline

Tables 3-1, 3-2 and 3-3 organized projects by priority and implementation timeline. However, the actual order of implementation may not always correspond with those priorities and timelines. Straightforward projects with available funding should be initiated immediately for the worthwhile benefits they provide. Even lower-priority projects provide ecological benefits and should be conducted as opportunities arise. Finally, new information, as well as changes in ecosystem condition or land use, could affect the assessment of ecological benefits and/or feasibility of individual projects, resulting in changes to the priorities and timelines identified in these three tables.

4.4 Design & Permitting

Depending on the scale and type of project, qualified professionals, such as biologists or engineers, may need to assist in project design and implementation. Additionally, permits or approvals from several government agencies may be required prior to commencing a restoration action. Permits or approvals may be required from the City, the Washington State Department of Ecology, the Washington State Department of Fish and Wildlife, the Washington State Department of Natural Resources, and/or the US Army Corps of Engineers.

4.5 Outreach & Education

Land use activities on privately owned lands outside of shoreline jurisdiction can play a significant role in hydrologic, water quality, and geomorphic functions and processes of a watershed. As a result, private landowners play an extremely important role in the condition of shoreline ecological functions. Outreach and education measures that help inform and engage the public to take actions that limit degradation and/or improve shoreline functions are essential to effectively maintain and restore conditions in a watershed. Several agencies and non-governmental organizations (see Section 4.1) are actively involved in public outreach and education measures in the Ilwaco area.

4.6 Tracking

The SMP Guidelines require that shoreline restoration plans "...provide for mechanisms or strategies to ensure that restoration projects and programs will be implemented according to plans and to appropriately review the effectiveness of the projects and programs in meeting the overall restoration goals" (WAC 173-26-201(2)(f)(vi)).

The Habitat Work Schedule provides the primary mechanism to track development and implementation of salmon habitat conservation projects. The Lead Entities in the county continue to develop their use of the Habitat Work Schedule. The Habitat Work Schedule has the potential to track restoration actions and funding. The state's Project Information System (PRISM) database also provides a means of tracking proposed and funded projects. Finally, the Washington State Conservation Commission's Conservation Practice Data System provides a database that tracks projects and conservation practices on private lands. Together, these databases provide an overall view of proposed, active, and recently completed projects.

5 REFERENCES

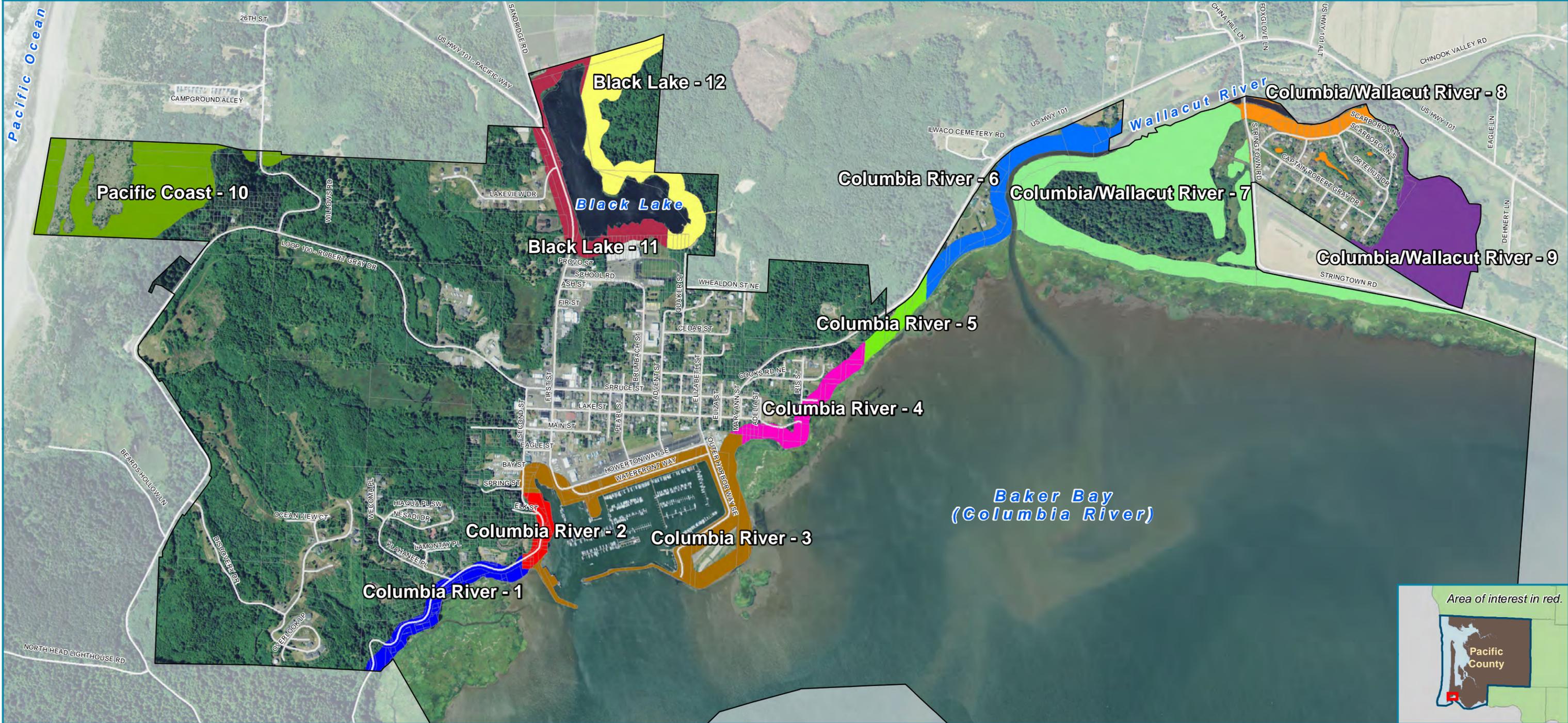
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APPENDIX A

Shoreline Reaches Map



REACHES



Reaches ^{TWC}

- Columbia River - 1
- Columbia River - 2
- Columbia River - 3
- Columbia River - 4
- Columbia River - 5
- Columbia River - 6
- Columbia/Wallacut River - 7
- Columbia/Wallacut River - 8
- Columbia/Wallacut River - 9
- Pacific Coast - 10
- Black Lake - 11
- Black Lake - 12
- City Limit ^{PC}

Data sources:
 PC - Pacific County
 TWC - The Watershed Company
 Aerial background from USDA NAIP Imagery of 2013



Original Scale=1:14,500 @ 11 x 17 layout.



All features 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 confirm/ verify information shown on this map.