

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority	Action	Source	Status
BakerBay_Columbia_01	Section consists of relatively steep river terraces. Some small intertidal and intermittent upper and lower surge plains exist between Grays Bay and the upland terrace features. Reach ends at the mouth of the Deep River. Surge plain intertidal wetlands exist closer to the mouth of Deep River and the floodplain begins to open up. Tidally influenced mixed wetland vegetation is dominant below the terrace. Habitat on the terraces includes mixed conifer and deciduous forests and scrub-shrub habitat. Open space development does occur intermittently on the terrace	Steep wooded bank, bedrock/sand/gravel shoreline, contains low to med density pile fields in the Bay	Pile fields may alter hydrologic/ sediment transport and shoreline habitat components. May include impacts to: beach sediment size/ type/ abundance, flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification.		Roosevelt Elk Winter Range: Willapa herd, Winter concentrations of dunlins, sanderlings, Western SA, ND Pipers, and gulls, Wintering waterfowl habitat for ducks, geese and swans, bald eagle feeding area, cavity nesting ducks. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Conservation, Restoration/Development, Protection/Restoration, Highest Protection, Development/Restoration			
BakerBay_Columbia_02	Geomorphology includes alluvium based lower flooded plain. Reach is dominated by intertidal herbaceous wetland vegetation. Land is currently not categorized under any land use data.	Disconnected floodplain Hydraulic disconnection from floodplain	Impervious surfaces in and around the shoreline(> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.	Acquisition by CLT with planned dike breaching and native vegetation planting	Roosevelt Elk Winter Range: Willapa herd, Winter concentrations of dunlins, sanderlings, Western SA, ND Pipers, and gulls, Wintering waterfowl habitat for ducks, geese and swans, bald eagle feeding area, cavity nesting ducks. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Highest Restoration, Highest Protection, Development/Restoration	land acquisition, ditch filling, tidegate removal, swale enhancement	CLT	Complete
BakerBay_Columbia_03	This reach picks up on the other side of the mouth of deep river where lower flooded and upper flooded surge plains dominate the reach and upland terraces are present. Vegetation consists of mixed wetland land vegetation that is both affected and in some places, not affected by tidal influences	Forested floodplain beyond SMP reach is leveed	Timber or forestry related uses may alter hydrology and sediment processes due to loss of vegetative cover.		Roosevelt Elk Winter Range: Willapa herd, Winter concentrations of dunlins, sanderlings, Western SA, ND Pipers, and gulls, Wintering waterfowl habitat for ducks, geese and swans, bald eagle feeding area, cavity nesting ducks. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Highest Protection, Protection			

APPENDIX C Reach Priorities and Restoration Opportunities

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BakerBay_Columbia_04	This reach is characterized by its location in Grays Bay in proximity to Deep River, Grays River and the mainstem of the Columbia River. This reach lies between the mouths of the Grays River and Deep River. The geomorphology consists of upper flooded surge plain dominated by tidally influenced herbaceous wetlands. Tidally influenced coniferous forests are also a common land cover in this reach. Isolated scrub-shrub wetlands in the upland areas are also present. Land use in this reach is dominated by single and multi-family residential development and "undeveloped" land.	1 tidagate, other Tidal complexes in good condition	Deforested areas, impervious surface >10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: water quality/quantity, and flow energy, habitat, local water temperatures.		Roosevelt Elk Winter Range: Willapa herd, Winter concentrations of dunlins, sanderlings, Western SA, ND Pipers, and gulls, Wintering waterfowl habitat for ducks, geese and swans, bald eagle breeding and feeding area, cavity nesting ducks. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Conservation, Highest Protection, Protection/Restoration	land acquisition	CLT, WDFW	Concept
BakerBay_Columbia_05	This reach lies between the mouths of the Grays River and Deep River. The geomorphology consists of upper flooded surge plain dominated by tidally influenced herbaceous wetlands. Tidally influenced coniferous forests are also a common land cover in this reach. Isolated scrub-shrub and herbaceous wetlands in the upland areas are also present. Land use consists of open space and forestry.		None noted		Roosevelt Elk Winter Range: Willapa herd, Winter concentrations of dunlins, sanderlings, Western SA, ND Pipers, and gulls, Wintering waterfowl habitat for ducks, geese and swans, bald eagle feeding area, cavity nesting ducks. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Highest Protection, Protection			
BakerBay_Columbia_06	This reach lies to the east of the mouth of Grays River. The geomorphology consists of upper flooded surge plain dominated exclusively by tidally influenced herbaceous wetlands in front of the levee. Behind the levee, much of the land has been converted to agriculture. Land use consists of open space and agriculture.	Levee behind most of this reach. Some of the levee separates forested wetlands from the emergent wetlands adjacent to the Columbia River.	System of levees may impact hydrologic and sediment transport, storage and floodplain habitat. Impervious surfaces in and around the shoreline(> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes.		Roosevelt Elk Winter Range: Willapa herd, Winter concentrations of dunlins, sanderlings, Western SA, ND Pipers, and gulls, Wintering waterfowl habitat for ducks, geese and swans, bald eagle feeding area, cavity nesting ducks. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Highest Protection, Protection	Land acquisition	CLT	Proposed/Planning

APPENDIX C Reach Priorities and Restoration Opportunities

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BakerBay_Columbia_07	This reach lies to the east of the mouth of Crooked Creek. The geomorphology consists of upper flooded surge plain dominated by tidally influenced herbaceous wetlands and to a lesser extent, non-tidal deciduous wetland forests and non-tidal herbaceous wetlands. Lots of LWD in this reach in the intertidal areas. Shoreline is primarily in front of a levee. Land use in this area is primarily single-family residential development behind the levee.	Levee running behind whole length of reach. Failing/undersized culvert creates fish passage barrier, tidegate has fallen off.	System of levees may impact hydrologic and sediment transport, storage and floodplain habitat. Impervious surfaces in and around the shoreline (> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.		Roosevelt Elk Winter Range: Willapa herd, Winter concentrations of dunlins, sanderlings, Western SA, ND Pipers, and gulls, Wintering waterfowl habitat for ducks, geese and swans, bald eagle feeding area, cavity nesting ducks. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Protection, Protection/Restoration	Culvert replacement with a larger structure, land acquisition	Wahkiakum County, CREST, CLT	Proposed/planning
BakerBay_Columbia_08	The geomorphology consists of lower and upper flooded surge plain dominated by tidally influenced herbaceous wetlands and to a lesser extent, tidal scrub-shrub habitat, non-tidal deciduous wetland forests and non-tidal herbaceous wetlands. Lots of LWD in the intertidal areas of this reach. Shoreline is primarily in front of a levee. Land use behind the levee is dominated by agriculture	1 culvert. Hwy 4 is within the reach. Levee along most of the reach.	System of levees (road on top) may impact hydrologic and sediment transport, storage and floodplain habitat. Impervious surfaces in and around the shoreline (> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Culverts may impact hydrology and hydraulics of tributary stream		Roosevelt Elk Winter Range: Willapa herd, Winter concentrations of dunlins, sanderlings, Western SA, ND Pipers, and gulls, Wintering waterfowl habitat for ducks, geese and swans, bald eagle feeding area, cavity nesting ducks. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Development/Restoration			
BakerBay_Columbia_09	The geomorphology consists of lower and upper flooded surge plain dominated by tidally influenced herbaceous wetlands and to a lesser extent, tidal scrub-shrub habitat, non-tidal deciduous wetland forests and non-tidal herbaceous wetlands. The eastern most section of the reach, the intertidal area is non-existent as the levee/Hwy 4 (rip-rap) makes up the start of this shoreline. Behind the levee in this section is dominated by forestry practices. Lots of LWD in the intertidal areas of this reach. Shoreline is primarily in front of a levee. Behind the levee, the terrain gets steep with lots of topographic changes. On small area of single-family residential development. Intertidal areas are considered open space. Behind the levee is largely forestry land.	Fish passage barrier and occasional flooding issues	Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Timber or forestry related uses may alter hydrology and sediment processes due to loss of vegetative cover and construction of logging roads. Impervious surfaces and deforested surfaces in and around the shoreline (> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures		Roosevelt Elk Winter Range: Willapa herd, Winter concentrations of dunlins, sanderlings, Western SA, ND Pipers, and gulls, Wintering waterfowl habitat for ducks, geese and swans, bald eagle feeding area, cavity nesting ducks. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Highest Protection, Protection	Culvert replacement	Wahkiakum County, CREST	Concept

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BakerBay_Columbia_10	Terrain is steep moving inland from the Columbia River. Some herbaceous intertidal habitat exists, but the land cover is largely dominated by non-tidal deciduous wetlands and coniferous upland forests. Lots of subdivided parcels in this reach containing both undeveloped land and forestry land. Dominant land use is single-family residential and multi-family residential development		Timber or forestry related uses may alter hydrology and sediment processes due to loss of vegetative cover. Impervious surfaces and deforested surfaces in and around the shoreline (> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.		Roosevelt Elk Winter Range: Willapa herd, Winter concentrations of dunlins, sanderlings, Western SA, ND Pipers, and gulls, Wintering waterfowl habitat for ducks, geese and swans, bald eagle feeding area, cavity nesting ducks, bald eagle perch habitat. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Protection			
BakerBay_Columbia_11	Terrain is steep moving inland from the Columbia River. a small section of tidal herbaceous wetlands occur in the western section of the reach. The dominant land cover consists of deciduous and coniferous upland forest. Land use consists of forestry land that surrounds land utilized for recreation that is adjacent to the Columbia River.	modified floodplain, private boat launch, Hwy 4, medium to high density pile field. Rock reinforced shoreline, remanent overwater structures	Docks and pile fields may alter hydrologic/ sediment transport and shoreline habitat components (e.g., light, vegetation). May include impacts to: beach sediment size/ type/ abundance, flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification. Impervious surface, residential development on the shoreline and deforested surfaces (> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal habitat fragmentation/removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Timber or forestry related uses may alter hydrology and sediment processes due to loss of vegetative cover.	large pile fields along shoreline. delapidated overwater structures. Water quality affected by proximity of HWY 4	Roosevelt Elk Winter Range: Willapa herd, bald eagle perch habitat, cormorant spring concentrations. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Conservation, Restoration/Development, Protection/Restoration, Development/Restoration			
BakerBay_Columbia_12	Terrain is steep moving inland from the Columbia River. Geomorphology in a couple of areas includes tributary floodplain and upper floodplain mixed non-wetland forests. Land cover is dominated by coniferous upland forests, but some areas along the Columbia River consists of sand and mud flats, non-tidal herbaceous and scrub-shrub wetland habitat. Land use consists of single-family residential development, designated open space, undeveloped land and forestry land.	offshore pile dike, minimal LD residential, medium density pile field.	Pile dikes, pilings and impervious surface/ development may alter hydrologic/ sediment transport and shoreline habitat components (e.g., light, vegetation). May include impacts to: beach sediment size/ type/ abundance, flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification. Shoreline armoring may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. Bridges may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding.		Steep cliffs, old growth timber stands, Bald eagle perch habitat, cormorant spring concentrations. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Conservation, Restoration/Development, Protection/Restoration, Highest Protection, Development/Restoration			

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BakerBay_Columbia_13	The reach is characterized by small floodplains and sand flats that immediately become steep mountainous terrain. Land cover is dominated by mixed deciduous and coniferous upland forests (some of which is old growth). Some small tidally influence herbaceous areas exist in this reach. Mud and sandflats are also prevalent. Land use is dominated by forestry. Possible dredge mats dotted along shoreline. Large derelict overwater structure at the east end of the reach. Dredge mats dotted along shoreline.	Dredge spoils/mat, culverts, med to high density pile field, constructed rock wall in some places, agriculture and rural development, derelict overwater structure upriver part of reach	Rock way/armoring Shoreline armoring may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. Dredge spoils may alter habitat function. Culverts may impact hydrologic/ sediment transport and habitat function. Upland Timber or forestry related uses may alter hydrology and sediment processes due to loss of vegetative cover. Reduced shoreline vegetation may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces in and around the shoreline(> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Docks and pile fields may alter hydrologic/ sediment transport and shoreline habitat components (e.g., light, vegetation). May include impacts to: beach sediment size/ type/ abundance, flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification.	water quality impacts to impervious roadways and some LD development.	Steep cliffs, old growth timber stands, dahlia, Roosevelt Elk Winter Range: Willapa herd, bald eagle high use habitat, wintering cormorant habitat. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Conservation, Development/Restoration, Protection, Protection/Restoration			

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BakerBay_Columbia_14	Western side of Jim Crow Creek. Steep terrain with old growth forest and narrow sand flats. Geomorphology is characterized by intermittently exposed, tidally influenced mud/sandflats. Land cover is dominated by both coniferous and deciduous upland forests. Some tidally influenced herbaceous and scrub/shrub habitat occurs throughout the reach. Land use is dominated by forestry land. Possible dredge mats dotted along shoreline	Dredge mats, medium density pile field, overwater structure.	Pile field and overwater structure may alter hydrologic/ sediment transport and shoreline habitat components. May include impacts to: beach sediment size/ type/ abundance, flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification. Timber or forestry related uses may alter hydrology and sediment processes due to loss of vegetative cover. Reduced shoreline vegetation may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces in and around the shoreline(> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Impervious surfaces in and around the shoreline(> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.		Steep cliffs, old growth timber stands, Roosevelt Elk Winter Range: Willapa herd, basalt caves. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration			
BakerBay_Columbia_15	Eastern side of Jim Crow Creek Steep terrain open to a small floodplain. Reach is characterized by a small floodplain that consists of tidal herbaceous wetlands, non-tidal herbaceous wetlands, coniferous and deciduous non-tidal wetlands and a small pond. Land use is dominated by forestry. Rocky/gravel shoreline and steep cliffs. Steep cliffs containing old growth stands.	Derelict rock reinforced shoreline, low to medium density pile field. Salmonid net pens.	Pile field may alter hydrologic/ sediment transport and shoreline habitat components. May include impacts to: beach sediment size/ type/ abundance, flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification. Rock/armoring Shoreline armoring may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. Timber or forestry related uses may alter hydrology and sediment processes due to loss of vegetative cover. Net pens may impact water quality locally and down river.		Roosevelt Elk Winter Range: Willapa herd. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration			
BakerBay_Columbia_16	Steep terrain continues. Geomorphology for the rest of the reach is characterized by intermittently exposed, tidally influenced mud/sandflats. Land cover is dominated by both coniferous and deciduous upland forests. Some tidally influenced herbaceous and scrub/shrub habitat occurs throughout the reach. Land use is dominated by forestry and undeveloped land.		None noted		Roosevelt Elk Winter Range: Willapa herd, bald eagle habitat. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Conservation, Protection, Protection/Restoration			

APPENDIX C Reach Priorities and Restoration Opportunities

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BakerBay_Columbia_17	Geomorphic characteristic is dredge disposal site dominated by sand and to a lesser extent upland herbaceous cover. Some non-tidal coniferous wetland forests are present. Land use is classified as developed open space. Steep wooded bank (old growth stands), sand gravel shoreline.		Timber or forestry related uses (logging roads upland of shoreline) may alter water quality, hydrology and sediment processes due to loss of vegetative cover		Roosevelt Elk Winter Range: Willapa herd, bald eagle habitat	Highest Protection, Protection/Restoration			
BakerBay_Ricelsland_01			Dredge disposal site. Artificial island. Creation of predator habitat that feed on salmonids. Island creation may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. Dredge spoils may alter habitat function.		Colonies of gulls, terns, cormorants, goose, and streaked-horned lark. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Development/Restoration, Restoration/Development			
BakerBay_Ricelsland_02			Dredge disposal site. Artificial island. Creation of predator habitat that feed on salmonids. Island creation may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. Dredge spoils may alter habitat function.		nesting colonies of geese, gulls, terns, cormorants and streaked horned larks. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Highest Restoration, Restoration			
CC_BrownIsland_01	A tiny island up river of Little Island. A primary channel island consisting of an alluvium surge plain. Land cover consists of tidal herbaceous wetland on the up and down river areas of the island, the middle area is dominated by tidal and non-tidal deciduous wetland forests. Land use is solely open space.		None noted	303(d) Cat 5 2,3,7,8 TCDD	Roosevelt Elk Winter Range: Willapa herd. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.				
CC_CoffeePotsIsland_01	Most down river of the island complex. Land use is solely designated as open space. Part of the island is natural lower and undifferentiated surge plain, while the other is dredge spoils. Down river and working your way up river, on the dredge spoils is non-tidal deciduous wetland forest with small areas of tidal herbaceous and deciduous forested wetlands. Up river there is larger areas of tidal herbaceous wetlands sheltered by the island complex from fluvial impacts.	Dredge mat	Dredge disposal site. Artificial island. Island creation may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. Dredge spoils may alter habitat function.	Invasive species	Columbia white-tailed deer, wintering and breeding waterfowl concentrations. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration			

APPENDIX C Reach Priorities and Restoration Opportunities

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CC_CoffeePotIsland_02	Most up river of the island complex. Land use is solely designated as open space. The island was created with dredge spoils. Down river and working your way up river is tidal herbaceous and deciduous forested wetlands. There is also large areas of upland herbaceous, non-tidal herbaceous and deciduous forested wetlands.	Derelict vessel.	derelict vessel may alter hydrologic/ sediment transport and shoreline habitat components (e.g., light, vegetation). May include impacts to: beach sediment size/ type/ abundance, flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification.	Invasive vegetation.	Columbia white-tailed deer, wintering and breeding waterfowl concentrations. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence. Bald eagle.	Protection, Protection/Restoration	Derelict vessel removal/list	CREST	Concept
CC_Columbia_01	Characterized by steep cliffs, small isolated floodplain areas. Steep, wooded bank (old growth stands) and bedrock. Land cover is dominated by coniferous upland forests. Smaller areas of deciduous forests also exists. Small areas of sand and tidal coniferous and deciduous wetland forest and scrub-shrub wetland areas are also present immediately adjacent to the Columbia River. Land use is dominated by designated open space, forestry and undeveloped land.	Med and high density pile field.	Pilings may alter hydrologic/ sediment transport and shoreline habitat components. May include impacts to: beach sediment size/ type/ abundance, flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification.	305b listing for heptachlor and low dissolved oxygen.	Roosevelt Elk Winter Range: Willapa herd, bald eagle habitat. Contains old growth/mature forest. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Conservation, Highest Protection, Protection, Protection/Restoration	remove pilings where feasible or utilize as part of a salmonid habitat enhancement project	LCFRB	Concept
CC_Columbia_02	Intermittently exposed and dredge material/dredge disposal site at the mouth of Skamakowa Creek and Brooks Slough. Geomorphology consists of undifferentiated flooded and upper flooded areas. Land cover is dominated by sand. Other land cover consists of developed open space/beaches, non tidal herbaceous coniferous wetland forests, scrub-shrub habitat and impervious road/development. Land use is dominantly open space development.	Dredge mat.	Dredge disposal site. Island creation may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. Dredge spoils may alter habitat function. (Semi) impervious surfaces and general loss of vegetation in and around the shoreline may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Vehicle traffic on beach may contribute to habitat modification, erosion, beach scouring/lowering,	305b listing for temperature and exotic and invasive species.	Roosevelt Elk Winter Range: Willapa herd. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Highest Restoration, Protection, Protection/Restoration, Restoration, Restoration/Development			

APPENDIX C Reach Priorities and Restoration Opportunities

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CC_Columbia_03	Upper flooded alluvium surge plain at the down river end of Steamboat Slough along with some drained wetlands on the National Wildlife Refuge. Steamboat slough road sits on top of the levee system protecting land from Columbia River floods. tidal channels and sloughs that meander through the land behind the levee system have been altered by the use of water control structures. Land cover, working up river, is initially a mix of non-tidal scrub-shrub and deciduous wetland forests. There is also some developed open space at the down river mouth of Steamboat Slough. Traveling up river, there is non-tidal coniferous and tidal deciduous wetland forests along the river. Behind the levee is diked herbaceous, scrub-shrub, and deciduous forested wetlands, and pasture land. Land use down river is undeveloped land, some single-family residential development and public assembly land and moving up river changes entirely to open space.	high density pile field. Downstream half of reach is a modified floodplain with commercial development. County road on top of levee. 2 tidegates. Levee breach on NWR. 1 dock.	Pilings may alter hydrologic/ sediment transport and shoreline habitat components. May include impacts to: beach sediment size/ type/ abundance, flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification. impervious surfaces and general loss of vegetation in and around the shoreline may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. System of levees may impact hydrologic and sediment transport, storage and floodplain habitat/vegetation growth. Tidegates may contribute to increased water velocity, incised channels, erosion, road washouts, and downstream flooding. May also impact habitat accessibility and quality. Agriculture (pasture) has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Roads within associated wetlands may result in habitat fragmentation and altered hydrologic transport. Reduction of channel and side channel habitat and rearing capacity. Roads within the floodplain may result in reduced or altered floodplain, channel and side channel connectivity, water storage, and/or floodplain capacity.	Pier and over water covered facility. Invasive species, White-tailed deer ESA listing, Water quality and fish passage barriers by out-dated tidegates, failing levee, off-channel habitat creation, degraded riparian area	Columbia white-tailed deer habitat, Roosevelt Elk Winter Range: Willapa herd. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence. Osprey.	Highest Protection, Highest Restoration, Protection, Restoration/Restoration, Restoration, Restoration/Development	Regular invasive species management, remove old pilings	USFWS, LCFRB	on-going, concept

