

