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
CC_Columbia_04	An isolated and drained alluvium surge plain starting at the up river opening of Steamboat Slough. Area is diked by a system of levees. Levee and road on top are immediately adjacent to the mainstem of the Columbia River. Tidal channels have been altered by the use of water control structures. Land cover, working up river, primarily diked herbaceous wetland with some small areas of diked coniferous wetland forests and impervious road surface. At the upriver end of the reach, land cover shifts to sand, non-tidal deciduous wetland and scrub-shrub upland. Land use is solely open space.	Rock reinforced shoreline. County road on top of levee protecting pastoral lands. Upriver end of reach may have been a dredge disposal area.	Rock/shoreline armoring may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. Impervious surfaces and general loss of vegetation in and around the shoreline may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. System of levees may impact hydrologic and sediment transport, storage and floodplain habitat/vegetation growth. May also impact habitat accessibility and quality. Agriculture (pasture) has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/temperature/storage, recruitment/transport of woody/organic debris and sediment, habitat, and flooding regimes and nutrient circulation. Dredge disposal with frequent human use may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. Dredge spoils may alter habitat function.	Invasive species, White-tailed deer ESA listing, Water quality and fish passage barriers by outdated tidegates, failing levee, off-channel habitat creation, degraded riparian area	Columbia white-tailed deer habitat, spring shorebird concentrations, wintering waterfowl, Roosevelt Elk Winter Range: Willapa herd. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Highest Restoration, Protection, Restoration/Restoration, Restoration, Restoration/Development	Pasture management benefit CWTD	USFWS	on-going
CC_Columbia_05	Lower flooded alluvium surge plain. Levee is behind this reach. Land cover is sand that protects tidal herbaceous and scrub-shrub wetlands. Land use is designated open space.	small intertidal and beach area consisting of possible dredge spoils.	Rock/shoreline armoring may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. Impervious surfaces and general loss of vegetation in and around the shoreline may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. System of levees may impact hydrologic and sediment transport, storage and floodplain habitat/vegetation growth. May also impact habitat accessibility and quality. Agriculture (pasture) has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/temperature/storage, recruitment/transport of woody/organic debris and sediment, habitat, and flooding regimes and nutrient circulation. Dredge disposal with frequent human use may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. Dredge spoils may alter habitat function.	Invasive species, White-tailed deer ESA listing, Water quality and fish passage barriers by outdated tidegates, failing levee, off-channel habitat creation, degraded riparian area	Columbia white-tailed deer habitat, spring shorebird concentrations, wintering waterfowl, Roosevelt Elk Winter Range: Willapa herd. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Highest Restoration, Protection, Restoration/Restoration, Restoration, Restoration/Development	Tidegate replacements with side-hinged self-regulating tidegates	USFWS	Complete/proposed (in other areas)
CC_Columbia_06	Altered floodplain. Area is behind a system of levees and includes a tidal channel that is controlled by a water control structure. Land cover is primarily agricultural at the down river end and changes to diked herbaceous and deciduous forest wetlands. Land use is designated open space.	County road on levee. 1 tidegate.	Rock/shoreline armoring may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. Dredge disposal with frequent human use may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. Dredge spoils may alter habitat function.	Invasive species, White-tailed deer ESA listing, Water quality and fish passage barriers by outdated tidegates, failing levee, off-channel habitat creation, degraded riparian area	Columbia white-tailed deer habitat, spring shorebird concentrations, wintering waterfowl, Roosevelt Elk Winter Range: Willapa herd. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Development/Restoration	Remove levee, improve tidal channel, vegetation planting	USFWS	Completed
CC_Columbia_07	Reach moves up river and terminates at the mouth of the Elochoman River. Most of the area is an altered floodplain. Most of the area is behind a system of levees. Area not behind a levee consists of tidal herbaceous wetland. Land cover behind the levee consists of diked herbaceous wetland and agriculture. Land use is designated open space.	County road on levee dividing floodplain from Col. River	Rock/shoreline armoring may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. Dredge disposal with frequent human use may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. Dredge spoils may alter habitat function.	Invasive species, White-tailed deer ESA listing, Water quality and fish passage barriers by outdated tidegates, failing levee, off-channel habitat creation, degraded riparian area	Columbia white-tailed deer, wintering waterfowl concentrations, cavity nesting duck habitat, Roosevelt Elk Winter Range: Willapa herd. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Highest Restoration, Protection, Restoration/Restoration, Restoration, Restoration/Development	Riparian tree planting	USFWS	on-going

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority	Action	Source	Status
CC_Columbia_08	Upper flooded surge plain on the east side of the Elochoman River. Land cover is dominated by non-tidal coniferous wetland forests with a large area of deciduous non-tidal wetland forest. Land use is designated open space.		None noted			Columbia white-tailed deer, cavity nesting ducks, sitka spruce and willow shrub swamp, purple martins, heron rookery, Roosevelt Elk Winter Range: Willapa herd. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Highest Protection, Highest Restoration, Protection, Protection/Restoration, Restoration		
CC_Columbia_09	Developed floodplain. Land cover is dominated by developed open space and bare area. Other land cover types include non-tidal coniferous wetland forests. Land use is designated by lumber/wood products production.	Industrial Development (Lumber yard), Developed open space land	Impervious surfaces and general loss of vegetation in and around the shoreline may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. System of levees may impact hydrologic and sediment transport, storage and floodplain habitat/vegetation growth. May also impact habitat accessibility and quality. Piers, docks, or boat ramps may alter hydrologic/sediment transport and shoreline habitat components (e.g., light, vegetation). May include impacts to: beach sediment size/ type/ abundance, flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification. Roads within associated wetlands may result in habitat fragmentation and altered hydrologic transport. Reduction of channel and side channel habitat and rearing capacity. Railroads within the floodplain may result in reduced or altered floodplain, channel and side channel connectivity, water storage, and/or floodplain capacity.	WQ impacts from industrial development, riparian/floodplain modified. Slough channel undersized culvert under SR 4	Roosevelt Elk Winter Range: Willapa herd, cavity nesting duck. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Development/Restoration	Replace undersized culvert	CREST	Concept

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority	Action	Source	Status
CC_Columbia_10	This reach includes the Town of Cathlamet. Developed floodplain and upland areas. Land cover is dominated by developed open space and urban/impervious surface. Other land cover types include deciduous upland forest and even smaller areas of coniferous upland forest. Land use includes government services (public marina/port), undeveloped land, and single-family residential development.	Marina development, Commercial/Industrial development, impervious roadway/surfaces, single family homes. 4 docks not including Marina. Med. & low density pile field. Rock reinforced shoreline	Piers, docks, or boat ramps may alter hydrologic/ sediment transport and shoreline habitat components (e.g., light, vegetation). May include impacts to: beach sediment size/ type/ abundance, flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification. Shoreline armoring may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. Culverts may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding.	WQ impacts from upriver development. Habitat, riparian and floodplain modification. WQ impacts from water treatment facility. 305b listing for exotic invasive species.	Roosevelt Elk Winter Range: Willapa herd, cavity nesting ducks. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Development/Restoration			
CC_Columbia_11	This reach includes the Town of Cathlamet. Developed floodplain and upland areas. Land cover is dominated by urban/impervious surface. Other land cover types include deciduous upland forest and smaller areas of coniferous upland forest. Land use includes some developed and undeveloped open space (which includes the water treatment plant), cultural museum, utilities, marine craft transportation and retail (with some over water and floating structures), single and multi-family residential development, fishery/fishing activities, and some undeveloped land.	Commercial/Industrial development, impervious roadway/surfaces, single family homes. 4 docks not including Marina. Med. & low density pile field. Rock reinforced shoreline. Bernie Creek invasive species degrades habitat quality.	Piers, docks, or boat ramps may alter hydrologic/ sediment transport and shoreline habitat components (e.g., light, vegetation). May include impacts to: beach sediment size/ type/ abundance, flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification. Shoreline armoring may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. Culverts may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. Water treatment may effect water quality including temperature and biological impairments. Impervious surfaces and general loss of vegetation in and around the shoreline may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.	WQ impacts from water treatment facility and urban development. Modified floodplain/riparian habitat. 305b listing for exotic invasive species	Roosevelt Elk Winter Range: Willapa herd. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Conservation, Restoration/Development, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration	Wetland invasive species control/management	CREST	Concept
		Fish passage barrier in Bernie Creek					modify the existing box culvert to improve the downstream grade	WDFW, Town of Cathlamet	Complete
		Reclaimed sewer lagoons					Opportunity for wetland creation, riparian restoration, invasive species treatment as part of a larger parks planning effort	Town of Cathlamet	Concept
		Fish passage barrier in Bernie Creek					Remove relic structure in Bernie Creek to improve fish passage	CREST	Concept

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
CC_Columbia_12	Just upriver of the Town of Cathlamet. Consists of mostly upland areas on relatively steep bluffs. Areas below the bluffs include intermittently exposed areas, and a filled area/artificial floodplain. Land cover is dominated by deciduous upland forest and even smaller areas of coniferous upland forest. Land use is dominated by undeveloped land. Other land uses include open space and single-family residential development.	Bridge to Puget Island. At least 5 docks (3 of the 5 are for industrial uses), Derelict vessels, Derelict houseboat and dock, Impervious roadway/surface and urban development. Some old piling.	Piers, docks, or boat ramps may alter hydrologic/sediment transport and shoreline habitat components (e.g., light, vegetation). May include impacts to: beach sediment size/ type/ abundance, flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification. Shoreline armoring may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. Bridges may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. Impervious surfaces and general loss of vegetation in and around the shoreline may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.	WQ impacts from urban development/impervious surfaces. Development on bluffs. 305b listing for exotic invasive species	Roosevelt Elk Winter Range: Willapa herd, fall and winter cormorant concentrations, cliff habitat, breeding vultures and raptors. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Conservation, Restoration/Development, Protection/Restoration, Highest Restoration, Development/Restoration	Work with the DNR derelict vessel removal program to dismantle and remove derelict vessel	DNR, SAC, WDFW	Concept
CC_Columbia_13	Most of this reach is on steep upland areas. Below the bluffs is intermittently exposed areas. Land cover is dominated coniferous and deciduous upland forest. Highway 4 also goes through these reaches. Land use is a mix of forestry, non commercial forest, and undeveloped land.	Rural development, agricultural operations, single family development. Areas of Med. density piles.	Impervious surfaces and general loss of vegetation in and around the shoreline may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Development on steep cliffs may impact sediment transport including erosion. Piers, docks, or boat ramps may alter hydrologic/ sediment transport and shoreline habitat components (e.g., light, vegetation). May include impacts to: beach sediment size/ type/ abundance, flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification. Shoreline armoring may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift.	WQ from development/impervious surface and agricultural operations. Development in critical areas.	Roosevelt Elk Winter Range: Willapa herd, fall and winter cormorant concentrations, cliff habitat, breeding vultures and raptors. Documented eulachon spawning area. Dunn's salamander.	Conservation, Restoration/Development, Protection/Restoration, Highest Protection, Development/Restoration	remove pilings where feasible or utilize as part of a salmonid habitat enhancement project	LCFRB	Concept

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
CC_Columbia_14	Most of this reach is on steep upland areas. below the bluffs is intermittently exposed areas and a small floodplain at the down stream terminus of the reach. Land cover is dominated coniferous and deciduous upland forest. Highway 4 also goes through these reaches. Land use is dominated by undeveloped land, but also includes single-family residential development, some commercial areas and resource extraction/production facilities.	1 tributary culvert. Impervious roadway (HWY 4).	Impervious surfaces and general loss of vegetation in and around the shoreline may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Undersized culvert impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. May also impact habitat accessibility and quality. Rock/shoreline armoring may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. impervious surfaces and general loss of vegetation in and around the shoreline may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.	Wildlife connectivity. WQ from roads and upland logging operations.	Roosevelt Elk Winter Range: Willapa herd, fall and winter cormorant concentrations, cliff habitat, breeding vultures and raptors. Documented eulachon spawning area. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence. Dunn's salamander. Osprey.	Conservation, Restoration/Development, Protection/Restoration, Highest Restoration, Development/Restoration			
CC_Columbia_15	Most of this reach is on steep upland areas. below the bluffs is intermittently exposed areas. Land cover is dominated coniferous and deciduous upland forest. Highway 4 also goes through these reaches. Land use is dominated by forestry.	2 tributary culverts, Impervious roadway. High density pile field. Reinforced rock shoreline in some areas.	Impervious surfaces and general loss of vegetation in and around the shoreline may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Undersized culvert impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. May also impact habitat accessibility and quality. Rock/shoreline armoring may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. impervious surfaces and general loss of vegetation in and around the shoreline may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.	WQ impacts from impervious development. Wildlife connectivity. Fish passage to tributary streams.	Roosevelt Elk Winter Range: Willapa herd, fall and winter cormorant concentrations. Documented eulachon spawning area. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Conservation, Restoration/Development, Protection/Restoration, Highest Restoration, Development/Restoration	remove pilings where feasible or utilize as part of a salmonid habitat enhancement project	LCFRB	Concept

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
CC_Columbia_16	Most of this reach is on steep upland areas. below the bluffs is intermittently exposed areas. Land cover is dominated coniferous and deciduous upland forest. Highway 4 also goes through these reaches. Land use is dominated by undeveloped land and single-family residential development.	1 culvert. Reinforced rock shoreline. Impervious roadway.	Impervious surfaces and general loss of vegetation in and around the shoreline may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Undersized culvert impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. May also impact habitat accessibility and quality. Rock/shoreline armoring may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. impervious surfaces and general loss of vegetation in and around the shoreline may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.	WQ impacts from upland logging ops and impervious development. Wildlife connectivity. Fish passage to tributary streams.	Roosevelt Elk Winter Range: Willapa herd, fall and winter cormorant concentrations. Documented eulachon spawning area. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Conservation, Restoration/Development, Restoration/Protection, Protection/Restoration, Development/Restoration			
CC_Columbia_17	Most of this reach is on steep upland areas. below the bluffs is intermittently exposed areas. Land cover is dominated coniferous and deciduous upland forest. Highway 4 also goes through these reaches. Land use is dominated by open space.	1 culvert. upland single family urban development. reinforced rock shoreline. Dredge spoils/sandy beach.	Impervious surfaces and general loss of vegetation in and around the shoreline may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Undersized culvert impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. May also impact habitat accessibility and quality. Rock/shoreline armoring may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. impervious surfaces and general loss of vegetation in and around the shoreline may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Dredge disposal site. Island creation may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift.	WQ impacts from impervious development and upland logging ops. Wildlife connectivity.	Roosevelt Elk Winter Range: Willapa herd, fall and winter cormorant concentrations. Documented eulachon spawning area. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, p	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Development/Restoration			

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
CC_Columbia_18	Most of this reach is on steep upland areas. below the bluffs is intermittently exposed areas. Land cover is dominated coniferous and deciduous upland forest with small areas of upland scrub-shrub habitat. Highway 4 also goes through these reaches. Land use is dominated by undeveloped land and single-family residential development, but also includes some open space.	Med pile field. Dredge mat/sandy beaches	Dredge disposal site. Island creation may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. Pile fields may alter hydrologic/sediment transport and shoreline habitat components. May include impacts to: beach sediment size/ type/ abundance, flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification.		Roosevelt Elk Winter Range: Willapa herd. Documented eulachon spawning area. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Development/Restoration			
CC_Columbia_19	Most of this reach is on steep upland areas. Intermittently exposed areas and dredge fill areas (breach at the park) are also present. Land cover is dominated coniferous and deciduous upland forest. Along the water there is sand and mud. Highway 4 also goes through these reaches. Land use is dominated by open space and a park (with facilities). other land use types include forestry.	Reinforced rock shoreline. Upland residential development. Impervious roadway/surface. Dredge mat. Small area of Medium and high density pile fields. 1 boat dock in upriver end of reach.	Impervious surfaces and general loss of vegetation in and around the shoreline may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Undersized culvert impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. May also impact habitat accessibility and quality. Rock/shoreline armoring may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. Dredge disposal site. Island creation may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift.	WQ impacts from impervious development. Development on/near critical areas?	Cliff habitat, breeding vultures and raptors, Roosevelt elk wintering grounds. Documented eulachon spawning area. Dunn's salamander. Peregrine falcon.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Development/Restoration			

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
CC_Columbia_20	Most of this reach is on steep upland areas. Intermittently exposed areas and dredge fill areas (breach at the park) are also present. Land cover is dominated coniferous and deciduous upland forest. Along the water there is sand and mud. Highway 4 also goes through these reaches. Land use is dominated by open space and a park (with facilities). other land use types include forestry.	Impervious development/roadways. Dredge Mats throughout reach. Areas of rock reinforced shoreline. Derelict boat ramp. Pile dikes	Dredge disposal site. Island creation may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. Impervious surfaces and general loss of vegetation in and around the shoreline may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Rock/shoreline armoring may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. Impervious surfaces and general loss of vegetation in and around the shoreline may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Pile fields may alter hydrologic/ sediment transport and shoreline habitat components. May include impacts to: beach sediment size/ type/ abundance, flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification.	Development on/near critical areas?	Cliff habitat, breeding vultures and raptors, Roosevelt elk wintering grounds. Documented eulachon spawning area. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Development/Restoration			
CC_HuntingIsland_01	Columbia River channel upper flooded surge plain. Floodplain island. Tidal coniferous wetland forests dominate the island. Other cover types include tidal scrub-shrub wetland, some non-tidal coniferous wetland forests and tidal herbaceous wetlands immediately adjacent to the main stem of the Columbia River. Land use is classified as open space.		None noted	Invasive vegetation.	Columbia white-tailed deer habitat, spring shorebird concentrations, wintering waterfowl				
CC_HuntingIsland_02	Columbia River channel upper flooded surge plain. Floodplain island. Tidal coniferous wetland forests dominate the island. Other cover types include tidal scrub-shrub wetland, some non-tidal coniferous wetland forests and tidal herbaceous wetlands immediately adjacent to the main stem of the Columbia River. Land use is classified as open space.	Potential dredge mat site on river facing part of the island.	Dredge disposal site. Island creation may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift.	Invasive vegetation	Columbia white-tailed deer habitat, spring shorebird concentrations, wintering waterfowl. Bald eagle feeding/nesting.	Highest Protection, Protection			

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status	
CC_HuntingIsland_03	Columbia River channel upper flooded surge plain. Floodplain island. Tidal coniferous wetland forests dominate the island. Other cover types include tidal scrub-shrub wetland, some non-tidal coniferous wetland forests and tidal herbaceous wetlands immediately adjacent to the main stem of the Columbia River. Land use is classified as open space.		None noted		Invasive vegetation	Columbia white-tailed deer, cavity nesting ducks, sitka spruce and willow shrub swamp, Roosevelt Elk Winter Range: Willapa herd	Highest Protection, Protection			
CC_HuntingIsland_04	Columbia River channel upper flooded surge plain. Floodplain island. Some dredge spoils also exist on the upriver-river most end of the island. Tidal scrub-shrub wetland forests dominate the island. Other cover types include tidal coniferous wetland, some non-tidal coniferous wetland forests and tidal herbaceous wetlands. Non tidal deciduous wetlands are present on and around the dredge spoil area. Land use is classified as open space.		None noted		305b listing for exotic invasive species, Invasive species	Columbia white-tailed deer, cavity nesting ducks, wintering waterfowl concentrations, sitka spruce and willow shrub swamp, Roosevelt Elk Winter Range: Willapa herd, purple martins and heron rookery	Highest Protection, Protection, Protection/Restoration	Invasive species management	CREST	Concept
CC_HuntingIsland_05	Columbia River channel upper flooded surge plain. Floodplain island. Tidal coniferous wetland forests dominate the island. Other cover types include tidal scrub-shrub wetland, some non-tidal coniferous wetland forests and tidal herbaceous wetlands immediately adjacent to the main stem of the Columbia River. Land use is classified as open space.		None noted		Invasive species	Roosevelt Elk Winter Range: Willapa herd	Highest Protection, Protection	Invasive species management	CREST	Concept
CC_HuntingIsland_06	Columbia River channel upper flooded surge plain. Floodplain island. Tidal coniferous wetland forests dominate the island. Other cover types include tidal scrub-shrub wetland, some non-tidal coniferous wetland forests and tidal herbaceous wetlands immediately adjacent to the main stem of the Columbia River. Land use is classified as open space.		None noted		Invasive species	Columbia white-tailed deer, cavity nesting ducks, wintering waterfowl concentrations, sitka spruce and willow shrub swamp, Roosevelt Elk Winter Range: Willapa herd	Protection, Protection/Restoration	Invasive species management	CREST	Concept
CC_JacksonIslandComplex_01	Upper flooded alluvium surge plain on a primary channel island. Series of sloughs form an island complex consisting of similar land cover types on each island. Land cover consists of tidal herbaceous and scrub-shrub wetland. Smaller areas in the up river section of the island consists of non-tidal scrub-shrub and deciduous wetland forests. Land use is dominated by undeveloped land.		None noted		Invasive vegetation.	Columbia white-tailed deer, forested intertidal wetlands, spring and fall cormorant concentrations, scrub shrub and forested wetlands, wintering bald eagles, cavity nesting ducks, heron rookery, shorebird concentrations	Highest Protection, Protection, Protection/Restoration	Invasive species management	CREST	Concept

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
CC_Jacksons landComplex_01	Upper flooded alluvium surge plain on a primary channel island. Series of sloughs form an island complex consisting of similar land cover types on each island. Land cover consists of tidal herbaceous and scrub-shrub wetland. Smaller areas in the up river section of the island consists of non-tidal scrub-shrub and deciduous wetland forests. Land use is dominated by undeveloped land.		None noted	Invasive vegetation.	Columbia white-tailed deer, forested intertidal wetlands, spring and fall cormorant concentrations, scrub shrub and forested wetlands, wintering bald eagles, cavity nesting ducks, heron rookery, shorebird concentrations	Highest Protection, Protection, Protection/Restoration	Invasive species management	CREST	Concept
CC_Jacksons landComplex_01	Upper flooded alluvium surge plain on a primary channel island. Series of sloughs form an island complex consisting of similar land cover types on each island. Land cover consists of tidal herbaceous and scrub-shrub wetland. Smaller areas in the up river section of the island consists of non-tidal scrub-shrub and deciduous wetland forests. Land use is dominated by undeveloped land.		None noted	303(d) Cat 5 2,3,7,8 TCDD. Invasive vegetation.	Columbia white-tailed deer, forested intertidal wetlands, spring and fall cormorant concentrations, scrub shrub and forested wetlands, wintering bald eagles, cavity nesting ducks, heron rookery, shorebird concentrations	Highest Protection, Protection, Protection/Restoration			
CC_Jacksons landComplex_01	Upper flooded alluvium surge plain on a primary channel island. Series of sloughs form an island complex consisting of similar land cover types on each island. Land cover consists of tidal herbaceous and scrub-shrub wetland. Smaller areas in the up river section of the island consists of non-tidal scrub-shrub and deciduous wetland forests. Land use is dominated by undeveloped land.		None noted	Invasive vegetation.	Columbia white-tailed deer, forested intertidal wetlands, spring and fall cormorant concentrations, scrub shrub and forested wetlands, wintering bald eagles, cavity nesting ducks, heron rookery, shorebird concentrations	Highest Protection, Protection, Protection/Restoration	Invasive species management	CREST	Concept
CC_Jacksons landComplex_01	Upper flooded alluvium surge plain on a primary channel island. Series of sloughs form an island complex consisting of similar land cover types on each island. Land cover consists of tidal herbaceous and scrub-shrub wetland. Smaller areas in the up river section of the island consists of non-tidal scrub-shrub and deciduous wetland forests. Land use is dominated by undeveloped land.		None noted	Invasive vegetation.	Roosevelt Elk Winter Range: Willapa herd	Highest Protection, Protection, Protection/Restoration	Invasive species management	CREST	Concept
CC_Jacksons landComplex_01	Upper flooded alluvium surge plain on a primary channel island. Series of sloughs form an island complex consisting of similar land cover types on each island. Land cover consists of tidal herbaceous and scrub-shrub wetland. Smaller areas in the up river section of the island consists of non-tidal scrub-shrub and deciduous wetland forests. Land use is dominated by undeveloped land.		None noted	Invasive vegetation.	Columbia white-tailed deer, forested intertidal wetlands, spring and fall cormorant concentrations, scrub shrub and forested wetlands, wintering bald eagles, cavity nesting ducks, heron rookery, shorebird concentrations	Highest Protection, Protection, Protection/Restoration	Invasive species management	CREST	Concept

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status	
CC_LittleIslandComplex_01	Most down river section of the island. The reaches are divided by W Little Island Road. Reach is and upper flood alluvium surge plain and is considered a primary channel island. Land cover is dominated by tidal scrub shrub wetlands. Other wetland types include some tidal herbaceous wetlands, non-tidal scrub-shrub wetland, tidal and non-tidal deciduous wetland forests. Land use is dominated by open space.	Levee between reach and agriculture on island.	None noted		Invasive vegetation. Columbia white-tailed deer habitat	Roosevelt Elk Winter Range: Willapa herd. California floater.	Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration	Invasive species management	CREST	Concept
CC_LittleIslandComplex_02	Drained primary channel island with an isolated alluvium surge plain wetland. Land cover is dominated by agriculture and pasture land. Other land cover types include diked deciduous wetland forests, impervious areas including development and roads and developed open space. Land use is dominated by agriculture. Other somewhat dominant land uses include open space, undeveloped land and single-family residential development. Some retail and fishing related activities also occur on the island. on the Bernie Slough side of the island, there is a lot of over water structures and float homes, some could be considered delapidated.	Bridge to Cathlamet. 6 docks on the Columbia side of Island. 1 has a derelict overwater structure. Slough has 15 overwater structures, 21 docks (several derelict). Bridge to Puget Island. Single family/commercial development. Levee around reach.	Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. System of levees, pile dikes, bridge infrastructure, piers, docks, or boat ramps may alter hydrologic/ sediment transport and shoreline habitat components (e.g., light, vegetation). May include impacts to: beach sediment size/ type/ abundance, flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification. Shoreline armoring may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, and water temperatures. System of levees may impact hydrologic and sediment transport, storage and floodplain habitat. Culverts and tidegates. If culverts are undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. May also impact habitat accessibility and quality.	303(d) Cat 5 2,3,7,8 TCDD. WQ from impervious development. Boat traffic congestion with docks and overwater structure in slough. Fish access to floodplain habitat. Popular growth area.	Roosevelt Elk Winter Range: Willapa herd	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration				
CC_LittleIslandComplex_03	tiny island down river of main island. No development		None noted	Invasive vegetation	Roosevelt Elk Winter Range: Willapa herd	Protection, Protection/Restoration	Invasive species management	CREST	Concept	

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status	
CC_Pricelsland_01	Most of the island consists is upper flooded alluvium surge plain on a primary channel island. Some of the island is also dredge spoils. Land cover is dominated by tidal coniferous forest wetland. Other land cover includes non-tidal deciduous wetland forest, sand, and some small areas of non-tidal herbaceous wetlands.	Part of island is a former dredge disposal site. 1 overwater structure (houseboat?) on slough side of island.	Dredge disposal site. Island creation may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. Overwater structures may alter shoreline habitat components. May include impacts to: water quality, drift material accumulation, and habitat modification.		305b listing for exotic invasive species	Columbia white-tailed deer habitat, sitka spruce and willow shrub swamp, heron rookery. Osprey and bald eagle.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration	Invasive species management	CREST	Concept
CC_PugetIslandComplex_01	Large primary channel island consisted of a drained and isolated alluvium surge plain that is largely protected by a system of levees and water control structures. Several tidal channels meander through the island. Outside the system of levees exists some lower floodplain areas containing tidal herbaceous wetlands. Land cover is dominated by agriculture and urban development/impervious surface (roads). Other land cover types include areas containing diked herbaceous, scrub-shrub, and deciduous forested wetlands and tree farms. There is also many areas of developed open space. Land use is dominated by agriculture/pasture land, but bordering the island and along the sloughs there is a lot of single-family residential development and some multi-family residential development. There is also a fair amount of undeveloped land, open space and some commercial development. Lots of over water structures and float-homes. Some delapidated vessels and abandoned docks in the sloughs and along the main channel of the Columbia River. Concentrated row crop agriculture	Pile dikes. Rock reinforced shoreline. Dredge mat. Levee around reach. tidegate on slough side. Agricultural development. Single family/commercial development. 105 docks, 46 overwater structures. Several derelict docks, vessels and overwater structures.	System of Levees, pile dikes, piers, docks, or boat ramps may alter hydrologic/ sediment transport and shoreline habitat components (e.g., light, vegetation). May include impacts to: beach sediment size/ type/ abundance, flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification. Shoreline armoring may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. System of levees, pile dikes, bridge infrastructure, piers, docks, or boat ramps may alter hydrologic/ sediment transport and shoreline habitat components (e.g., light, vegetation). May include impacts to: beach sediment size/ type/ abundance, flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. If culverts are undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. May also impact habitat accessibility and quality.	303(d) Cat 5 2,3,7,8 TCDD. 303(d) Cat 5 2,3,7,8 TCDD. WQ from impervious development. Boat traffic congestion with docks and overwater structure in slough. Fish access to floodplain habitat. Popular growth area. 305b listed exotic invasive species. Shoreline erosion at southeast end of island.	Columbia white-tailed deer, forested intertidal wetlands, spring and fall cormorant concentrations, scrub shrub and forested wetlands, wintering bald eagles, cavity nesting ducks, heron rookery, shorebird concentrations	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Development/Restoration				

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
CC_PugetIslandComplex_02	Dredge Material Beach. Contains several single family residential units.	Levee between river and agricultural development. Single family development, Dredge mat, Rock reinforced areas. 4 docks, 2 with overwater structures. Med pile fields	System of Levees, pile dikes, piers, docks, or boat ramps may alter hydrologic/ sediment transport and shoreline habitat components (e.g., light, vegetation). May include impacts to: beach sediment size/ type/ abundance, flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification. Shoreline armoring may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. If culverts are undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. May also impact habitat accessibility and quality.	WQ impacts from agricultural operations and development/impervious surfaces. Wildlife habitat connectivity. Fish access to floodplain habitat.	Columbia white-tailed deer. Chum, spring, summer and fall Chinook, winter and summer steelhead, green and white sturgeon, sockeye, cutthroat, coho, bull trout, pink salmon presence. Sand roller.	Development/Restoration, Protection, Restoration, Restoration/Development			
CC_PugetIslandComplex_03		Dredge mat.	Dredge disposal site. Island creation may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift.	Invasive vegetation	Columbia white-tailed deer, forested intertidal wetlands, spring and fall cormorant concentrations, scrub shrub and forested wetlands, wintering bald eagles, cavity nesting ducks, heron rookery, shorebird concentrations	Protection	Invasive species management	CREST	Concept
CC_RyanIslandComplex_01	Main island. Alluvium upper flooded surge plain on a secondary channel island. The up river portion of the island is at a higher elevation and forms a natural levee for part of the island. A large tidal channel meanders through the northern down river portion of the island to the center of the island. Island land cover is dominated by tidal herbaceous wetland vegetation on the down river half of the island. And a mix of tidal herbaceous, scrub-shrub, and deciduous wetlands and non-tidal deciduous wetlands dominate the up river half.	Offshore derelict vessel	Invasive vegetation impacts habitat complexity	Invasive vegetation.	Columbia white-tailed deer, waterfowl concentrations, freshwater forested wetlands, heron rookery	Highest Protection, Protection	Invasive species management	CREST	Concept
CC_RyanIslandComplex_02	Just up river and closest to the navigation channel from the main island. Alluvium flooded surge plain making up a secondary channel island. Dominated entirely by tidal herbaceous wetland vegetation. Land use is dominated by open space.		Invasive vegetation impacts habitat complexity	Invasive vegetation	Wintering waterfowl concentrations and pristine forested wetlands	Protection	Invasive species management	CREST	Concept

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
CC_RyanIslandComplex_03	Just south of the up river end of the main island. Alluvium flooded surge plain making up a secondary channel island. Dominated by tidal herbaceous wetland vegetation. Other land cover includes tidal and non-tidal deciduous wetlands. Land use is dominated by open space.		Invasive vegetation impacts habitat complexity	Invasive vegetation	Columbia white-tailed deer, waterfowl concentrations, freshwater forested wetlands, heron rookery	Highest Protection, Protection	Invasive species management	CREST	Concept
CC_RyanIslandComplex_04	Little section south of the most up river section of the island complex. West of CC_RyanIslandComplex_05 Alluvium flooded surge plain making up a secondary channel island. Dominated by tidal herbaceous wetland vegetation. Other land cover includes small areas of tidal and non tidal deciduous wetlands in the up river part of the island. Land use is dominated by open space.		Invasive vegetation impacts habitat complexity	Invasive vegetation	Columbia white-tailed deer, waterfowl concentrations, freshwater forested wetlands		Invasive species management	CREST	Concept
CC_RyanIslandComplex_05	Just south of the most up river island in the complex. Alluvium flooded surge plain making up a secondary channel island. Dominated by tidal herbaceous wetland vegetation. Land use is dominated by open space.		Invasive vegetation impacts habitat complexity	Invasive vegetation	Columbia white-tailed deer, waterfowl concentrations, freshwater forested wetlands	Protection	Invasive species management	CREST	Concept
CC_WhitIslandComplex_01	Island complex consisting of Alluvium lower and upper flooded surge plain and dredge spoils on a primary channel island. Land cover on the down river section of the island (working upriver) is a mix of tidal herbaceous, scrub-shrub, and deciduous forest wetlands. At higher elevations there is non-tidal deciduous forest wetlands. The up river section of the island is dominated by sand (dredge material), but also contains tidal herbaceous, scrub-shrub, and deciduous forested wetlands. Land use is considered entirely open space.		None noted		Columbia white-tailed deer, forested intertidal wetlands, spring and fall cormorant concentrations, scrub shrub and forested wetlands, wintering bald eagles, cavity nesting ducks, heron rookery, shorebird concentrations	Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Protection, Development/Restoration			
CC_WhitIslandComplex_02	Island complex consisting of Alluvium lower and upper flooded surge plain and dredge spoils on a primary channel island. Land cover on the down river section of the island (working upriver) is a mix of tidal herbaceous, scrub-shrub, and deciduous forest wetlands. At higher elevations there is non-tidal deciduous forest wetlands. The up river section of the island is dominated by sand (dredge material), but also contains tidal herbaceous, scrub-shrub, and deciduous forested wetlands. Land use is considered entirely open space.		None noted	305b listing for water temperature in upriver area	Canada goose concentrations, Columbia white-tailed deer, forested intertidal wetlands, spring and fall cormorant concentrations, scrub shrub and forested wetlands, wintering bald eagles, cavity nesting ducks, heron rookery, shorebird concentrations Streaked horned lark. California sea lion. Bald eagle.	Protection, Protection/Restoration			

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
CC_WhitelIsl andComplex_03	Island complex consisting of Alluvium lower and upper flooded surge plain and dredge spoils on a primary channel island. Land cover on the down river section of the island (working upriver) is a mix of tidal herbaceous, scrub-shrub, and deciduous forest wetlands. At higher elevations there is non-tidal deciduous forest wetlands. The up river section of the island is dominated by sand (dredge material), but also contains tidal herbaceous, scrub-shrub, and deciduous forested wetlands. Land use is considered entirely open space.		None noted		Columbia white-tailed deer, forested intertidal wetlands, spring and fall cormorant concentrations, scrub-shrub	Protection			
CC_WhitelIsl andComplex_04	Island complex consisting of Alluvium lower and upper flooded surge plain and dredge spoils on a primary channel island. Land cover on the down river section of the island (working upriver) is a mix of tidal herbaceous, scrub-shrub, and deciduous forest wetlands. At higher elevations there is non-tidal deciduous forest wetlands. The up river section of the island is dominated by sand (dredge material), but also contains tidal herbaceous, scrub-shrub, and deciduous forested wetlands. Land use is considered entirely open space.		Invasive vegetation impacts habitat complexity	Invasive vegetation.	Columbia white-tailed deer, forested intertidal wetlands, spring and fall cormorant concentrations, scrub shrub and forested wetlands, wintering bald eagles, cavity nesting ducks, heron rookery, shorebird concentrations	Protection, Protection/Restoration	Invasive species management	CREST	Concept
CC_WhitelIsl andComplex_05	Island complex consisting of Alluvium lower and upper flooded surge plain and dredge spoils on a primary channel island. Land cover on the down river section of the island (working upriver) is a mix of tidal herbaceous, scrub-shrub, and deciduous forest wetlands. At higher elevations there is non-tidal deciduous forest wetlands. The up river section of the island is dominated by sand (dredge material), but also contains tidal herbaceous, scrub-shrub, and deciduous forested wetlands. Land use is considered entirely open space.		Invasive vegetation impacts habitat complexity	Invasive vegetation.	Columbia white-tailed deer, forested intertidal wetlands, spring and fall cormorant concentrations, scrub shrub and forested wetlands, wintering bald eagles, cavity nesting ducks, heron rookery, shorebird concentrations	Protection, Protection/Restoration	Invasive species management	CREST	Concept
EFC_AlgerCreek_01	Tributary valley (outside floodplain) dominated by coniferous, and to a lesser degree, deciduous upland forests (along the riparian area). Land use is dominated by forestry	Logging roads.	Timber or forestry related uses may alter hydrology and sediment processes due to loss of vegetative cover and runoff from logging roads.	water quality from upland logging operations and logging roads.	Roosevelt Elk Winter Range: Willapa herd. Summer steelhead, coho, rainbow trout, resident cutthroat presence. Winter steelhead rearing.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Development/Restoration			
EFC_AlgerCreek_02	Tributary valley (outside floodplain) dominated by coniferous, and to a lesser degree, deciduous upland forests (along the riparian area). Land use is dominated by forestry and undeveloped land. Some relatively recent clear cuts.	1 culvert at road crossing. logging and impermeable roads. past logging activities observed.	Timber or forestry related uses may alter hydrology and sediment processes due to loss of vegetative cover and runoff from logging roads.	erosion, sedimentation, and water quality impacts from upland logging operations.	Roosevelt Elk Winter Range: Willapa herd. Summer steelhead, coho, rainbow trout, resident cutthroat presence. Winter steelhead rearing.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Development/Restoration			

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
EFC_AlgerCreek_03	Small floodplain cut off from the rest of the floodplain area divided by a road. Tributary channel passes through a culvert under the road. Land cover is dominated by deciduous upland forest with some areas of coniferous upland forest, non-tidal herbaceous wetlands, deciduous wetland forests, and some agriculture. Land use is dominated by undeveloped land.	1 culvert up stream of hwy 4 for road crossing. Alger Creek Rd. meanders through SMP jurisdiction area.	Timber or forestry related uses may alter hydrology and sediment processes due to loss of vegetative cover and runoff from logging roads.	upland erosion and sedimentation from logging practices.	Columbia white-tailed deer, diving duck wintering concentrations, cavity nesting ducks, Roosevelt Elk Winter Range: Willapa herd. Summer steelhead, coho, rainbow trout, resident cutthroat presence. Winter steelhead rearing	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Development/Restoration			
EFC_AlgerCreek_04	Tributary canyon terminates into a tributary fan and spreads out into a drained surge plain wetland that sits behind a system of levees. Land cover is dominated by agriculture and herbaceous tidal and non-tidal wetlands. Land use is dominated by agriculture/pasture land. There is a single-family residence near the road. The former/natural channel of Skamokawa Creek before the Army Corps of Engineers constructed the new channel.	Levee on both sides of slough. 2 culverts at upstream terminus of reach and 1 near farm/housing structure, rural/agricultural development.	System of Levees, pile dikes, piers, docks, or boat ramps may alter hydrologic/ sediment transport and shoreline habitat components (e.g., light, vegetation). May include impacts to: beach sediment size/ type/ abundance, flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification. Shoreline armoring may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. If culverts are undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. May also impact habitat accessibility and quality.	Floodplain/riparian area modified for agriculture. Possible water quality impacts from agriculture. limited/no tidal access to floodplain, Fish access to floodplain habitat restricted.	Columbia white-tailed deer, diving duck wintering concentrations, cavity nesting ducks, Roosevelt Elk Winter Range: Willapa herd. Summer steelhead, coho, rainbow trout, resident cutthroat presence. Winter steelhead rearing.	Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Development/Restoration			

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
EFC_AlgerCreek_05	Reach is a tributary delta surrounded by a drained herbaceous wetlands behind a levee. The terminus of Alger creek flows into Brooks Slough. Land cover is dominated by agriculture/pastureland with some non-tidal herbaceous wetlands and tidal herbaceous wetlands along the creek. Larger areas of tidal herbaceous wetlands occur at the mouth of Alger Creek. Land use is dominated by undeveloped land and agriculture.	Levee on both sides of slough. 1 tidegate on south side and 1 culvert in north side of slough. pump station on south side.	System of Levees, pile dikes, piers, docks, or boat ramps may alter hydrologic/ sediment transport and shoreline habitat components (e.g., light, vegetation). May include impacts to: beach sediment size/ type/ abundance, flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification. Shoreline armoring may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. If culverts are undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. May also impact habitat accessibility and quality. Water diversion and channelization may impact hydrologic and sediment transport and water quality	Floodplain/riparian area modified for agriculture. Possible water quality impacts from agriculture. limited/no tidal access to floodplain, Fish access to floodplain habitat restricted.	Columbia white-tailed deer, diving duck wintering concentrations, cavity nesting ducks, Roosevelt Elk Winter Range: Willapa herd. Summer steelhead, coho, rainbow trout, resident cutthroat presence. Winter steelhead rearing.	Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection			
EFC_DeadSlough_01	Slough is the original natural/historic Skamokawa Creek channel. Army Corps created the current/artificial channel in the lower floodplain. Area is generally flat and surrounded by agriculture and diked wetlands. Recent restoration efforts by landowners and the Conservation District have improved hydrology and fish access through the slough through a series of tidegates on both sides of the slough.	1 freshwater intake pipe upriver section of reach, 1 in stream culvert, 1 tributary culvert.	System diverted water may alter hydrologic/ sediment transport and shoreline habitat components (e.g., light, vegetation). May include impacts to: flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Bridges and culverts may impact functions through increased water velocity, incised channels, erosion, road washouts, and downstream flooding.	303(d) water temperature. Modified riparian areas. Water quality impacts due to agricultural development. Eutrophying system (temperature, Dissolved Oxygen, turbidity due to algae blooms, limited/no fisheries utilization, water quantity, degraded riparian areas	Roosevelt Elk Winter Range: Willapa herd, Columbia white-tailed deer, wintering waterfowl. PHS salmonids will likely change resulting from restoration and tidegate replacement. Species and use will likely be similar to the corps constructed channel.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Development/Restoration	restore tidal influence to the historic tidal channel by replacing inlet and outlet structures Replace/remove interior undersized culverts between inlet and outlet structures LWD structures on banks and in-stream Riparian replanting/restoration	WCD WCD WCD WCD	Completed in 2014 Completed in 2014 Completed in 2014 Completed in 2014

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
EFC_BeaverCreek_01	Tributary channel enclosed by steep slopes. Land cover is dominated by deciduous and coniferous upland forests. Other land cover includes developed open space and a impervious road surface. Land use is dominated by forestry, but also includes some single-family residential development.	Impervious roadway/surface, single family development	Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.	WQ impacts from upstream development and logging operations.	Roosevelt Elk Winter Range: Willapa herd. Rainbow trout, winter steelhead, coho, resident cutthroat trout, chum, and fall Chinook present	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration			
EFC_BeaverCreek_02	Tributary channel enclosed by steep slopes. Land cover is dominated by deciduous and coniferous upland forests. Other land cover includes developed open space and a impervious road surface. Land use includes open space, open space and single-family residential development.	Impervious roadway/surface, artificial pond/retention basin, commercial and single family development. 1 culvert, 1 dam that creates pond	Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.	303(d) water temperature. WQ impacts from upstream development and logging operations. Fish access to floodplain habitat. Altered floodplain and riparian area. Dam structure may create fish passage	Roosevelt Elk Winter Range: Willapa herd. Rainbow trout, winter steelhead, coho, resident cutthroat trout, chum, and fall Chinook present	Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection	fish passage barrier removal/retrofit	CREST	Concept
				Degraded riparian areas			Riparian replanting/restoration	CREST	Concept
				Bank instability			Implement bank stability measures including the use of LWD	CREST	Concept

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
EFC_BrooksSlough_01	Tidally influenced tributary delta/channel surrounded by diked herbaceous wetland. Land cover in this reach is agriculture on the southern side of the slough and diked wetland on the north side. Within the channel, in the upper section of the reach, tidal herbaceous wetland is present, but becomes less present in the downstream section of the reach. Non-tidal herbaceous wetlands are present on the levees. There is a road on the south-side levee. Land use is dominated by agriculture on the north side of the slough and by designated open space/pastureland on the south side.	Levee on both sides of slough. 2 tidegates on each side of slough.	System of levees may alter hydrologic/ sediment transport, decrease in water storage and shoreline habitat components (no connection to floodplain). May include impacts to: flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification. Shoreline armoring may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. culverts may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.	Floodplain/riparian area modified for agriculture. Possible water quality impacts from agriculture. limited/no tidal access to floodplain, Fish access to floodplain habitat restricted.	Columbia white-tailed deer, diving duck wintering concentrations, cavity nesting ducks, Roosevelt Elk Winter Range: Willapa herd. Winter steelhead rearing. Coho, chum, cutthroat, summer steelhead presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration			
EFC_BrooksSlough_02	Tidal channel surrounded by diked herbaceous wetlands on the north and south side of the slough. The north side also contains a developed floodplain and floodplain tidal channel that was isolated from the slough by the construction of the levee. Land cover on the north side is dominated by diked herbaceous wetlands, some developed open space and urban development. The south side of the slough is dominated by agriculture/pasturelands. Land use on the south side of the slough is dominated by designated open space. On the north side there is agriculture, single family residential development, and undeveloped land surrounded by forest land on the hillsides.	Logging processing structures? 1 dock with overwater structure. Levee on both sides of slough. 1 tidegate and 2 culverts. Modified floodplain	System of levees may alter hydrologic/ sediment transport, decrease in water storage and shoreline habitat components (no connection to floodplain). May include impacts to: flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification. Industry on/near waterway may result in water quality impacts. Industry and modified floodplains may impact hydrologic and sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. culverts may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.	limited/no tidal access to floodplain, no fish access to floodplain habitat.	Columbia white-tailed deer, Roosevelt Elk Winter Range: Willapa herd. Winter steelhead rearing. Coho, chum, cutthroat, summer steelhead presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration			

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
EFC_BrooksSlough_03	Tidal channel channelized by a system of levees on both sides of the slough. The north side of the slough is characterized by having developed floodplain area next to a landslide deposit containing mixed non-wetland forests in front of steep slopes. It also is characterized by containing an upper flooded surge plain. Highway 4 is between the slough and the hillside. The south side of the slough is a drained wetland utilized for agriculture. There is also a floodplain channel that has access to the slough through a water structure through the levee. Land cover on the north side of the slough is dominated by tidal coniferous wetland forests and deciduous upland forests. Impervious surface resulting from Highway 4. There is also some upland coniferous forests. On the south side of the slough, land cover is dominated by both diked herbaceous and deciduous wetland forests. Land use is dominated by partially developed open space. On the north side, land use is dominated by the highway and forestry land. There is also some over water structures and a derelict vessel.	1 tidgate, 1 tributary culvert. Impervious roadways on both sides of slough. Levee on south side, Hwy 4 on the other. 3 derelict docks, 1 with an overwater structure and a derelict boat. Cut logs in water.	Piers, docks, or boat ramps may alter hydrologic/ sediment transport and shoreline habitat components (e.g., light, vegetation). May include impacts to: beach sediment size/ type/ abundance, flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification. System of levees may impact hydrologic and sediment transport, storage, quality of floodplain habitat and floodplain connection to habitat. Impervious surfaces in and around the shoreline (> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.	Derelict debris from docks and boats.	Cavity nesting ducks, Columbia white-tailed deer, diving duck wintering concentrations, Roosevelt Elk Winter Range: Willapa herd	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration			
EFC_BrooksSlough_04	Reach is the terminous of the slough where it meets the Skamakowa River before entering into the Columbia River. The tidal channel is surrounded by a developed upper flooded surge plain and on the north side is enclosed by steep slopes. Steamboat Slough Road bridge crosses the slough in this reach. Land cover on the north side is dominated by impervious surface and urban development and to a lesser extent, developed open space and deciduous upland forests. The south side is dominated by tidal coniferous and deciduous wetland forests and aquatic beds containing herbaceous vegetation. Land use on the north side of the slough is dominated by highway 4, single-family residential development, undeveloped land, retail and multi-family residential development. The south side is dominated by single-family residential development and undeveloped land. Reach contains the site of the now defunct Elochoman Fish Hatchery.	1 roadway bridge. levee on south side at upstream end of reach. 1 overwater structure. 2 derelict docks. Urban development and impervious roadways	System of levees may impact hydrologic and sediment transport including, decreased water storage, increase in velocity, decrease in riparian and floodplain habitat . Piers, docks, or boat ramps may alter hydrologic/ sediment transport and shoreline habitat components (e.g., light, vegetation). May include impacts to: beach sediment size/ type/ abundance, flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification. Shoreline armoring may alter hydrologic/sediment transport. May include impacts to: water quality, beach scouring/lowering, erosion, fish migration, beach sediment size/type/abundance, drift material accumulation, habitat, wave energy, shoreline hydrodynamics, and drift. Bridges may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.	Water quality impact from impervious development and roadways. Derelict vessel and inwater/overwater structures	Columbia white-tailed deer, diving duck wintering concentrations, Roosevelt Elk Winter Range: Willapa herd. Winter steelhead rearing. Coho, chum, cutthroat, summer steelhead presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration	Work with the DNR derelict vessel removal program to dismantle and remove derelict vessel. County and work to remove other derelict structures	DNR, SAC, WDFW	Concept

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
EFC_EastFor kElochoman _01	Tributary channel enclosed by steep slopes on both sides. Land cover is dominated by coniferous upland forests. Mixed deciduous/coniferous forests make up the riparian areas. Imperious road follows the creek on the east side of the creek. Land use is dominantly forestry. moderate to steep gradient. Reach is considered flashy.		Timber or forestry related uses may alter hydrology and sediment processes due to loss of vegetative cover.	WQ impacts from upriver logging operations. Elochoman Road prevents natural channel morphology from occurring in floodplain. Relatively intact riparian areas and ecosystem functions	Roosevelt Elk Winter Range: Willapa herd. Winter steelhead spawning. Coho, cutthroat, summer steelhead, rainbow trout presence.	Conservation, Protection, Restoration	Explore the potential to utilize regulatory and/or non regulatory protections	CREST	Concept
				logging roads impact channel morphology, sediment transport and fish passage issues			Correct barrier issues and improve roads	WDNR	Complete
EFC_EastFor kElochoman _02	Tributary channel enclosed by steep slopes on both sides. Land cover is dominated by coniferous upland forests. Mixed deciduous/coniferous forests make up the riparian areas. Imperious road follows the creek on the east side of the creek. Land use is dominantly forestry. moderate to steep gradient. Reach is considered flashy.	Some areas adjacent to SMP jurisdiction are logged	Timber or forestry related uses may alter hydrology and sediment processes due to loss of vegetative cover.	WQ impacts from upriver logging operations.	Roosevelt Elk Winter Range: Willapa herd. Winter steelhead spawning. Coho, cutthroat, summer steelhead, rainbow trout presence.	Conservation, Restoration/Development, Protection/Restoration, Protection, Development/Restoration			

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
EFC_Elochoman_01	Tributary channel enclosed by steep slopes on both sides. small pocket floodplains exist throughout the reach. Land cover is dominated by coniferous upland forests. Mixed deciduous/coniferous forests make up the riparian areas. There are also small areas of scrub-shrub habitat within the shoreline jurisdiction throughout the reach. Logging roads are interspersed throughout the reach. Land use is dominantly forestry.	forestland cleared for pasture land, some dirt roads. Impervious roadway follows part of the river.	Timber or forestry related uses may alter hydrology and sediment processes due to loss of vegetative cover.	303(d) water temperature. 305b for pH. WQ impacts from upriver logging operations. Invasive species management	Roosevelt Elk Winter Range: Willapa herd. Winter steelhead spawning. Coho, fall Chinook, cutthroat, summer steelhead, rainbow trout presence. Bald eagle. Reticulate sculpin, Pacific lamprey. Marbled murrelet,	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Development/Restoration	Continued invasive species management	CREST, CLT	Proposed
				Fish passage barrier (perched culvert on unnamed stream that enters the Elochoman near RM 10.6			Culvert replacement	Wahkiakum County, CLT, WDFW	Proposed
				relatively intact riparian forestland with some enhancement/restoration potential			land acquisition	CLT	Complete
				lack of habitat complexity			bridge removal, forest stand enhancement, ELP placement, wetland enhancement	CLT	Proposed
				partial fish passage barrier (bridge)			Remove infrastructure on CLT land to improve hydraulics in the floodplain and along the riparian area including ditches and road fill	CLT	proposed
				degraded riparian and off-channel wetland areas			Riparian replanting/restoration	CLT	proposed
				water conveyance infrastructure/roads create fish passage barriers and cut off access to riparian/floodplain areas.			push-up levee removal on CLT property	CLT	proposed
				degraded riparian areas			Correct barrier issues and improve roads	WDNR	Complete
				disconnection with floodplain					
				logging roads impact channel morphology, sediment transport and fish passage issues					

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
EFC_Elocho man_02	Tributary channel enclosed by steep slopes on both sides. small pocket floodplains exist throughout the reach some of which host agricultural practices. Land cover is dominated by coniferous upland forests. Mixed deciduous/coniferous forests make up the riparian areas. There are also small areas of scrub-shrub habitat within the shoreline jurisdiction throughout the reach. Logging roads are interspersed throughout the reach. Land use is dominantly forestry.	Small Ag development, dirt/maintained roadway.	Timber or forestry related uses may alter hydrology and sediment processes due to loss of vegetative cover.	303(d) water temperature. Elochoman Road prevents natural channel morphology from occurring in floodplain. Older deposition areas (vegetation growth) likely from historic logging practices upstream.	Roosevelt Elk Winter Range: Willapa herd. Winter steelhead spawning. Coho, fall Chinook, cutthroat, summer steelhead, rainbow trout presence.	Conservation, Protection, Restoration	LWD instream to trap sediment and keep from moving downstream	CREST	Concept
EFC_Elocho man_03	Small upper floodplain enclosed by steep slopes. Primarily utilized for agriculture and single-family residential development	1 dam across river. Impervious roadway, some agriculture, Single family development	Timber or forestry related uses may alter hydrology and sediment processes due to loss of vegetative cover. Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Dams alter hydrologic regimes. Impacts may include: periodic low flows and/or flooding, areas of high erosion, and limited ability to maintain flows necessary for habitat function.	303(d) and 305b water temperature. Areas of riparian modification, WQ impacts from surrounding logging and some agricultural operations and development. Elochoman Road prevents natural channel morphology from occurring in floodplain. Channel complexity (side channels and steady bars and islands and LWD.	Roosevelt Elk Winter Range: Willapa herd. Winter steelhead spawning. Coho, fall Chinook, cutthroat, summer steelhead, rainbow trout presence. Dunn's salamander and riffle sculpin.	Conservation, Restoration/Development, Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration	Protect/maintain habitat complexity	CREST	Concept
				degraded riparian areas			Riparian replanting/restoration		Concept

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
EFC_Elocho man_04	Floodplain opens up into larger areas surrounded by steep slopes. Land cover is dominated by deciduous upland forest and some coniferous upland forest. There is also small agriculture plots, sand, and mudflats. Land use includes forestry, single-family residential development and non-commercial forest.	2 tributary culverts, 1 dam/water intake pipe, impervious roadway, commercial and single family development, some agriculture	<p>Timber or forestry related uses may alter hydrology and sediment processes due to loss of vegetative cover. Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Bridges may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.</p>	Areas of riparian modification, WQ impacts from surrounding logging operations and development. Elochoman Road prevents natural channel morphology from occurring in floodplain.	Roosevelt Elk Winter Range: Willapa herd. Winter steelhead spawning. Coho, fall Chinook, cutthroat, summer steelhead, rainbow trout, chum presence. Reticulate sculpin.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration	Remove fish passage structure	CREST	Concept
				degraded riparian areas			Riparian replanting/restoration	CREST	Concept
				Bank erosion			Bank stability measures including the use of LWD	CREST	Concept
				Lack of instream habitat complexity			LWD placement	CREST	Concept
				Clear Creek Culvert/Fish passage barrier with quality habitat behind the culvert.			Culvert replacement	Wahkiakum County	Design/Planning
				dam/ water control structure/fish passage barrier			remove/retrofit dam structure enhance fish passage	CREST	Concept

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
EFC_Elochoman_05	Relatively narrow upper floodplain enclosed by steep slopes dominated by agriculture and to a lesser extent, upland coniferous and deciduous forests. Additionally, impervious development is also common in this reach. Land use is dominated by single-family residential development, agriculture, open space, and forestry (on the east side of the river).	1 tributary culvert, 1 dam across river, 1 roadway bridge, single family and commercial development, agriculture.	<p>Timber or forestry related uses may alter hydrology and sediment processes due to loss of vegetative cover. Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Bridges may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.</p>	Modified riparian area and floodplain. Fish access to intertidal floodplain wetlands. WQ from development, agriculture, up river logging operations. Elochoman Road prevents natural channel morphology from occurring in floodplain. Fish passage barrier/hatchery fish/water intake at decommissioned fish hatchery. degraded riparian areas.	Roosevelt Elk Winter Range: Willapa herd. Winter steelhead spawning. Coho presence, fall Chinook spawning, cutthroat, summer steelhead, rainbow trout presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration	Riparian replanting/restoration	CREST	Concept
				Bank erosion			Bank stability measures including the use of LWD	CREST	Concept
				Lack of instream habitat complexity			LWD placement	CREST	Concept
				Threats from development and roads to limit the ability for the channel to naturally laterally migrate within the floodplain valley.			Channel migration zone easements	Tetrattech	Concept
				Fish passage barrier at the mouth of Duck Creek			remove/replace barrier	Wahkiakum County	Complete
				Disconnection from floodplain during high fluvial flows			Projects to reconnect the floodplain	CREST	Concept

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
EFC_Elochoman_06	Floodplain protected from the river by a natural levee widens further in this reach. Land cover is dominated by agriculture, upland coniferous and deciduous forests. Other common land cover characteristics include non-tidal coniferous wetland forests, impervious development and developed open space. Land use is dominated by agriculture, single-family residential development, and undeveloped land.	Agricultural land, impervious road, rural/single family development	<p>Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Culverts may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.</p>	WQ impacts from upstream development, agriculture and logging operations. Fish access to floodplain habitat. Altered floodplain and riparian area. Elochoman Road prevents natural channel morphology from occurring in floodplain. Degraded riparian areas	Roosevelt Elk Winter Range: Willapa herd. Winter steelhead and fall Chinook spawning. Coho, cutthroat, summer steelhead, chum, rainbow trout presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration	Riparian replanting/restoration	CREST	Concept
				bank erosion, lack of habitat diversity, loss of riparian vegetation, lack of side channel connectivity			install wood-based instream structure, develop/maintain side channel and off channel habitats, and restore riparian function	WCD	Proposed
				Bank erosion			Bank stability measures including the use of LWD	CREST	Concept
				Threats from development and roads to limit the ability for the channel to naturally laterally migrate within the floodplain valley.			Channel migration zone easements	Tetrattech	Proposed
				Lack of instream habitat complexity			LWD placement	CREST	Concept

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
EFC_Elocho man_07	Floodplain on the north side and steep slopes on the south side. Land cover is dominated by agriculture, undeveloped land and single-family residential development on the north side and forestry on the south side.	1 culvert. logging roads near stream. impervious roadway follows river. 1 single family development associated structures.	Timber or forestry related uses and logging roads may alter hydrology and sediment processes due to loss of vegetative cover. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, runoff, and flow energy, habitat, headwater input, and water temperatures.			Roosevelt Elk Winter Range: Willapa herd. Winter steelhead and fall Chinook spawning. Coho, cutthroat, summer steelhead, chum, rainbow trout presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Protection, Development/Restoration		
EFC_Elocho man_08	Tributary Valley/floodplain. Elocho man River bottlenecks at this point where steep slopes briefly enclose the river. Land cover is dominated by deciduous non-tidal wetland forests, coniferous upland forests and deciduous upland forests and to a lesser extent, consists of developed impervious roadway that follows the river in this reach, developed openspace/pasture and small scale agriculture. There are also several sand bars in the river. Land use is dominated by forestry on both sides of the river. Some designated open space and single-family residential development occur on the north side of the river.	Small rural/suburban development. 1 over water roadway bridge. Impervious surface including development and roadways. Agricultural operations.				Columbia white-tailed deer, Roosevelt Elk Winter Range: Willapa herd. Winter steelhead and fall Chinook spawning. Coho, cutthroat, summer steelhead, chum, rainbow trout presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Protection, Highest Protection, Development/Restoration	opportunity for fish passage enhancement (CREST - Concept), Riparian replanting/restoration (WCD - Planned/Funded), remove levees where appropriate to reconnect floodplains for flood storage and off-channel habitat (CREST - Concept), Channel migration zone easements (TetraTech, Concept), continued vegetation management on properties already restored (WCD - Planned/funded), Land acquisition (CLT - Complete), LWD placement where appropriate both instream and on banks (WCD - Planned/funded).	
EFC_Elocho man_09			Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Culverts may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Development close to shore has limited the opportunities for channel migration.	303(d) water temperature. WQ impacts from development, agriculture and logging upriver. Water control structure, degraded riparian areas, no flood storage areas or off-channel habitat, threats from development and roads to limit the ability for channel to naturally laterally migrate within the floodplain valley, invasive species, relatively intact forested intertidal habitat in some areas, lack of habitat complexity in some areas, channel instability and sediment delivery issues.				Several Partners	Varying stages
EFC_Elocho man_10	Steep slopes/tributary fan on the north side of the river. South side is a floodplain primarily utilized for agriculture. Other than agriculture, land cover includes non-tidal deciduous wetland forest and upland coniferous forests on the south side. On the north side, the dominant land cover is deciduous upland forests with some coniferous upland forest. Land use is dominated by agriculture on the south side. Park space and single-family development is also present. On the north side agriculture and single family development are the dominant land uses	Levee on north side at the down river section of the reach. Agricultural roads in riparian area. 1 bridge crossing in reach. 4 single family homes in SMP jurisdiction. Pastoral/agricultural lands on both sides of the river. Tree farms, Spill over dam.				Columbia white-tailed deer, cavity nesting ducks, Roosevelt Elk Winter Range: Willapa herd. Winter steelhead rearing and fall Chinook spawning. Coho, cutthroat, summer steelhead, chum, rainbow trout presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Protection, Highest Protection, Development/Restoration		

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
EFC_Elocho man_11	Geomorphology in this reach is a floodplain that changes to a natural leveed floodplain and an upper flooded surge plain. Land cover is dominated by Agriculture and tree farm operations in the upriver half of the reach. The downriver half of the reach is dominated by tidal and non-tidal deciduous wetland forests. There is also a large section of non-tidal coniferous wetland forests at the mouth of the river. On the north side of the river, at the mouth, land cover is dominated by agriculture, developed open space and diked herbaceous wetlands. Land use is dominated by agriculture and open space. On the south side, open space is also common. Single-family development is also present on both sides of the river.	Levee on north side of slough protecting NWR. 2 tidegates, 1 bridge, 1 pumphouse pumping water out of slough, but not in.	Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Bridges may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. System of levees may impact hydrologic and sediment transport, storage, quality of floodplain habitat and floodplain connection to habitat.	Limited fish access to intertidal floodplain. Invasive vegetation	Columbia white-tailed deer, cavity nesting ducks, wintering waterfowl habitat, Roosevelt Elk Winter Range: Willapa herd. Winter steelhead rearing and fall Chinook spawning. Coho, cutthroat, summer steelhead, chum, rainbow trout presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration			
EFC_FalkCreek_01	Tributary valley floodplain enclosed by steep slopes. Land cover is dominated by coniferous and deciduous upland forests. Other present land cover types includes upland herbaceous and scrub-shrub habitats. Land use is dominantly forestry.	logging roads intersect stream, 1 tributary culvert in SMP jurisdiction and several more upstream.	Timber or forestry related uses may alter hydrology and sediment processes due to loss of vegetative cover.	Water quality impacts from upland/upriver logging practices and logging roads.	Roosevelt Elk Winter Range: Willapa herd. Winter steelhead rearing, coho, rainbow trout, cutthroat trout, summer steelhead presence.	Conservation, Protection, Protection/Restoration, Restoration			

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
EFC_FalkCreek_02	Tributary valley floodplain enclosed by steep slopes, but increasingly widening floodplain as it enters into the same floodplain as the Skamokawa Creek. Land cover is dominated by agriculture. Other land cover types include coniferous and deciduous upland forest, herbaceous upland forest, herbaceous upland, and some impervious and open space development. Land use is dominated by Agriculture and forestry. Forestry is less dominant as Falk Creek enters the Skamokawa Creek Floodplain, where agriculture takes over.	Bridge/road crossing. Rural development, dirt roads, agricultural operations	Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Bridges may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. System of levees may impact hydrologic and sediment transport, storage, quality of floodplain habitat and floodplain connection to habitat.	Modified riparian area (agriculture). Water quality impacts from upland/upriver logging practices and logging roads. Channel incision/erosion problems Lack of habitat complexity Poor water quality conditions (temperature)	Roosevelt Elk Winter Range: Willapa herd. Winter steelhead rearing, coho, rainbow trout, cutthroat trout, summer steelhead presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Development/Restoration	LWD placement to stabilize banks and provide channel habitat complexity, Riparian vegetation planting	WCD	Complete
EFC_FalkCreek_03	Alluvium floodplain shared with Skamokawa Creek. Land Cover is dominated by agriculture. Towards the mouth of the creek, Herbaceous upland and non-tidal herbaceous wetlands are dominant. In this area, deciduous non-tidal wetlands are also common. Land uses include agriculture	Modified riparian area (agriculture). 1 bridge crossing. Impervious development/roads. Remanent tree farm.	Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Bridges may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. System of levees may impact hydrologic and sediment transport, storage, quality of floodplain habitat and floodplain connection to habitat.	303(d) water temperature. Water quality from agricultural operations and upriver forestry/logging ops. Riparian modification. Streambank instability Lack of instream habitat complexity Poor water quality conditions (temperature) Sediment delivery issues	Roosevelt Elk Winter Range: Willapa herd. Winter steelhead rearing, coho, rainbow trout, cutthroat trout, summer steelhead presence.	Highest Restoration, Protection, Restoration/Restoration, Restoration/Development	Stabilize streambanks, instream LWD, and implementation of improved agricultural practices.	WCD	Complete

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
EFC_LeftForkSkamokawa_01	Tributary in a narrow floodplain valley surrounded by steep forested slopes. Land cover is dominated by upland coniferous and deciduous forests. Other land cover types include agriculture and developed open space. Land use is dominated by forestry. Other land use types include agriculture near the creeks confluence.	Riparian modification (agriculture), roads and rural development.	Timber or forestry related uses may alter hydrology and sediment processes due to loss of vegetative cover.	Some riparian modification (agriculture and road construction). 303(d) water temperature. Water quality impacts from agricultural operations, adjacent logging operations/logging roads and impervious rural development. Bank instability contributing to sediment inputs, lack of channel habitat complexity, degraded habitat quality, degraded riparian areas	Scrub-shrub wetlands, cavity nesting ducks, beavers, wintering waterfowl, Roosevelt Elk Winter Range: Willapa herd. Winter steelhead spawning, chum, coho, cutthroat, rainbow trout, summer steelhead presence. Columbia Torrent Salamander, Marbled murrelet	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration	LWD placement, restore riparian condition through planting and invasive species management, bank regrading	WCD	Complete
EFC_McDonaldCreek_01	Tributary channel enclosed by steep slopes. Land cover consists coniferous and deciduous upland forests. Land use is exclusively forestry.	Logging roads	Timber or forestry related uses may alter hydrology and sediment processes due to loss of vegetative cover.	Potential water quality impacts from upland logging operations.	Roosevelt Elk Winter Range: Willapa herd. Winter steelhead spawning, rainbow trout, cutthroat trout, fall Chinook, coho presence.	Conservation, Protection, Protection/Restoration			
EFC_NelsonCreek_01	Relatively narrow tributary floodplain enclosed by steep slopes. A natural levee divides the upper portion of the reach from Risk Road. There is also a small shallow lake within this tributary floodplain. At the downstream terminus of the reach, there is also an upper floodplain and a drained wetland utilized for agriculture. Upper portion of the reach is dominated by coniferous upland forest and to a lesser degree, deciduous upland forest. Lower half of the reach is dominated by scrub-shrub non-tidal wetlands and deciduous non-tidal wetlands. Land use is dominated by forestry.	2 culverts. Impervious roadway. Utility corridor. 1 single family development and agricultural structure.	Timber or forestry related uses may alter hydrology and sediment processes due to loss of vegetative cover. Sediment deposition has been an ongoing problem at the downstream end of the reach (at the intersection with Risk Road).	303(d) water temperature. Water quality impacts from upriver/upland farming and logging operations. Creek morphology has been straightened and dramatically altered. Currently runs along a road.	Columbia white-tailed deer, Roosevelt Elk Winter Range: Willapa herd. Winter steelhead, coho, rainbow trout presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration	Potential to create a more natural channel morphology in the floodplain and realign channel away from the road.	Allan Whiting, CREST	Concept
				Degraded riparian areas			Riparian replanting/restoration	Allan Whiting, CREST	Concept
				Fish passage barrier and frequent dredging at the risk road culvert. Some backwatering and flooding during bigger storm events.			Culvert replacement keeping in mind that beavers are active in this reach	Allan Whiting, WDFW	Concept

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
EFC_NelsonCreek_02	Floodplain opens up. Tributary channel follows the road. The east side of the tributary is an upper flooded surge plain while the west side is a drained wetland utilized for agriculture. Land cover on the east side of th tributary is dominated by non-tidal deciduous wetland forests and non-tidal scrub-shrub wetland habitat. On the west side of the tributary, land cover is dominated by agriculture, diked herbaceous wetland and a tree farm. The road is built on top of a levee. Land use on the east side is dominated by RCW classified agriculture and forestry. On the west side, designated open space is dominant. Artificially routed channel	Levee with roadway on west side on stream and levee on the southside.	Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. System of levees may impact hydrologic and sediment transport, storage, quality of floodplain habitat and floodplain connection to habitat.	water quality impacts from upstream logging and agricultural operations. Relatively intact forested and scrub-shrub wetland habitat.	Columbia white-tailed deer, Roosevelt Elk Winter Range: Willapa herd. Winter steelhead , coho, rainbow trout presence. Bald eagle.	Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection	Land acquisition	CLT	Complete
EFC_NelsonCreek_03	Tributary channel follows the road. The east side of the tributary is an upper flooded surge plain while the west side is a drained wetland utilized for agriculture. land cover on the east side of th tributary is dominated by non-tidal/diked herbaceous wetland habitat and agriculture. Land cover on the west side is dominated by diked scrub-shrub wetlands and a tree farm. Land use on the east side is dominated by single-family residential development, open space, and undeveloped land. On the west side, it is dominated by designated open space. On the east side, land use consists of designated open space and undeveloped land. Artificially routed channel	Levee on south side of river throughout reach. Roadway/levee on North side. straightened/channelized section of stream? Impervious roadway.	Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Bridges may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. System of levees may impact hydrologic and sediment transport, storage, quality of floodplain habitat and floodplain connection to habitat. rerouted/channelized creek bed may impact sediment transport, hydrologic regimes, habitat, erosion/bank stability, flow energy, and water quality/ temperature/ storage.	Water quality impacts from Agriculture. Impervious Roadway. Channelization/straightening of stream	Columbia white-tailed deer, Roosevelt Elk Winter Range: Willapa herd. Winter steelhead , coho, rainbow trout presence.	Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection			
EFC_NorthForkElochoman_01	Tributary channel enclosed by steep slopes on both sides. Land cover is dominated by coniferous upland forests. Mixed deciduous/coniferous forests make up the riparian areas. Imperious road follows the creek on the east side of the creek. Land use is dominantly forestry.	Logging roads, heavily logged immediately adjacent to SMP jurisdiction	Timber or forestry related uses may alter hydrology, water quality and sediment processes due to loss of vegetative cover.	WQ impacts from upriver logging operations. logging roads impact channel morphology, sediment transport and fish passage issues	Roosevelt Elk Winter Range: Willapa herd. Rainbow trout, coho, cutthroat trout presence. Winter steelhead spawning. Columbia torrent salamander, Cope's giant salamander, Dunn's salamander.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Development/Restoration	Remove /replace culverts that present fish passage barriers improve roads and correct fish passage barriers Protect intact riparian areas	CREST WDNR CREST	Concept Complete Concept

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
EFC_OtterCreek_01	Tributary channel enclosed by steep slopes on both sides. Land cover is dominated by coniferous upland forests. Mixed deciduous/coniferous forests make up the riparian areas. Imperious road follows the creek on the east side of the creek. Land use is dominantly forestry.	Logging roads and logging operations immediately adjacent to SMP jurisdiction.	Timber or forestry related uses may alter hydrology and sediment processes due to loss of vegetative cover.	WQ impacts from upriver logging operations. Upland logging practices cause changes to instream sediment transport issues.	Roosevelt Elk Winter Range: Willapa herd. Rainbow trout, coho, summer steelhead presence. Winter steelhead spawning.	Conservation, Protection/Restoration	LWD instream to trap sediment instream	CREST	Concept
EFC_SkamokawaCreek_01	Down stream of Standard Creek. Tributary valley enclosed by steep slopes. braided channel morphology. Land cover consists coniferous and deciduous upland forests, some non-tidal herbaceous wetland habitat and small plots of agriculture. . Scrub-shrub habitat is also common. Land use is exclusively forestry.	Logging roads	Timber or forestry related uses may alter hydrology and sediment processes due to loss of vegetative cover.	303(d) water temperature. Water quality impacts from upland/upriver logging operations.	Roosevelt Elk Winter Range: Willapa herd. Winer steelhead and fall Chinook spawning. Rainbow trout, chum, coho, cutthroat presence.	Conservation, Protection, Restoration			
EFC_SkamokawaCreek_02	Tributary valley that is increasingly widening. Braided or former/cut-off channels. Land cover is dominated by deciduous and coniferous upland forests and agriculture. Othe land cover types include sand bars in the river, some developed open space and impervious development. Land uses are dominantly agriculture and forestry.	2 vehicle bridges. Some rural development. Impervious roads.	Timber or forestry related uses may alter hydrology, water quality and sediment processes due to loss of vegetative cover. Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Bridges may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding.	303(d) water temperature. Water quality impacts from agricultural operations and logging operations upland/upriver.	Roosevelt Elk Winter Range: Willapa herd. Winer steelhead and fall Chinook spawning. Rainbow trout, chum, coho, cutthroat presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Development/Restoration			

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
EFC_SkamokawaCreek_03	Tributary valley floodplain. Land cover is dominated by agriculture. Other common land cover features include: deciduous upland forest, developed open space, non-tidal herbaceous wetlands, herbaceous uplands, non-tidal scrub-shrub wetland. Land use consists of agriculture, open space, single-family residential development and to a lesser extent forestry and undeveloped land.	Rural/road development, riparian modification (agriculture and roads). Some modified riparian areas (agriculture)	Timber or forestry related uses may alter hydrology, water quality and sediment processes due to loss of vegetative cover. Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Bridges may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding.	Some riparian modification (agriculture and road construction). 303(d) water temperature. Water quality impacts from agricultural operations, adjacent logging operations/logging roads and impervious rural development. Bank Erosion Lack of instream habitat complexity	Roosevelt Elk Winter Range: Willapa herd. Coho, summer steelhead, rainbow trout, cutthroat presence. Chum, fall Chinook and winter steelhead spawning.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration	Placement of LWD	WCD	Phase 1 complete, phase 2 proposed
EFC_SkamokawaCreek_04	Tributary valley/floodplain at the upriver section of the reach. The rest of the reach is alluvium floodplain. Land cover is dominated by agriculture. Other common land cover types includes deciduous wetland forests, some developed open space and impervious development. Land use is dominantly agriculture.	1 bridge (road crossing), 1 tributary culvert, rural development/roads. modified riparian areas (agriculture)	Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Bridges may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding.	Modified riparian areas, some erosion issues. 303(d) water temperature. Erosion from current/past grazing along river. Water quality impacts from agricultural operations and impervious rural development/roads.	Roosevelt Elk Winter Range: Willapa herd. Coho, summer steelhead, rainbow trout, cutthroat presence. Chum, fall Chinook and winter steelhead spawning.	Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Development/Restoration			

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
EFC_SkamokawaCreek_05	Alluvium floodplain. Land cover is dominated by agriculture but also includes tree farms, developed open space, non-tidal herbaceous wetlands, non-tidal deciduous wetland forests, and some areas of deciduous upland forests. Land use is dominated by agriculture.	Levee/road along west side of river. 1 tributary culvert. Rural development/roads. Modification to riparian areas (Agriculture)	Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Bridges may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. System of levees may impact hydrologic and sediment transport, storage, quality of floodplain habitat and floodplain connection to habitat. rerouted/channelized creek bed may impact sediment transport, hydrologic regimes, habitat, erosion/bank stability, flow energy, and water quality/ temperature/ storage.	303(d) water temperature. Erosion from current/past grazing along river. Water quality impacts from agricultural operations and impervious rural development/roads. Streambank stability, lack of instream habitat complexity, poor water quality conditions (temperature), sediment delivery issues	Roosevelt Elk Winter Range: Willapa herd. Coho, summer steelhead, rainbow trout, cutthroat presence. Chum, fall Chinook and winter steelhead spawning.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Development/Restoration	Stabilize streambanks, instream LWD, and implementation of improved agricultural practices.	WCD	Complete
EFC_SkamokawaCreek_06	Alluvium Floodplain just down river of the mouth of Falk Creek Land cover is a mixture of agriculture, large tree farm, some herbaceous non-tidal wetlands, deciduous tidal and non-tidal wetland forests, herbaceous upland forests and some impervious development. Land use is dominated by agriculture. Single-family residential development is common as well. Much of the agricultural land is protected by a system of levees.	Some floodplain area in front of levee on west side of the river. 1 tributary culvert in down river section of the reach. Impervious rural development/road construction	Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Bridges may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. System of levees may impact hydrologic and sediment transport, storage, quality of floodplain habitat and floodplain connection to habitat. rerouted/channelized creek bed may impact sediment transport, hydrologic regimes, habitat, erosion/bank stability, flow energy, and water quality/ temperature/ storage.	303(d) water temperature. Erosion from current/past grazing along river. Water quality impacts from agricultural operations and impervious rural development/roads. Streambank stability, lack of instream habitat complexity, poor water quality conditions (temperature), sediment delivery issues	Roosevelt Elk Winter Range: Willapa herd. Fall Chinook, rainbow trout, cutthroat, coho, summer steelhead presence. Chum and winter steelhead spawning.	Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection	Stabilize streambanks, instream LWD, and implementation of improved agricultural practices.	WCD	Complete

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
EFC_SkamokawaCreek_07	Alluvium floodplain. Land use is dominated by agriculture protected by natural levees as well as a system of constructed levees. Land cover is dominated by agriculture (including a tree farm) and non-tidal herbaceous habitat. Other land cover types include urban/ impervious development, and tidally influenced herbaceous cover in and around the channel. Scrub-shrub and deciduous non-tidal wetlands are also present. Land use includes some undeveloped land exists in this reach as well as residential single-family development. constructed channel by the Corps	Modified riparian area, Levees on both sides of river. 1 freshwater intake.	Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Bridges may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. System of levees may impact hydrologic and sediment transport, storage, quality of floodplain habitat and floodplain connection to habitat. rerouted/channelized creek bed may impact sediment transport, hydrologic regimes, habitat, erosion/bank stability, flow energy, and water quality/ temperature/ storage. Channel modification may impact hydrologic and sediment transport including: erosion/bank stability, flow energy, water quality, storage, habitat structure and transport and recruitment of organic material and sediment, floodplain connectivity and regimes, and incised channels	303(d) water temperature. Tidal and fish access to floodplain limited by road on west side and levee on east side. Water quality impacts due to agricultural and some rural/impervious development. Stream channelization. Degraded riparian areas	Roosevelt Elk Winter Range: Willapa herd, Columbia white-tailed deer, wintering waterfowl. Fall Chinook, chum, rainbow trout, cutthroat, coho, summer steelhead presence. Winter steelhead rearing.	Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection	Riparian forest replanting		funded/on-going
				Invasive species concerns					
EFC_SkamokawaCreek_08	Alluvium floodplain. Geomorphology consists of an Alluvium isolated surge plain wetland. Land cover on the south/east side of the river consists of a tree farm and diked scrub-shrub wetlands. There is a road on top of the levee and tidally influenced deciduous forests exist on the river side of the levee. On the north/west side of the levee, a mix of non-tidal herbaceous and coniferous wetlands and agriculture are dominant. Land use is dominated by agriculture including tree farms. constructed channel by the Corps	No levee on west side below west fork. Levees everywhere else on both sides of river. 1 tidegate on west side of river.	Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Bridges may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding.	Tidal and fish access to floodplain. Water quality impacts due to agricultural development. Stream Channelization.	Roosevelt Elk Winter Range: Willapa herd, Columbia white-tailed deer. Fall Chinook, chum, rainbow trout, cutthroat, coho, summer steelhead presence. Winter steelhead rearing	Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration			

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
EFC_SkamokawaCreek_09	Alluvium floodplain narrows on one side. Steep slopes on one side of the valley close in. . . Geomorphology consists of an Alluvium isolated surge plain wetland. Land cover on the east side of the river is a mix of diked and non-diked non-tidal wetlands (herbaceous, coniferous, deciduous, and scrub-shrub). on the river side of the levee, there is some tidally influenced herbaceous wetlands. On the west side, land cover consists of a mix of upland and non-tidal wetland coniferous and deciduous habitat. The east-side of the river consists of agriculture whereas the west side is undeveloped land. constructed channel.	Levee on east side of river. 1 tributary culvert.	Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Bridges may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding.	Water quality impacts due to agricultural development. Some riparian modifications on the east side of river. Straightened/channelized.	Roosevelt Elk Winter Range: Willapa herd, Columbia white-tailed deer, wintering waterfowl. Fall Chinook, chum, rainbow trout, cutthroat, coho, summer steelhead presence. Winter steelhead rearing	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration			

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
EFC_SkamokawaCreek_10	Alluvium floodplain continues to narrow before entering the Columbia River. Steep slopes on one side of the valley close in. . Geomorphology consists of an Alluvium isolated surge plain wetland. Land cover on both sides of the river is dominated by upland coniferous forests. On the east side, there is some non-tidal and diked coniferous forest wetland. Land use on the east-side of the river consists of government services, whereas the west side is designated open space.	Levee on east side of river. Some urban development. Tidegate protecting fairgrounds.	Urban development has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Bridges may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding.	Water quality impacts due to urban and agricultural development.	Roosevelt Elk Winter Range: Willapa herd, Columbia white-tailed deer. Fall Chinook, chum, rainbow trout, cutthroat, coho, summer steelhead presence. Winter steelhead rearing	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration			
EFC_SkamokawaCreek_11	Alluvium floodplain continues to narrow before entering the Columbia River. Steep slopes on one side of the valley close in. Geomorphology consists of an Alluvium isolated surge plain wetland. the mouth of Brooks Slough occurs in this reach as Skamokawa Creek enters the Columbia River. Land cover both sides of the river is dominated by developed open space and urban/impervious surface (town of Skamokawa). Land use dominated by single-family residential development and open space. Other land use types in the reach include retail, multi-family residential development and undeveloped land.	1 bridge. Dredge mat. Urban development. Levee in up river east side of reach. 16 docks (some of derelict). One possible over water structure.	Urban development has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Bridges may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding.	Water quality issues due to impervious urban development and upriver agricultural operations. 305b listing for exatoc and invasive species	Roosevelt Elk Winter Range: Willapa herd, Columbia white-tailed deer. Fall Chinook, chum, rainbow trout, cutthroat, coho, summer steelhead presence. Winter steelhead rearing	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration			
EFC_StandardsCreek_01	Tributary channel enclosed by steep slopes. Land cover consists coniferous and deciduous upland forests. Scrub-shrub habitat is also common. Land use is exclusively forestry.	Logging roads	Timber or forestry related uses may alter hydrology and sediment processes due to loss of vegetative cover.	Potential water quality issues from upland logging operations.	Roosevelt Elk Winter Range: Willapa herd. Rainbow trout, cutthroat and fall Chinook presence. Coho and winter steelhead spawning. Marbled murrelet	Conservation, Protection, Protection/Restoration			

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
EFC_WestForkElochoman_01	Channel enclosed by relatively steep canyons, headwater tributary to the Elochoman River.	Logging roads near/intersect this reach.	Timber or forestry related uses may alter hydrology and sediment processes due to loss of vegetative cover.	WQ impacts from upriver logging operations. 305b listing for temperature. mass wasting events from past logging practices	Summer steelhead, rainbow and cutthroat trout presence. Coho and winter steelhead spawning.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Development/Restoration	Protect intact riparian areas to buffer sediment inputs in upper reaches. Ensure that there is a source of LWD in the riparian areas to help mitigate sediment inputs into the stream system.	CREST	Concept
				logging roads impact channel morphology, sediment transport and fish passage issues			Correct barrier issues and improve roads	WDNR	Complete
EFC_WestForkSkamokawa_01	Relatively narrow tributary floodplain valley. Land cover is dominated by non-tidal herbaceous wetlands. Other land cover types include upland coniferous and deciduous forests, and herbaceous upland (on the west side of the tributary), and some areas of scrub-shrub wetland on the east side. The tributary is relatively small and contains tidally influenced wetlands from bank to bank. Land use is dominated by agricultural land. Other land uses consists of forestry land and small areas of multi and single family residential development toward the confluence of West Valley Creek. Parts of Highway 4 intersect this reach.	1 tidegate, 2 tributary culverts. Impervious road along east side of stream. Some rural development. Modified riparian area?	Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Bridges may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding.	Modified riparian area? Water quality impacts due to agricultural (grazing?). Unmaintained logging roads pose fish passage barriers and present sediment input issues	Roosevelt Elk Winter Range: Willapa herd. Chum, coho, cutthroat, rainbow and winter steelhead presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Development/Restoration	correct fish passage barrier and improve road	WDNR	Complete
EFC_WestForkSkamokawa_02	A tributary floodplain with a natural and constructed levee. Land cover is dominated a mixture of agriculture and non-tidal herbaceous wetlands. Other land cover types include a small area of upland coniferous forest near the creek, tidal herbaceous and deciduous forest wetlands, impervious surfaces (roads), and non-tidal scrub-shrub wetlands. Land use is dominated by agriculture.	Levee at lower reach, impervious road on east side. Riparian modifications (agriculture). 3 tidegates and 1 bridge crossing stream.	Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Bridges may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. System of levees may impact hydrologic and sediment transport, storage and floodplain habitat. Impervious surfaces in and around the shoreline(> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.	Tidal and fish access to floodplain limited by road on east side. Water quality impacts due to agricultural development. Unmaintained logging roads pose fish passage barriers and present sediment input issues	Roosevelt Elk Winter Range: Willapa herd, Columbia white-tailed deer, wintering waterfowl. Chum, coho, cutthroat, rainbow and winter steelhead presence.	Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration	correct fish passage barrier and improve road	WDNR	Complete

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
EFC_WestForkSkamokawa_03	A tributary floodplain with a constructed levee. Land cover is dominated by a mixture of agriculture and non-tidal herbaceous wetlands. Other land cover types include a small area of upland coniferous forest near the creek, tidal herbaceous and deciduous forest wetlands, impervious surfaces (roads), and non-tidal scrub-shrub wetlands. Land use is dominated by agriculture with a single-family residential development and farm structures at an hydrologically abandoned oxbow.	Impervious road on west side, levee on east side. 3 tidegates, 2 tributary culverts	Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Culverts and tidegates may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. System of levees may impact hydrologic and sediment transport, storage and floodplain habitat.	303(d) water temperature. Tidal and fish access to floodplain limited by road on west side and levee on east side. Water quality impacts due to agricultural development. Unmaintained logging roads pose fish passage barriers and present sediment input issues	Roosevelt Elk Winter Range: Willapa herd. Chum, coho, cutthroat, rainbow and winter steelhead presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration	correct fish passage barrier and improve road	WDNR	Complete
EFC_WestForkSkamokawa_04	A tributary floodplain with a natural and constructed levee. Land cover is dominated by agriculture. Other land cover types include developed open space, tidal and non-tidal coniferous wetland forest, tidal herbaceous, non-tidal deciduous forest wetlands, tree farm, non-tidal scrub-shrub, impervious surfaces (roads), and deciduous tidal wetland forests. Land use is dominated by agriculture.			303(d) water temperature. Tidal and fish access to floodplain limited by road on west side and levee on east side. Water quality impacts due to agricultural development	Roosevelt Elk Winter Range: Willapa herd, Columbia white-tailed deer, wintering waterfowl. Chum, coho, cutthroat, rainbow and winter steelhead presence.	Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration			
EFC_WestValleyCreek_01	A tributary of west fork Skamowkawa, in a tributary valley/floodplain. Relatively narrow tributary floodplain valley. Land cover is dominated a mixture of agriculture and upland herbaceous and deciduous habitat. , by non-tidal herbaceous wetlands. Other land cover types include impervious surfaces (roads), upland coniferous forest and non-tidal herbaceous wetlands. Land use is dominated by agriculture. Other land uses consist of small areas of single family residential (near the confluence) and undeveloped land.	1 tributary culvert, 1 bridge of stream. Impervious road, modified riparian areas (agriculture).	Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Bridges and culverts may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. System of levees may impact hydrologic and sediment transport, storage and floodplain habitat.	Degraded riparian buffer	Roosevelt Elk Winter Range: Willapa herd, Columbia white-tailed deer, wintering waterfowl. Rainbow trout, winter steelhead, coho presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration	improve riparian buffer to improve water quality, sediment input issues and erosion	WCD	Complete/Ongoing
				Unmaintained logging roads pose fish passage barriers and present sediment input issues			correct fish passage barrier and improve road.	WDNR	Complete
EFC_WilsonCreek_01	Tributary valley enclosed by steep slopes. Land cover is dominantly coniferous upland forests with some deciduous riparian habitat along the creek corridor. Land use is dominantly forestry.	Logging roads	Timber or forestry related uses may alter hydrology, water quality and sediment processes due to loss of vegetative cover.	Potential water quality issues from upland logging operations.	Roosevelt Elk Winter Range: Willapa herd, Columbia white-tailed deer, wintering waterfowl. Coho, rainbow trout, winter steelhead presence.	Conservation, Protection, Protection/Restoration			

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
EFC_WilsonCreek_02	Tributary valley enclosed by steep slopes. Land cover is dominantly deciduous and mixed coniferous upland forests. There is also many scrub-shrub upland habitat areas. Several logging roads intersect with this reach. Land use is dominantly forestry. There is also some vacation homes, single-family residential development and undeveloped land along the river, primarily on the north side.		Timber or forestry related uses may alter hydrology, water quality and sediment processes due to loss of vegetative cover.	Water quality impacts from forestry operations, impervious development (adjacent road), small rural development and logging roads.	Roosevelt Elk Winter Range: Willapa herd. Coho, rainbow trout, winter steelhead and fall Chinook presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Development/Restoration			
EFC_WilsonCreek_03	Tributary valley with small floodplain areas enclosed by steep slopes. Land cover is dominated by deciduous and coniferous upland forests. Some sand bars in the creek occur in this reach of the river. Land use is dominated by forestry.	1 tributary culvert. Logging roads.	Timber or forestry related uses may alter hydrology, water quality and sediment processes due to loss of vegetative cover.	303(d) water temperature. Water quality impacts from forestry operations and small scale agriculture.	Roosevelt Elk Winter Range: Willapa herd. Coho and winter steelhead spawning. Rainbow trout, cutthroat and fall Chinook presence. Reticulate sculpin.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Development/Restoration			
EFC_WilsonCreek_04	Tributary valley whose floodplain begins to open up from the steep slopes. Land cover is dominated by deciduous and coniferous upland forests and agriculture. Land use is a mixed bag of multi-family residential units, undeveloped land, forestry, agriculture and single-family residential development.	some modified riparian areas (agriculture), 1 tributary culvert, several tributary culverts under HWY.	Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Culverts may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding.	303(d) water temperature. Water quality impacts due to agricultural and some rural/impervious development. Implementation of septic system and agricultural BMPs, Sediment delivery issues, poor habitat quality, poor water quality conditions (temperature), bank instability contributing to sediment inputs, lack of habitat complexity	Roosevelt Elk Winter Range: Willapa herd. Coho, fall Chinook, chum, rainbow and cutthroat trout presence. Winter steelhead spawning. Reticulate sculpin.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Development/Restoration	Riparian revegetation and invasive species management, LWD placement instream and along banks to provide habitat and bank stability, utilization of agricultural BMPs	WCD	Planning/proposed for funding

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
EFC_WilsonCreek_05	Tributary valley floodplain. Land cover is dominated by agriculture/pasture. Other land cover types include non-tidal deciduous, coniferous and herbaceous wetlands. Land use includes forestry, agriculture, non commercial forested area and single-family residential development.	Modified riparian areas (agriculture). Tributary streams out of SMP jurisdiction pass through culverts in this reach.	Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Culverts may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding.	Water quality impacts due to agricultural and some rural/impervious development. Implementation of septic system and agricultural BMPs, Sediment delivery issues, poor habitat quality, poor water quality conditions (temperature), bank instability contributing to sediment inputs, lack of habitat complexity	Roosevelt Elk Winter Range: Willapa herd. Coho, fall Chinook, chum, rainbow and cutthroat trout presence. Winter steelhead spawning.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration	Riparian revegetation and invasive species management, LWD placement instream and along banks to provide habitat and bank stability, utilization of agricultural BMPs	WCD	Planning/proposed for funding
EFC_WilsonCreek_06	Tributary valley floodplain. Land cover in the upstream section of the reach, on the south side of the creek, is dominated by upland coniferous and deciduous forests. Agriculture is dominant throughout the reach. Other common land cover types include non-tidal herbaceous wetland, tidal herbaceous wetland immediately in and around the creek., impervious road development. Land use is dominated by agriculture and single-family residential development. Other land uses include forestry, undeveloped land, and multi-family residential development.	Levee in lower south side of stream. Impervious road intersects stream at a number of locations	Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Bridges and culverts may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding.	303(d) water temperature. Modified riparian areas (agriculture). Water quality impacts due to agricultural and some rural/impervious development. Implementation of septic system and agricultural BMPs, Sediment delivery issues, poor habitat quality, poor water quality conditions (temperature), bank instability contributing to sediment inputs, lack of habitat complexity	Roosevelt Elk Winter Range: Willapa herd. Coho, fall Chinook, chum, rainbow and cutthroat trout presence. Winter steelhead spawning.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration	Riparian revegetation and invasive species management, LWD placement instream and along banks to provide habitat and bank stability, utilization of agricultural BMPs	WCD	Planning/proposed for funding
GB_FossilCreek_01	Tributary headwater stream flowing into Grays River. Uplands are softer undulations than some of the other canyon areas on the Grays River containing. LWD present in this tributary. Land cover consists of coniferous and deciduous upland forests. Mixed forests and scrub-shrub land cover becomes more dominant towards the mouth of the tributary. Land use is dominated by forestry.	1 bridge crossing across stream	Timber or forestry related uses may alter hydrology, water quality and sediment processes due to loss of vegetative cover. Bridges and culverts may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding.	Water quality impacts from forestry practices upstream. Relatively presitine condition, some past mass wasting events, but has LWD, relatively mature riparian canopy.	Roosevelt Elk Winter Range: Willapa herd, wintering waterfowl. Coho and Rainbow Trout presence. Winter steelhead spawning.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration	Riparian revegetation and invasive species management, LWD placement instream and along banks to provide habitat and bank stability, utilization of agricultural BMPs	WCD	Planning/proposed for funding

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
GB_FossilCreek_02	Confluence of Fossil Creek. Creek exits the mountains and opens into a tributary valley (outside floodplain). Land cover is dominated by deciduous upland forests, but also contains large areas of altered herbaceous upland. Small areas of coniferous upland forests, tidal and non-tidal deciduous wetland forests. Some unimproved roads and single-family residential units with additional structures occur in the floodplain. Forestry and undeveloped land are also common in this reach.	Levee on south side of Creek.	System of levees may impact hydrologic and sediment transport, storage and floodplain habitat, surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.	Water quality impacts from forestry practices upriver/upland. Relatively presitine condition, some past mass wasting events, but has LWD, relatively mature riparian canopy.	Roosevelt Elk Winter Range: Willapa herd. Coho and Rainbow Trout presence. Winter steelhead spawning.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Protection, Development/Restoration			
GB_GraysRiver_01	Steep slopes enclose headwaters in steep forested canyon with no floodplain. Land cover dominated by coniferous, deciduous and scrub-shrub habitat. Land use is forestry.		Timber or forestry related uses may alter hydrology, water quality and sediment processes due to loss of vegetative cover.	Water quality impacts from upland forestry operations.	Roosevelt Elk Winter Range: Willapa herd. Resident cutthroat, Rainbow trout, Coho, fall Chinook, chum presence. Winter steelhead spawning. Marbled murrelet.	Conservation, Protection, Protection/Restoration	LWD placement (LCFEG - Complete), Riparian replanting/restoration (CREST - Concept), Land acquisition and land stewardship including invasive species removal and riparian planting (CLT - Complete/on-going), placement of wood to trap and stabilize sediment, placement of wood for habitat diversity, riparian restoration, reconnection of addition channels to allow stabilization of pool/riffle habitats while storing gravel on bars and islands.		
GB_GraysRiver_02	Steep slopes enclose headwaters in steep forested canyon. Channel bars are present in the river. Land cover dominated by coniferous, deciduous and scrub-shrub habitat. With the presence of a floodplain, woody and herbaceous wetlands are present. Land use is almost exclusively forestry with some medium and low intensity residential development.		Timber or forestry related uses may alter hydrology, water quality and sediment processes due to loss of vegetative cover.	Water quality impacts from upriver forestry operations.	Roosevelt Elk Winter Range: Willapa herd. Resident cutthroat, Rainbow trout, Coho, fall Chinook, chum presence. Winter steelhead spawning.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration	placement of woods along fossil creek road to deflect flows away from the roadway and stabilize sediment (CREST - Concept), Project design will create protected and stable groundwater fed off-channel chum spawning habitat and possible rearing habitat benefitting Coho, and steelhead juveniles (LCFEG - Funded/Design), reconnection of additional historic channels to allow the stabilization of pool/riffle habitats (CREST Concept)	Several Partners	Varying stages
GB_GraysRiver_03	Steep slopes open into a small floodplain area. Channel bars are present in the river. Land cover dominated by deciduous upland, sand and scrub-shrub and upland herbaceous habitat. With the presence of a floodplain, woody and herbaceous wetlands. Land use includes agricultural land primarily used as pasture and some small areas with medium and low intensity development residential development with some forestry.		Timber or forestry related uses may alter hydrology, water quality and sediment processes due to loss of vegetative cover. Riprap placement	Streambank erosion	Roosevelt Elk Winter Range: Willapa herd. Resident cutthroat, Rainbow trout, Coho, fall Chinook, chum presence. Winter steelhead spawning.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration			

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
GB_GraysRiver_04	Downstream of the West Fork of Grays River. Tributary valley outside the floodplain. Small pockets of tidally influenced herbaceous, deciduous and coniferous wetland habitat. Non-tidal scrub-shrub and deciduous wetlands are dominant. Deciduous upland forest is also common. Channel bars of bare sand are also present. Land uses include forestry and undeveloped wetland on the west side of the river and undeveloped land and low density residential development on the east side.	Levee on west side of river, partial levee on east side.	System of levees may impact hydrologic and sediment transport, storage and floodplain habitat, surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes.	Water quality impacts from upriver forestry. Streambank erosion. lack of instream complexity	Roosevelt Elk Winter Range: Willapa herd. Resident cutthroat, Rainbow trout, Coho, fall Chinook, chum presence. Winter steelhead spawning.	Conservation, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration	LWD placement to create pools	LCFEG	Complete
GB_GraysRiver_05	Tributary valley on the south side and small upper floodplain on the north side. Land cover is dominated by sandflats, agriculture (pasture) and non-tidal deciduous wetland habitat.	Partial levee on west side of river in the upper part of reach.	Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes.	303(d) and 305b water temperature. Riparian impacts from agriculture? Water quality impacts from development, forestry, and agriculture. Streambank erosion. Lack of in-strean habitat, bank instability, and degraded riparian zone	Roosevelt Elk Winter Range: Willapa herd. Resident cutthroat, Rainbow trout, Coho, fall Chinook, chum presence. Winter steelhead spawning.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration	riparian zone revegetation, bank stabilization and creation of instream habitat	WCD	In-progress

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
GB_GraysRiver_06	Tributary valley on the south side and tributary bench and steep slopes on the north side. Land cover is dominated by agriculture (pasture and row crop) and upland coniferous forest. There is also non-tidal herbaceous and deciduous wetland habitat, scrub-shrub upland and some tidal herbaceous wetland habitat. Land use is dominated by open space and undeveloped land. Single-family residential development also occurs in this reach.	1 overwater bridge, 1 tidagate. Partial levee on west side of river.	Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Bridges and tidegates may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding.	303(d) and 305b water temperature, water quality issues from impervious development, roads, agriculture and upriver/upland forestry. limited fish and tidal access to floodplain due to levee. Streambank erosion. River migration in this section has washed away vegetation creating water temperature and streambank stability issues. Eroding stream banks, particularly during high flows, chum salmon habitat loss, Water quality and lack of habitat complexity, degraded riparian areas, lack of in-stream cover, sediment deposition, Channel instability, Uniform channel habitat, lack of floodplain habitat	Roosevelt Elk Winter Range: Willapa herd. Resident cutthroat, Rainbow trout, Coho, fall Chinook, chum presence. Winter steelhead spawning.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration			

APPENDIX C Reach Priorities and Restoration Opportunities

<p>GB_GraysRiver_07</p>	<p>Tributary valley outside the floodplain that opens up to floodplains at the after the down river terminous of the reach. Steep slopes on the north side of the river. Land cover is dominated by agriculture/pasture and non-tidal herbaceous wetlands. Other land cover types include non-tidal deciduous wetland forests and deciduous upland forests. Tidal vegetation, primarily herbaceous exists immediately along the river. Some impervious surface development occurs on the south end of the river within the shoreline jurisdiction. Land use consists of open space (on the south side of the river), single-family residential development and undeveloped land on both sides of the river. Agriculture largely occurs on the south side of the reach, but some small operations occur on the north side. A historical covered bridge exists in this reach.</p>		<p>Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Bridges may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. System of levees may impact hydrologic and sediment transport, storage and floodplain habitat. Impervious surfaces in and around the shoreline(> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.</p>	<p>303(d) and 305b water temperature, water quality issues from impervious development, roads, agriculture and upriver/upland forestry. limited fish and tidal access to floodplain due to levee. Streambank erosion. River migration in this section has washed away vegetation creating water temperature and streambank stability issues. Eroding stream banks, particularly during high flows, chum salmon habitat loss, Water quality and lack of habitat complexity, degraded riparian areas, lack of in-stream cover, sediment deposition, Channel instability, Uniform channel habitat, lack of floodplain habitat .</p>	<p>Roosevelt Elk Winter Range: Willapa herd. Resident cutthroat, Rainbow trout, Coho, fall Chinook, chum presence. Winter steelhead spawning. Dun skipper.</p>	<p>Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration</p>	<p>Streambank protection, LWD placement (CLT - Complete/On-going), Assessment and prioritization of off-channel chum spawning sites (GRHED, WDFW - Complete), LWD placement rock vane installation i-hook vanes and riparian revegetation (GRHED - Complete),</p>		
<p>GB_GraysRiver_08</p>	<p>Natural leveed floodplain and floodplain bar and scroll primarily utilized for agriculture/pasture land. Reach also includes an area on the river that is unvegetated sand. Land cover throughout this reach is primarily agriculture/pasture. Other significant land cover includes non-tidal herbaceous and deciduous wetland forest. Other land cover types that characterize this reach includes urban/impervious areas, non-tidal scrub-shrub, deciduous and coniferous upland forests also occur along the river. immediately along the river, includes tidally influenced herbaceous and deciduous wetland forest. land use includes agriculture and pasture, includes a large agricultural operation (building structures surrounded by a levee) and some row crop production. Some single and multi-family residential units and designated forestry.</p>	<p>Partial levee on west side of river.</p>	<p>Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. System of levees may impact hydrologic and sediment transport, storage and floodplain habitat. Impervious surfaces in and around the shoreline(> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.</p>	<p>Impacts from heavy agriculture in the floodplain, forestry operations in uplands, and rural development on water quality. Fish/tidal access to the floodplain is limited due to levee and water control structures. Riparian buffer may be impaired. Streambank erosion. Eroding stream banks, particularly during high flows, chum salmon habitat loss, Water quality and lack of habitat complexity, degraded riparian areas, lack of in-stream cover, sediment deposition, Channel instability, Uniform channel habitat, lack of floodplain habitat.</p>	<p>Roosevelt Elk Winter Range: Willapa herd. Documented eulachon spawning area. Resident cutthroat, Rainbow trout, Coho, fall Chinook, chum presence. Winter steelhead spawning.</p>	<p>Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration</p>	<p>replanting/restoration (CLT - Proposed), LWD Placement in upstream reaches to control downstream deposition and to provide habitat diversity, bank protection and cover. (CREST/CLT - Proposed), Explore opportunities to open up floodplain areas to provide flood storage and off-channel habitat (CLT, CREST - Concept/Proposed)</p>	<p>Several Partners</p>	<p>Varying stages</p>

APPENDIX C Reach Priorities and Restoration Opportunities

<p>GB_GraysRiver_09</p>	<p>Natural leveed floodplain primarily utilized for agriculture/pasture land. The area surrounded by the Grays river and Hull Creek near its confluence forms a peninsula that is dominated by non-tidal herbaceous wetland. The upper river section of this reach, on the west side is characterized by a steep slopes. Land cover throughout this reach is primarily agriculture/pasture. Other significant land cover includes non-tidal herbaceous wetland and to a lesser extent, non-tidal deciduous wetland forest and deciduous upland forests. immediately along the river, includes tidally influenced herbaceous and deciduous wetland forest.</p>	<p>1 bridge crossing over tributary stream. 1 bridge crossing over the Grays River. Levee system for the majority of the reach on both sides of the river.</p>	<p>Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Bridges may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. System of levees may impact hydrologic and sediment transport, storage and floodplain habitat. Impervious surfaces in and around the shoreline(> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.</p>	<p>Impacts from heavy agriculture in the floodplain, forestry operations in uplands, and rural development on water quality. Fish/tidal access to the floodplain is limited due to levee and water control structures. Riparian buffer may be impaired. Streambank Erosion. Eroding stream banks, particularly during high flows, chum salmon habitat loss, Water quality and lack of habitat complexity, degraded riparian areas, lack of in-stream cover, sediment deposition, Channel instability, Uniform channel habitat, lack of floodplain habitat.</p>	<p>Roosevelt Elk Winter Range: Willapa herd. Documented eulachon spawning area. Winter steelhead rearing, Resident cutthroat, Rainbow trout, Coho, fall Chinook, chum presence.</p>	<p>Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration</p>
<p>GB_GraysRiver_10</p>	<p>Downstream of Hull Creek, geomorphology is characterized by alluvium floodplain dominated by agriculture on one side of the river. The other side is dominated by floodplain scroll cut off from the river by a natural levee. Agriculture is the dominant land use on this section as well. land cover consists primarily of agriculture, but non-tidal herbaceous and scrub-shrub wetland habitat are present. Upland deciduous, scrub-shrub and coniferous habitat are also present. While one side of the river is dominated by agriculture, the other side contains single and multi-family residential development, undeveloped land, and retail/restaurant development</p>	<p>4 culverts on west side of river to tributaries flowing into the Grays River. Levee on east side of river.</p>	<p>Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Bridges may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. System of levees may impact hydrologic and sediment transport, storage and floodplain habitat.</p>	<p>Water quality impacts from development, agriculture, upland forestry operations. Fish access to floodplain habitat limited by levee. Eroding stream banks, particularly during high flows, chum salmon habitat loss, Water quality and lack of habitat complexity, degraded riparian areas, lack of in-stream cover, sediment deposition, Channel instability, Uniform channel habitat, lack of floodplain habitat.</p>	<p>Roosevelt Elk Winter Range: Willapa herd. Documented eulachon spawning area. Resident cutthroat, Rainbow trout, Coho, fall Chinook, chum and winter steelhead presence.</p>	<p>Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Development/Restoration</p>

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
GB_GraysRiver_11	Natural levee-Floodplain scroll dominated by agriculture. Reach contains a channel bar dominated by tidal herbaceous wetlands. Reach also contains some perched herbaceous, scrub-shrub, and deciduous forested wetlands. Land cover also includes upland deciduous forest habitat. Land use includes agricultural production and open space.	2 culverts behind levee to tributaries of the Grays river. Levee system for the majority of the reach on both sides of the river.	Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes.	Impacts from heavy agriculture in the floodplain, forestry operations in uplands, and rural development on water quality. Fish/tidal access to the floodplain is limited due to levee and water control structures. poor instream habitat quality/complexity, lack of riparian zone, Bank erosion, sediment deposition.	Cavity nesting duck, Roosevelt Elk Winter Range: Willapa herd. Documented eulachon spawning area.	Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration	LWD placement on instream to provide habitat diversity and cover. Riparian replanting/restoration , LWD placement on banks. Channel regrade with the potential for LWD placement upstream to capture sediment.	CREST	Concept
				Threats from development and roads to limit the ability for the channel to naturally laterally migrate within the floodplain valley.			Channel migration zone easements	Tetrattech	Concept
				No flood storage areas			identify and pursue opportunities to provide river access to floodplain areas for flood storage and off-channel habitat	CLT, CREST	Concept
GB_GraysRiver_12	Natural levee-Floodplain scroll dominated by agriculture and bordered on both sides of the river by drained floodplain backswamp also utilized for agriculture. Reach contains small stretches of tidally influenced herbaceous wetland immediately adjacent to the river. Other land cover types within this reach include non-tidal herbaceous and coniferous wetland forest immediately along the river. Land cover also includes herbaceous and scrub-shrub upland habitat. Land use includes agricultural production and open space. Just downriver of the Altoona-Pillar Rock Road Bridge is a boat launch and Deep River community center. The land cover in this area is more diverse than the rest of the reach and includes tidal herbaceous and deciduous forests, non-tidal herbaceous deciduous and coniferous wetland forests resulting from the presence of drainage ditches. Upland deciduous forest habitat is also present in this area.	1 tidegate. Levee system for the majority of the reach on both sides of the river.	Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes.	Impacts from heavy agriculture in the floodplain, forestry operations in uplands, and rural development on water quality. Fish/tidal access to the floodplain is limited due to levee and water control structures. poor instream habitat quality/complexity, lack of riparian zone, Bank erosion, sediment deposition.	Cavity nesting duck, Roosevelt Elk Winter Range: Willapa herd. Documented eulachon spawning area.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration	LWD placement on instream to provide habitat diversity and cover. Riparian replanting/restoration , LWD placement on banks. Channel regrade with the potential for LWD placement upstream to capture sediment.	CREST	Concept
				Threats from development and roads to limit the ability for the channel to naturally laterally migrate within the floodplain valley.			Channel migration zone easements	Tetrattech	Concept
				No flood storage areas			identify to provide river access to floodplain areas	CLT, CREST	Concept

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
GB_GraysRiver_13	Reach is an upper floodplain protected by a natural levee on one side of the river. Adjacent to these this natural levee area is an undifferentiated flooded surge plain containing tidal mixed wetland vegetation that is dominantly herbaceous. The land on this side of the river is the terminus of Seal slough. the vegetation is affected by the tide with a few pockets of non-tidal herbaceous, scrub-shrub and mixed forest type wetland habitat. Scattered single-family residences and several structures exist in this reach along the Grays River. On the other side of the river is a diked floodplain backswamp modified for agricultural production. Land cover includes diked herbaceous, scrub-shrub and mixed forest wetland habitat. There is also a floodplain terrace that contains buildings adjacent to the shoreline boundary. Land uses on this side of the river include agriculture and forestry and some scattered single-family residential uses.	8 tidegates. Levee on both sides of the reach	Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Bridges may alter water/sediment transport. Impacts include effects to water velocity and development of habitat features (pools/riffles/gravel bars). If undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. System of levees may impact hydrologic and sediment transport, storage and floodplain habitat.	Limited tidal access to floodplain. Agriculture and up river development and forestry on water quality. Fish access to foraging habitat limited.	Cavity nesting ducks, Roosevelt Elk Winter Range: Willapa herd. Documented eulachon spawning area.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration			
GB_GraysRiver_14	altered alluvium tidal surge plain. Land cover is dominated by herbaceous tidal wetlands on the north side of the river and dike scrub-shrub wetlands on the south. Other vegetation types include coniferous and deciduous wetland tidal forests and diked coniferous and deciduous wetland forests. The location is part of a CLT wetland restoration (Grays River/Seal Slough) where sections of dikes and other water control structures have been removed. Land use is open space.	3 tidegates on east side of river. Levee on both sides of reach. 4 dike breaches on west side of levee	Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Culverts and tidegates. If culverts are undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. May also impact habitat accessibility and quality.	up river agriculture, development, and forestry impacts on water quality. degraded riparian areas, no flood storage areas or off-channel habitat, Disconnected floodplain, Threats from development and roads to limit the ability for the channel to naturally laterally migrate within the floodplain valley. Invasive Species, deposition of the fine sediment in the bay.	Winter waterfowl habitat, cavity nesting ducks, bald eagle feeding habitat, winter and spring shorebird habitat, Roosevelt Elk Winter Range: Willapa herd	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration			
GB_GraysRiver_15	Reach is on the west side of Kandoll Road. It is classified as upper flooded mixed wetland forest. Wetland areas immediately adjacent to the river are tidal, but most wetlands within the SMA boundary are non-tidal. tidally influenced coniferous wetland forests and scrub-shrub wetlands are dominant outside of SMA jurisdiction due to Seal Slough tidal channels infiltrating the area. Several larger pockets of tidal herbaceous vegetation form the center of this area. Non-tidal herbaceous, deciduous and scrub-shrub wetlands make up the area within the shoreline boundary along the river. Land use on this side of the river is classified as open space.	Levee on east side of reach. 2 tidegates on east side	Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Culverts and tidegates. If culverts are undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. May also impact habitat accessibility and quality.		Winter waterfowl habitat, cavity nesting ducks, bald eagle feeding habitat, winter and spring shorebird habitat, Roosevelt Elk Winter Range: Willapa herd	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration	Riparian replanting/restoration, particularly sitka spruce		

APPENDIX C Reach Priorities and Restoration Opportunities

<p>GB_GraysRiver_16</p>	<p>East side of the river below Seal Slough, is characterized by herbaceous, scrub-shrub and deciduous wetland forests behind a system of levees. the downriver section of the river on the west side begins to climb in elevation and is characterized by mixed upland forests. An unnamed slough terminates at a water control structure protecting agricultural land. Upper flooded surge plain surrounds the mouth of the unnamed slough and contains tidal mixed wetland forests. The west side of the river is characterized by upper flooded surge plain consisting of mixed wetland vegetation primarily tidal and non-tidal coniferous wetland forests. Land use on the east side of the river is characterized by agriculture, pastureland and single-family residential development. The west side of the river is characterized by open space. The entire western side of the river includes Columbia Land Trust property.</p>	<p>Levee on east side of reach. 3 tidegates on east side of reach. LD development immediately adjacent to the river. Dock and overwater structure on east side of reach</p>	<p>Piers, docks, or boat ramps may alter hydrologic/ sediment transport and shoreline habitat components (e.g., light, vegetation). May include impacts to: beach sediment size/ type/ abundance, flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification. Culverts and tidegates. If culverts are undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. May also impact habitat accessibility and quality. Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes.</p>	<p>degraded riparian areas, no flood storage areas or off-channel habitat, Disconnected floodplain, Threats from development and roads to limit the ability for the channel to naturally laterally migrate within the floodplain valley. Invasive Species, deposition of the fine sediment in the bay.</p>	<p>Winter waterfowl habitat, cavity nesting ducks, bald eagle feeding habitat, winter and spring shorebird habitat, Roosevelt Elk Winter Range: Willapa herd</p>	<p>Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration</p>	<p>particularly site specific veg communities (CLT - Concept), remove levees where appropriate to reconnect floodplains for flood storage and off-channel habitat (CLT - Concept), land acquisition, ditch filling to restore tidal function (CLT - Complete), Channel migration zone easements (Tetratich - Proposed), Continued vegetation management on properties already restored (CLT - on-going), Riparian restoration upriver to stabilize banks, levee removal in the lower reaches so during high flow events fine sediments will settle out in the floodplains and LWD where appropriate to trap sediment up river (CLT - Proposed).</p>	<p>Several Partners</p>	<p>Varying stages</p>
<p>GB_GraysRiver_17</p>	<p>Reach is characterized by an upper flooded surge plain on the west-side of the river and steep slopes on the east side. West side land cover consists of tidal coniferous wetland forests. On the east side, mixed upland forests characterize the land cover on the slopes and impervious road surface near the river. Land use on the east side includes forestry. On the west side, land use is classified as open space. The entire western side of the river is part of a Columbia Land Trust property.</p>	<p>1 culvert. Impervious roadway.</p>	<p>Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Culverts and tidegates. If culverts are undersized, impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. May also impact habitat accessibility and quality.</p>	<p>degraded riparian areas, no flood storage areas or off-channel habitat, Disconnected floodplain, Threats from development and roads to limit the ability for the channel to naturally laterally migrate within the floodplain valley. Invasive Species, deposition of the fine sediment in the bay.</p>	<p>Winter waterfowl habitat, cavity nesting ducks, bald eagle nesting habitat, sitka spruce swamp, winter and spring shorebird habitat, Roosevelt Elk Winter Range: Willapa herd</p>	<p>Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Protection, Development/Restoration</p>	<p>particularly site specific veg communities (CLT - Concept), remove levees where appropriate to reconnect floodplains for flood storage and off-channel habitat (CLT - Concept), land acquisition, ditch filling to restore tidal function (CLT - Complete), Channel migration zone easements (Tetratich - Proposed), Continued vegetation management on properties already restored (CLT - on-going), Riparian restoration upriver to stabilize banks, levee removal in the lower reaches so during high flow events fine sediments will settle out in the floodplains and LWD where appropriate to trap sediment up river (CLT - Proposed).</p>	<p>Several Partners</p>	<p>Varying stages</p>
<p>GB_GraysRiver_18</p>	<p>This reach includes the mouth of the Grays River. The entire reach has levees built on both sides of the river. Behind the levees on the west side, is upper flooded surge plain containing coniferous wetland forests and near the mouth (which is not diked) is herbaceous intertidal wetlands on both sides of the river. On the east side, is a drained wetland surge plain that is utilized for agriculture and pasture land. Agriculture is the dominant land cover but this side of the river also contains diked coniferous, and deciduous wetlands. Land use on both sides of the river is dominated by open space. On the east side there is some undeveloped and single-family residential development near the upriver terminus. Pastureland is prevalent in this reach. Reach includes Columbia Land Trust property on the west side of the river. It also includes a relatively large tract of an NRCS WRP conservation easement on private land that is adjacent to another Columbia Land Trust property.</p>	<p>Entire east side of river is leveed. Part of upper reach is leveed. Unidentified water control structure allowing tidal access to slough on west side of upper reach. Dike breach on west side upper reach. Tidegate in upper east side of reach.</p>	<p>System of levees may impact hydrologic and sediment transport, storage and floodplain habitat. Impervious surfaces in and around the shoreline (> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes.</p>	<p>degraded riparian areas, no flood storage areas or off-channel habitat, Disconnected floodplain, Threats from development and roads to limit the ability for the channel to naturally laterally migrate within the floodplain valley. Invasive Species, deposition of the fine sediment in the bay.</p>	<p>Winter waterfowl habitat, cavity nesting ducks, bald eagle feeding habitat, winter and spring shorebird habitat, Roosevelt Elk Winter Range: Willapa herd</p>	<p>Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration</p>	<p>particularly site specific veg communities (CLT - Concept), remove levees where appropriate to reconnect floodplains for flood storage and off-channel habitat (CLT - Concept), land acquisition, ditch filling to restore tidal function (CLT - Complete), Channel migration zone easements (Tetratich - Proposed), Continued vegetation management on properties already restored (CLT - on-going), Riparian restoration upriver to stabilize banks, levee removal in the lower reaches so during high flow events fine sediments will settle out in the floodplains and LWD where appropriate to trap sediment up river (CLT - Proposed).</p>	<p>Several Partners</p>	<p>Varying stages</p>

APPENDIX C Reach Priorities and Restoration Opportunities

GB_HullCreek_01	Headwater of hull creek is entrenched by narrowing canyons with steep slopes. Land cover/habitat consists of coniferous and deciduous upland habitat. Forestry is the common land use.		Timber or forestry related uses may alter hydrology and sediment processes due to loss of vegetative cover.	Water quality, erosion, sediment impacts from forest road construction and forestry practices.	Roosevelt Elk Winter Range: Willapa herd, Winter concentrations of dunlins, sanderlings, Western SA, ND Pipers, and gulls, Wintering waterfowl habitat for ducks, geese and swans, bald eagle feeding area, cavity nesting ducks. Resident Cutthroat, rainbow trout, coho presence. Winter steelhead spawning.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Development/Restoration			
GB_HullCreek_02	Creek carves out its path through steep slopes forming narrow upper floodplains. Land cover is dominated by upland coniferous and deciduous forests, but also contains some herbaceous upland habitat. Near the channel, non-tidal deciduous and scrub-shrub wetland habitat is present. Agriculture dominates land cover in the floodplain. Land use is characterized by forestry practices and agriculture.	1 bridge crossing	Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.	Water quality impacts from agriculture and upland/upriver forestry operations. channel morphology has changed due to agriculture and rural development. degraded riparian areas Bank instability Threats from development and roads to limit the ability for the channel to naturally laterally migrate within the floodplain valley.	Roosevelt Elk Winter Range: Willapa herd. Resident Cutthroat, rainbow trout, fall Chinook, coho presence. Winter steelhead spawning. Reticulate sculpin	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Development/Restoration	Opportunities to provide side channel habitat and the ability for channels to migrate within its floodplain Riparian replanting/restoration LWD for short-term bank stability Channel migration zone easements	CREST CLT CLT Tetrattech	Concept Proposed Proposed Concept

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
GB_KlntsCreek_01	Headwaters enclosed by steep slopes. Small enclosed floodplain. Highway 4 follows the creek above on a river terrace. Land cover is dominated by deciduous non-tidal wetland and deciduous upland forests. Other land cover types include scrub-shrub non-tidal wetland and upland habitat as well as coniferous upland habitat. Land use is forestry and some undeveloped land.		Timber or forestry related uses may alter hydrology, water quality and sediment processes due to loss of vegetative cover. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.	Eroding stream banks, degraded riparian areas	Roosevelt Elk Winter Range: Willapa herd. Resident cutthroat, rainbow trout, coho presence. Winter steelhead spawning.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Development/Restoration			
GB_KlntsCreek_02	Creek opens up into a tributary valley. Land cover is dominated by Coniferous upland forest particularly on the south side of the creek. On the north side and on the down river section of the reach, developed open space and non-tidal herbaceous wetland. Other land cover types include deciduous upland forests and scrub-shrub upland. Land use is dominated by agriculture (pasture and row crop), forestry, and single-family residential development.		Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.	Eroding stream banks, degraded riparian areas	Roosevelt Elk Winter Range: Willapa herd. Resident cutthroat, rainbow trout, coho presence. Winter steelhead spawning.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection	Streambank protection, LWD placement, Riparian replanting/restoration	CLT	Proposed
GB_KlntsCreek_03	Tributary valley with wooded riparian corridors surrounded by pasture and other types of agriculture. Dominant land cover includes agriculture, and herbaceous non-tidal wetlands. Other land cover types include deciduous and scrub-shrub non-tidal wetlands, deciduous upland forests, and tidal herbaceous wetlands. Land use includes open space and undeveloped land.		Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes.	Eroding stream banks, degraded riparian areas	Roosevelt Elk Winter Range: Willapa herd. Resident cutthroat, rainbow trout, fall Chinook, coho presence. Winter steelhead spawning.	Highest Protection, Restoration/Development, Protection/Restoration, Protection			
GB_SealCreek_01	Seal Creek is considered an upper flooded surge plain with mixed wetland vegetation and a drained wetland on the upper terminus on the east side of a water structure. On the east side of the slough, land cover is dominated by agricultural production and pasture land. Land use is dominated by agriculture and single-family residential development. West of the water structure, tidal deciduous and coniferous wetland and upland forests are dominant. On the west side of Seal Creek, tidal deciduous wetland forests are dominant. Land use in this area is undeveloped land, directly adjacent to agricultural and single-family development	2 tidegates and a levee dividing the floodplain of the stream from the main channel of the slough	Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Impervious surfaces > 10% may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.	up stream agriculture, forestry and road development on water quality	Roosevelt Elk Winter Range: Willapa herd. Winter steelhead, coho, rainbow trout presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration			
GB_SealSlough_01	Reach is the upper channel extent of Seal Slough. The reach is an undifferentiated flooded surge plain containing tidal mixed wetland vegetation that is dominantly herbaceous and non-tidal coniferous forest. The vegetation is affected by the tide surrounding the upper terminus of the slough. The reach is designated as open space on one side of the slough and on the other is single-family residential and undeveloped land behind a levee.	Levee on both sides of reach moving up river until the road crossing. Rock reinforced shoreline at road crossing. 6 tidegates and 1 culvert (under roadway crossing). Riprap armoring	None noted	Upper river agriculture and development impacts on water quality. Fish access to floodplain habitat limited. Degraded riparian areas	Winter waterfowl habitat, cavity nesting ducks, bald eagle feeding habitat, winter and spring shorebird habitat, Roosevelt Elk Winter Range: Willapa herd. Winter steelhead, Rainbow trout, coho, fall Chinook presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection	Riparian replanting/restoration	CLT	Complete/on-going
				Degraded floodplain conditions			Floodplain replanting/restoration	CLT	Complete/on-going
				Disconnected floodplain			Reconnection to Seal Slough/Grays River	CLT	Completed

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
GB_SealSlough_02	Reach is dominated by upper floodplain containing mixed wetland vegetation. Near the mouth of Seal Slough, lower and undifferentiated floodplain are also present. Land cover varies in this reach. Towards the upstream terminous on the south side of the slough, tidal coniferous wetland forests are dominant, this changes to tidal and non-tidal herbaceous and deciduous wetland being dominant as the water flows towards the mouth of the slough. Open space is the dominant open space. On the north side of the slough, on the east side of Seal Creek, tidal coniferous wetland forests are dominant. On the west side of Seal Creek, pasture, agricultural and tidal herbaceous wetlands are dominant. Land uses in this section of the reach is single-family residential and agriculture.	Levee on west side of reach protecting rural development and agriculture. Dock on east side lower reach. 5 tidegates on east side of reach.	Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes.	Water quality from agricultural operations and development. Nutrient and sediment transport capabilities and access to floodplain due to levee and water control structures. Fish access to floodplains	Winter waterfowl habitat, cavity nesting ducks, bald eagle feeding habitat, winter and spring shorebird habitat, Roosevelt Elk Winter Range: Willapa herd. Winter steelhead, Rainbow trout, coho, fall Chinook presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration	Riparian replanting/restoration	CLT	Complete/ongoing
GB_SouthForKGrays_01	Minimal floodplain, enclosed in relatively steep valley in Willapa Hills. Steep cliff faces, lots of downed wood opportunities. Land cover is dominated by secondary growth coniferous forests and some deciduous riparian forests along the banks of the river. Logging roads and bridges cross and meander around the river. Land use is dominated by forestry.	Logging roads and logging operations immediately adjacent to SMP jurisdiction	Timber or forestry related uses may alter hydrology, water quality and sediment processes due to loss of vegetative cover. Major contributor of sediment into the mainstem	Water Quality impacts from upstream/upland forestry operations. Access to fish habitat maybe inhibited by downstream development. Fish habitat quality may be affected by forestry practices.	Winter waterfowl habitat, cavity nesting ducks, bald eagle feeding habitat, winter and spring shorebird habitat, Roosevelt Elk Winter Range: Willapa herd. Rainbow trout, winter steelhead, coho, resident cutthroat trout presence. Marbeled murrelet, Columbia torrent salamander, Cope's Giant Salamander, Tailed frog, Van dyke's salamander	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Development/Restoration	LWD placement in this reach as well as lower in the system (in Pacific County) to trap sediment and establish stable bars and islands	CREST	Concept
							Utilize regulatory mechanisms to maximize riparian buffer benefits	CREST	Concept
GB_WestForKGrays_01	Sloping terrain enclose river benches and tributary valleys (outside floodplain). Large woody debris is abundant in this section of the river. Land cover consists of deciduous non-tidal wetlands and scrub-shrub upland and non-tidal wetlands. Small patches of coniferous and mixed forest wetlands and uplands also occur. A fish hatchery exists just north of the County boundary. Forestry is the dominant land use in this reach.		Timber or forestry related uses may alter hydrology, water quality and sediment processes due to loss of vegetative cover.	High depth to width ratios, lack of habitat complexity, sediment deposition	Roosevelt Elk Winter Range: Willapa herd. Very important and productive chum spawning area. Coho, winter steelhead, fall Chinook spawning. Rainbow trout, resident cutthroat presence. Marbled murrelet.	Conservation, Protection/Restoration, Protection, Highest Protection,	Some existing LWD placement, could use more in some places	CREST	Some existing LWD placement
				Lack of off-channel habitat			Project design will create protected and stable groundwater fed off-channel chum spawning habitat and possible rearing habitat benefitting Coho, and steelhead juveniles	LCFEG	Funded, Design
				Degraded riparian areas			Riparian restoration	CLT	Proposed

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status		
GB_WestFor kGrays_02	Reach extends to the confluence with the Grays River. River is enclosed by upper floodplains and tributary benches. Dominant land cover includes deciduous upland forests and non-tidal deciduous wetland forests. Other land cover types include tidal deciduous wetland forests, herbaceous tidal wetlands, herbaceous uplands and some coniferous upland. Dominant land use includes forestry. Other land uses includes single family residential, open space and undeveloped land.	Levee on both sides of river	Timber or forestry related uses may alter hydrology, water quality and sediment processes due to loss of vegetative cover. System of levees may impact hydrologic and sediment transport, storage and floodplain habitat. Impervious surfaces in and around the shoreline(> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.	High depth to width ratios, lack of habitat complexity, sediment deposition	Roosevelt Elk Winter Range: Willapa herd. Very important and productive chum spawning area. Coho, winter steelhead, fall Chinook spawning. Rainbow trout, resident cutthroat presence.	Conservation, Protection/Restoration, Protection, Highest Protection	Some existing LWD placement, could use more in some places	CREST	Some existing LWD placement		
				Lack of off-channel habitat			Project design will create protected and stable groundwater fed off-channel chum spawning habitat and possible rearing habitat benefitting Coho, and steelhead juveniles			LCFEG	Funded, Design
				Degraded riparian areas			Riparian restoration			CLT	Proposed
GFC_MillCreek_01	Floodplain is small to non-existent as the creek is enclosed by steep slopes. On the slopes, land cover is dominated by coniferous upland forests. Within the tributary valley, mixed deciduous wetland forests are dominant. Some upland deciduous and scrub-shrub habitat are also present. Land use is dominantly forestry.	Logging roads and logging operations immediately adjacent to SMP jurisdiction	Timber or forestry related uses may alter hydrology, water quality and sediment processes due to loss of vegetative cover.	WQ impacts from upriver and adjacent logging operations. Riparian areas largely intact and maturing in reaches within Wahkiakum County.	Roosevelt Elk Winter Range: Willapa herd. Fall chinook, coho, rainbow trout, winter steelhead presence. Dunn's salamander.	Conservation, Protection/Restoration, Protection, Development/Restoration	Protect maturing and intact riparian areas	LCFRB	Concept		
				Lack of LWD in some places limit habitat complexity			LWD placement in-stream			LCFRB	Concept
				logging road maintenance needs and fish passage barriers			correct fish passage barrier and improved road			WDNR	several projects completed, on-going
GFC_SouthForkMill_01	Floodplain is small to non-existent as the creek is enclosed by steep slopes. On the slopes, land cover is dominated by coniferous upland forests. Within the tributary valley, mixed deciduous/coniferous wetland forests are dominant. Some upland deciduous and scrub-shrub habitat are also present. Land use is dominantly forestry.		Timber or forestry related uses may alter hydrology, water quality and sediment processes due to loss of vegetative cover.	WQ impacts from upriver and adjacent logging operations. logging road maintenance needs and fish passage barriers.	Roosevelt Elk Winter Range: Willapa herd. Fall Chinook, coho, rainbow trout, winter steelhead.	Conservation, Protection/Restoration	correct fish passage barrier and improved road	WDNR	several projects completed, on-going		

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
NW_Naselle_01	Open space land classified under chapter 84.34 RCW, land cover includes woody wetlands, coniferous forests, shrub scrub and some small patches of deciduous forests, presence of logging roads and fairly recent logging activity, section of the river is higher up in the watershed in entrenched by fairly steep upland slopes.	Degraded Riparian Areas	Timber or forestry related uses may alter hydrology, water quality and sediment processes due to loss of vegetative cover. Impervious surfaces in and around the shoreline(> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.	Nearby forestry practices effects on water quality	Roosevelt Elk Winter Range: Willapa herd, palustrine wetland habitat, Fall Chinook, Chum, Winter Steelhead, Coho Spawning habitat. Resident Cutthroat.	Conservation, Restoration, Protection/Restoration, Protection, Highest Protection, Development/Restoration	Riparian planting/restoration	LCFRB, CREST	Concept
NW_Naselle_02	Habitat is classified as westside lowlands Conifer-hardwood forests, River is less entrenched and opens into a floodplain that largely consists of multiple unit and single-family development/farms. North side of the river is largely undeveloped land and forestry land.	Deposition from upstream sources	Timber or forestry related uses may alter hydrology, water quality and sediment processes due to loss of vegetative cover. Impervious surfaces in and around the shoreline(> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes.	Nearby agricultural operations and forestry practices effects on erosion, nutrient transport and water quality	Roosevelt Elk Winter Range: Willapa herd, Fall Chinook, Chum, Winter Steelhead, Coho Spawning habitat. Resident Cutthroat.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration	upstream LWD	LCFRB, CREST	Concept
NW_Salmon Creek_01	Classified under NLCD as westside lowlands Conifer-hardwood forest habitat. floodplain is more apparent as you move downstream. Land cover includes hay and pasture fields, developed open space, woody wetland areas, scrub-shrub habitat and mixed conifer/deciduous forests. Largely dominated by scrub-shrub habitat and hay/pasture fields. Several subdivided properties with mostly single-family units on site. Agriculture and forestry are primary land uses	Degraded riparian area	Timber or forestry related uses may alter hydrology, water quality and sediment processes due to loss of vegetative cover. Impervious surfaces in and around the shoreline(> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes.	Nearby agricultural operations and forestry practices effects on water quality	Roosevelt Elk Winter Range: Willapa herd, Fall Chinook, Chum, Winter Steelhead, Coho Spawning habitat. Resident Cutthroat.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration	Riparian planting/restoration	LCFRB, CREST	Concept

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
NW_Salmon Creek_02	This reach is classified as westside lowlands Conifer-hardwood forest habitat. Land cover includes woody wetland areas, scrub-shrub habitat, upland deciduous forest, developed open space, and emergent herbaceous wetlands within the floodplain areas an upper headwater narrow floodplain that widens as the creek flows down the watershed. This reach contains a variety of land uses include forestry and agriculture (dairy, hay and pasture). Single-Family unit homes are found dotted along this reach. This reach also contains several subdivided properties utilized for ranchette properties. Riparian areas are minimized and forests have been cleared to provide agricultural opportunities within the Shoreline jurisdiction	Degraded riparian area	Timber or forestry related uses may alter hydrology, water quality and sediment processes due to loss of vegetative cover. Impervious surfaces in and around the shoreline (> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes.	Agriculture and nearby forestry practices and impervious development impacts on water quality,	Roosevelt Elk Winter Range: Willapa herd	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration	Riparian planting/restoration	LCFRB, CREST	Concept
NW_Salmon Creek_03	Westside lowlands conifer-hardwood forest habitat sill containing significant riparian and surrounding shrub-scrub and forest land. Woody wetlands are also prevalent along the creek. Several small clearcuts exist within and around this reach. Larger taxlots prevalent in this reach	Degraded riparian area	Timber or forestry related uses may alter hydrology, water quality and sediment processes due to loss of vegetative cover. Impervious surfaces in and around the shoreline (> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes.	Up river forestry and agricultural operations effects on water quality	Roosevelt Elk Winter Range: Willapa herd	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Protection, Development/Restoration	Riparian planting/restoration	LCFRB, CREST	Concept
WFC_ArtificialPath_02	Surge plain wetland restricted by tidegates and culverts. Road crossing over tidal channel. Land use is considered agricultural with some adjacent single-family dwelling units. On the west side of the road, the land use is considered forestry. Land cover is primarily agriculture with some diked herbaceous scrub-shrub habitat. Diked wetland deciduous forest on north side of channel.	2 tidegates and 1 culvert	Impervious surfaces in and around the shoreline (> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Tidegate impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. May also impact habitat accessibility and quality.		Roosevelt Elk Winter Range: Willapa herd	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration			

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
WFC_CrookedCreek_01	Upriver terminous of the floodplain. Floodplain enclosed by steep slopes. Land cover is characterized by scrub-shrub habitat, deciduous forests, and upland coniferous forests. Land use is characterized by undeveloped land, some of which is in agricultural production and single-family residential development.		Timber or forestry related uses may alter hydrology, water quality and sediment processes due to loss of vegetative cover.	Water quality impacts from upriver forestry operations/practices. Narrow steep areas are moderately susceptible to landslide hazards	Roosevelt Elk Winter Range: Willapa herd. Rainbow trout, winter steelhead, coho, resident cutthroat trout present	Conservation, Protection/Restoration, Protection			
WFC_CrookedCreek_02	Floodplain enclosed by steep slopes. Land cover consists of deciduous, scrub-shrub and herbaceous wetland habitat, deciduous, coniferous and herbaceous upland habitat. Land use is characterized by pasture and agricultural land (dominant), single-family unit residential, forestry land and undeveloped land. Closer to the mouth of Deep River, as the floodplain gets bigger, agricultural and pasture land becomes more and more prevalent.	1 tidegates, 8 culverts, 1 bridge across stream. Levee failure	Timber or forestry related uses may alter hydrology, water quality and sediment processes due to loss of vegetative cover. Impervious surfaces in and around the shoreline(> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. Tidegate and bridge impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. May also impact habitat accessibility and quality.	303(d) water temperature. Water quality impacts from adjacent agriculture and upland/upstream forestry practices. Small valley with moderate landslide susceptibility on both sides.	Roosevelt Elk Winter Range: Willapa herd. Rainbow trout, fall Chinook, winter steelhead, coho, resident cutthroat trout present. Hydaspe fritillary.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration	Levee removal	CLT	Concept
		No creek access to floodplain							
		Fish passage barrier and road contributing runoff/sediment					Culvert replacement and road repairs	WDNR	Complete
		Culvert that presents low flow barrier and is undersized during high flow. At milepost 3.1					Culvert replacement with box culvert or short span bridge	Wahkiakum County	Concept
		altered floodplain hydraulics (ditches)					fill ditches and open access to historic tidal channels	CLT	Concept
		altered hydraulics and potential fish passage barriers					Remove culvers, bridges, and earthen levees that create fish passage barriers and result in changes in the hydraulics	CREST	Concept
Degraded riparian areas	Riparian replanting/restoration	CLT	Concept						

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
WFC_CrookedCreek_03	Floodplain enclosed by steep slopes. At the mouth of Deep River, non-tidal coniferous wetland habitat is the dominant land cover type with pockets of herbaceous non-tidal and diked wetland habitats.	1 bridge crossing the river. 1 tidegate at upriver most section of the reach.	Impervious surfaces in and around the shoreline (> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Tidegate and bridge impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. May also impact habitat accessibility and quality. System of levees may impact hydrologic and sediment transport, storage and floodplain habitat. Impervious surfaces in and around the shoreline (> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.	water quality impacts from up river agriculture and forestry practices	Roosevelt Elk Winter Range: Willapa herd. Rainbow trout, fall Chinook, winter steelhead, coho, resident cutthroat trout present	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration			
WFC_DeepRiver_01	Tributary Valleys flow into surge plain wetlands surrounded by steep slopes. These slopes consist of mixed conifer and deciduous forests. Habitat in the upper reach is considered westside lowland conifer-hardwood forests and the lower portion of the reach is considered westside riparian wetlands. Landcover consists of non-tidal or diked herbaceous wetlands. The tributary valleys contain agricultural operations in the upper reach. The lower portion of this reach is also utilized as agriculture. open space in the floodplain is largely utilize for agriculture and some single-family units.	Channel Straightening	Impervious surfaces in and around the shoreline (> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Culvert impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. May also impact habitat accessibility and quality. System of levees may impact hydrologic and sediment transport, storage and floodplain habitat. Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes.	Agricultural influence, potential water quality, channel straightening. 305b listing for temperature	Roosevelt Elk Winter Range: Willapa herd, Rainbow Trout, Winter Steelhead, Coho presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration	stream realignment to historic channel morphology, habitat complexity and bank stability via LWD placement	CREST	Concept
		1 culvert under road. Undersized culvert/Fish passage barriers. One near Deep River Cemetery Rd and the other near Miles post 1.9	Impervious surfaces in and around the shoreline (> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. System of levees may impact hydrologic and sediment transport, storage and floodplain habitat. Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes.				remove/replace undersized culverts and the other upstream structure that prevents fish passage	Wahkiakum County, CREST	Proposed
WFC_DeepRiver_02	Floodplain wetlands surrounded by steep slopes. Habitat is considered Westside Riparian-Wetlands. Slopes consist of mixed conifer and deciduous forests. The lower portion of this reach is also utilized as agriculture. Dominant Land cover consists of herbaceous diked wetlands along with some scrub-shrub and deciduous non-tidal wetland forest. Land use consists of single-family residential units, designated forest land, and farmed/undeveloped areas.	Fish passage barrier, undersized and failing culvert on Wirkkala Rd.	Impervious surfaces in and around the shoreline (> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. System of levees may impact hydrologic and sediment transport, storage and floodplain habitat. Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes.	Valley surrounded by areas of moderate landslide susceptibility	Wintering waterfowl habitat, cavity nesting desk, winter and spring shorebird area, bald eagle feeding area, Roosevelt Elk Winter Range: Willapa herd	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration	Replace Culvert, prevent beaver from blocking the culvert	Wahkiakum County	Proposed

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
WFC_DeepRiver_03	Wetland floodplain where the steep slopes are spreading out and broadening. Habitat is considered westside riparian-wetlands. Area is dominated by diked herbaceous wetlands with some patches of non-tidal coniferous wetland forest. Land cover is dominated by diked herbaceous wetlands. Scrub-shrub wetlands are also present. SMA jurisdiction covers some of the landscape on the slopes, which consists of mixed coniferous and deciduous hardwood forests. This section is affected by a water control structure downriver that restricts tidal flow upriver as well as falluival flow downriver. This reach is dominated by forest practices and open space traditionally utilized for pasture. Some land on both sides of the river are owned by the Oregon Dept. of Natural Resources for multiple use i.e. resource extraction and other uses.	3 culverts	Impervious surfaces in and around the shoreline (> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Culvert impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. May also impact habitat accessibility and quality. System of levees may impact hydrologic and sediment transport, storage and floodplain habitat. Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes.	Degraded riparian area, water quality issues from agricultural practices?. Valley surrounded by areas of moderate landslide susceptibility	Wintering waterfowl habitat, cavity nesting desk, winter and spring shorebird area, bald eagle feeding area, Roosevelt Elk Winter Range: Willapa herd	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration			
WFC_DeepRiver_04	This reach contains filled areas/water control structure where A road crosses the river over the structure. The section of the reach up river of the road crossing is considered isolated and drained wetlands along with developed floodplain conditions. Habitat consists of westside riparian wetlands. Dominant land cover types above the sturcutre include agriculture and diked herbaceous wetlands. The other side of the road structure has wider deeper channels and is dominated by tidal and nontidal deciduous wetland forests and upland and wetland coniferous forests. Dominant land uses include undeveloped land, single-family residential units and forestry.	Derelict vessel(s)	Impervious surfaces in and around the shoreline(> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Culvert, tidegate and bridge impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. May also impact habitat accessibility and quality. System of levees may impact hydrologic and sediment transport, storage and floodplain habitat. Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. System of levees may impact hydrologic and sediment transport, storage and floodplain habitat.	Areas of moderate landslide susceptibility	Wintering waterfowl habitat, cavity nesting desk, winter and spring shorebird area, bald eagle feeding area, Roosevelt Elk Winter Range: Willapa herd, Fall Chinook, Winter steelhead, Chum, Rainbow Trout, Resident Cutthroat, Coho.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration	Work with the DNR derelict vessel removal program to dismantle and remove derelict vessel	DNR, SAC, WDFW	Concept
		2 tidegates, 2 culverts, 1 bridge, 2 overwater sturctures and 2 docks. Levee in lower reach of the river on the west side. Lack of hydraulic connectivity, lack of foodweb connection, lack of floodplain access, fish passage barrier					replace tidegate structures with side hinged	CREST	Concept
		Fish passage barrier					DNR Road improvement/culvert replacement	WDNR	Complete

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
WFC_DeepRiver_05	<p>This reach contains filled areas/water control structure where A road crosses the river over the structure. The section of the reach up river of the road crossing is considered isolated and drained wetlands along with developed floodplain conditions. Habitat consists of westside riparian wetlands. Dominant land cover types above the structure include agriculture and diked herbaceous wetlands. The other side of the road structure has wider deeper channels and is dominated by tidal and nontidal deciduous wetland forests and upland and wetland coniferous forests. Dominant land uses include undeveloped land, single-family residential units and forestry.</p>	Hydraulic and floodplain connectivity, fish passage					culvert and tidegate replacement	CREST	Concept
		Degraded riparian areas					riparian planting/restoration	CREST	Concept
WFC_DeepRiver_06	<p>This section includes the Deep River main channel characterized by diked wetland floodplains on both sides. Downriver section of this reach includes tidally influenced mixed wetland vegetation. Historical habitat includes tidally influenced westside riparian herbaceous and scrub-shrub wetland habitat that is now diked. A delapidated houseboat exists in the upper section of the reach near Wilme Slough. The diked section creates elevations above historical habitat types creating a sustained conifer and deciduous upland forest habitat on sections of the levee. The dominant land cover type is agriculture/pasture land. Land use consists of single-family residential units, undeveloped agricultural land and open space that is largely either formerly utilized for agriculture or still is. Private boat docks occur in this reach</p>	5 tidegates, 2 culverts, most of both sides of the river is leveed. Dock and pilings at the down river section of the reach. 1 overwater structure in upper reach. Lack of hydraulic and floodplain connectivity, water quality degradation fish passage (Several locations)	<p>Impervious surfaces in and around the shoreline(> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. Culvert, tidegate and bridge impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. May also impact habitat accessibility and quality. System of levees may impact hydrologic and sediment transport, storage and floodplain habitat. Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. System of levees may impact hydrologic and sediment transport, storage and floodplain habitat. Piers, docks, or boat ramps may alter hydrologic/ sediment transport and shoreline habitat components (e.g., light, vegetation). May include impacts to: beach sediment size/ type/ abundance, flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification.</p>	Some areas of low landslide hazard potential	<p>Wintering waterfowl habitat, cavity nesting duck, winter and spring shorebird area, bald eagle feeding area, Roosevelt Elk Winter Range: Willapa herd</p>	<p>Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration</p>	remove/replace culverts/tidegates	CREST	Concept
		Channel disconnection					remove barrier and replace with culvert/tidegate	CREST	Concept

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
WFC_DeepRiver_07	Reach is characterized by historical tidally influence wetlands, converted to agriculture behind a system of levees and cover can be characterized by coniferous non-wetland forests and agricultural/pastureland. Land uses are characterized by undeveloped/agricultural land, resource production which includes deep river net pens, single-family residential units and a lumber production facility that includes over water structures.	Fish net pens, log processing, low, med, high density pile field, dike breach in lower part of river, most of east side of river is leveed, boat dock. Tidegate and possible failed culvert	Impervious surfaces in and around the shoreline (> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. System of levees may impact hydrologic and sediment transport, storage and floodplain habitat. Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/ temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes. System of levees may impact hydrologic and sediment transport, storage and floodplain habitat. Piers, docks, or boat ramps may alter hydrologic/ sediment transport and shoreline habitat components (e.g., light, vegetation). May include impacts to: beach sediment size/ type/ abundance, flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification. Aquaculture may result in altered sediment transport, hydrologic regimes and habitat.	Fish net pens	Wintering waterfowl habitat, cavity nesting duck, winter and spring shorebird area, bald eagle feeding area, Roosevelt Elk Winter Range: Willapa herd, Fall Chinook, Winter steelhead, Chum, Rainbow Trout, Resident Cutthroat, Coho presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration	remove barrier and replace with culvert/tidegate	CREST	Concept
		Limited access to floodplain					more levee breaches on CLT floodplain to increase fish access		
WFC_DeepRiver_08	Reach is characterized by mixed wetland forests on undifferentiated floodplains separated from the river by a system of levees. Habitat in this reach is considered westside riparian-wetlands and conifer-hardwood forest. Land cover is characterized by tidal and non-tidal coniferous wetland forests, scrub-shrub wetland habitat and developed open space and upland coniferous forests. One side of this reach is entirely forestry, while the other side is single-family and multi-family residential units	2 tide gates, system of levees on the west side and lower east side of the river. 2 dike potential dike breaches, docks and mooring boats, medium density pilings	Impervious surfaces in and around the shoreline (> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. System of levees may impact hydrologic and sediment transport, storage and floodplain habitat. Piers, docks, or boat ramps may alter hydrologic/ sediment transport and shoreline habitat components (e.g., light, vegetation). May include impacts to: beach sediment size/ type/ abundance, flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification. Culvert, tidegate and bridge impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. May also impact habitat accessibility and quality.		Winter waterfowl habitat, cavity nesting ducks, bald eagle feeding habitat, winter and spring shorebird habitat, Roosevelt Elk Winter Range: Willapa herd, Fall Chinook, Winter steelhead, Chum, Rainbow Trout, Resident Cutthroat, Coho presence	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration			

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
WFC_DeepRiver_09	Reach is characterized by small floodplains enclosed by steep slopes on one side of the river, forested wetlands protected by a system of levees and intertidal emergent wetlands at the mouth of Deep River. mixed wetland forests on undifferentiated floodplains separated from the river by a system of levees. Habitat in this reach is considered westside riparian-wetlands and conifer-hardwood forest. Land cover is characterized by tidal and non-tidal coniferous wetland forests, tidal and non-tidal deciduous wetland forests, scrub-shrub wetland habitat, diked herbaceous wetland and developed open space and upland coniferous forests. One side of this reach is dominantly forestry with some open space, while the other side is undeveloped and open space	Several docks and mooring boats, at least 6 tidegates and 3 culverts	Impervious surfaces in and around the shoreline(> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures. System of levees may impact hydrologic and sediment transport, storage and floodplain habitat. Piers, docks, or boat ramps may alter hydrologic/ sediment transport and shoreline habitat components (e.g., light, vegetation). May include impacts to: beach sediment size/ type/ abundance, flow energy, water quality, drift material accumulation, erosion on adjacent properties, and habitat modification. Culvert, tidegate and bridge impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. May also impact habitat accessibility and quality.	Potential moderate landslide hazard areas on the west bank.	Winter waterfowl habitat, cavity nesting ducks, bald eagle feeding habitat, winter and spring shorebird habitat, Roosevelt Elk Winter Range: Willapa herd, Fall Chinook, Winter steelhead, Chum, Rainbow Trout, Resident Cutthroat, Coho presence	Conservation, Restoration/Development, Restoration, Protection/Restoration, Highest Restoration, Highest Protection, Development/Restoration	Culvert/tidegate replacement	Wahkiakum County, CLT, WDFW	Proposed
		Derelict vessel(s)					Work with the DNR derelict vessel removal program to dismantle and remove derelict vessel	DNR, SAC, WDFW	Concept
		Limited hydraulic access to floodplain, foodweb connection, nutrient cycling,					New tidegate installation and tidegate retrofit	CLT, CREST	Concept
WFC_HalayaSlough_01	A water control structure separates the slough from the Deep River main channel. The slough is considered an altered floodplain channel surrounded by historically westside riparian wetland habitat. Dominant land cover types include agriculture, diked herbaceous and scrub-shrub wetland habitat. Land uses include agriculture on what is considered undeveloped land.	1 culvert, slough has limited access to deep river due to system of levees	System of levees may impact hydrologic and sediment transport, storage and floodplain habitat. Culvert, tidegate and bridge impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. May also impact habitat accessibility and quality.		Roosevelt Elk Winter Range: Willapa herd, Winter concentrations of dunlins, sanderlings, Western SA, ND Pipers, and gulls, Wintering waterfowl habitat for ducks, geese and swans, bald eagle feeding area, cavity nesting ducks	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration			
WFC_JimCrows_01	Upper small tributary valley enclosed by steep slopes dominated by coniferous and deciduous upland non-wetland forest habitat within the floodplain and on the slopes. Wetlands in this section consists of woody wetland forest habitat. Downstream section of this reach is dominated by non-tidal deciduous wetland forests. Land use is entirely forestry	1 culvert under logging road crossing tributary of stream. May be a passage barrier. Logging roads intersect stream in this stretch, culverts or bridges allow for vehicle passage	Timber or forestry related uses may alter hydrology, water quality and sediment processes due to loss of vegetative cover. Impervious surfaces in and around the shoreline(> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.	303(d) water temperature. Forestry and logging roads impact on water quality and erosion. Narrow steep canyons pose areas of moderate and high landslide hazard susceptibility	Roosevelt Elk Winter Range: Willapa herd. Coho, resident cutthroat, rainbow trout, winter steelhead presence.	Highest Protection, Restoration/Development, Protection/Restoration, Protection, Highest Restoration, Development/Restoration	Replace/remove culvert	CREST, WDNR	Complete/Ongoing
		Lack of LWD					Place LWD in-streams to help facilitate the creation of salmon spawning and rearing habitat	CREST	Concept

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
WFC_JimCrown_02	This reach is characterized by non-tidal coniferous non-wetland forests on the edges of the floodplain and up on steep slopes and non-tidal deciduous wetland forests in the floodplain. Some patches of coniferous wetland forests are also present. Land use in this reach is entirely forestry due to steep canyon slopes little development occurs with the exception of some logging roads	1 culvert under logging road crossing tributary of stream. Maybe a passage barrier.	Timber or forestry related uses may alter hydrology, water quality and sediment processes due to loss of vegetative cover. Impervious surfaces in and around the shoreline(> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.	303(d) water temperature. Forestry and logging roads impact on water quality and erosion. Narrow valley surrounded by areas with moderate landslide hazards	Roosevelt Elk Winter Range: Willapa herd. Coho, resident cutthroat, rainbow trout, winter steelhead presence.	Conservation, Protection/Restoration, Protection, Highest Protection	Replace/remove culvert	CREST, WDNR	Complete/Ongoing
WFC_JimCrown_03	This reach is characterized by upper flooded surge plain surrounded by steep slopes on both sides before emptying into the Columbia River. Land cover is dominated by non-tidal wetland deciduous forests with smaller areas of coniferous wetlands. Towards the mouth of the river there are tidally influenced deciduous wetland forests. Land use in this reach is entirely forestry due to steep canyon slopes little development occurs with the exception of some logging roads. Steep wooded banks with rocky shoreline.	1 culvert to tributary of stream under logging road. Logging roads near/along stream in some stretches	Timber or forestry related uses may alter hydrology, water quality and sediment processes due to loss of vegetative cover. Impervious surfaces in and around the shoreline(> 10%) may affect surface water flow, groundwater infiltration, aquifer recharge and nutrient/contaminant removal. May include impacts to: flooding, water quality/quantity, and flow energy, habitat, headwater input, and water temperatures.	Forestry and logging roads impact on water quality and erosion. Narrow valley with some high landslide hazard susceptibility	Roosevelt Elk Winter Range: Willapa herd, cavity nesting duck habitat. Coho, resident cutthroat, rainbow trout, winter steelhead presence.	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration			
WFC_Rangila Slough_01	A water control structure separates the slough from the Deep River main channel. The slough is considered an altered floodplain channel surrounded by historically westside riparian wetland habitat. Dominant land cover types include agriculture, diked herbaceous and scrub-shrub wetland habitat. Land uses include agriculture, forestry, undeveloped land and single-family residential development. and a roadway that crosses the slough.		System of levees may impact hydrologic and sediment transport, storage and floodplain habitat. Culvert, tidegate and bridge impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. May also impact habitat accessibility and quality. Bridge impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding. May also impact habitat accessibility and quality. Agriculture has reduced shoreline vegetation which may alter sediment transport, hydrologic regimes, and habitat. May include impacts to: erosion/bank stability, flow energy, water quality/temperature/ storage, recruitment/ transport of woody/ organic debris and sediment, habitat, and flooding regimes		Roosevelt Elk Winter Range: Willapa herd, cavity nesting duck habitat	Conservation, Restoration/Development, Restoration, Protection/Restoration, Protection, Highest Restoration, Highest Protection, Development/Restoration			

APPENDIX C Reach Priorities and Restoration Opportunities

Reach ID	Physical Characteristics	Shoreline Modification	Potential Functions Impacted	Management Issues	PHS	Eco-Process Priority Action	Action	Source	Status
WFC_Sisson Creek_01	Westside lowlands conifer-hardwood forest habitat. Alluvium upper flooded surge plain dominant. Lower flooded surge plain towards the mouth of the creek. Intertidal herbaceous wetland habitat near the mouth of the river. Steep slopes enclose the floodplain throughout this reach. Land use is considered designated forest land under Chapter 84.33 RCW. Woody wetlands dominate the land cover and some deciduous forest make up some of this reach.	Fish barrier	Timber or forestry related uses may alter hydrology, water quality and sediment processes due to loss of vegetative cover. System of levees may impact hydrologic and sediment transport, storage and floodplain habitat. Culvert, tidegate and bridge impacts may include: increased water velocity, incised channels, erosion, road washouts, and downstream flooding.		Roosevelt Elk Winter Range: Willapa herd	Conservation, Protection/Restoration, Protection, Highest Restoration, Highest Protection	Replace culvert	Pacific Conservation District	Complete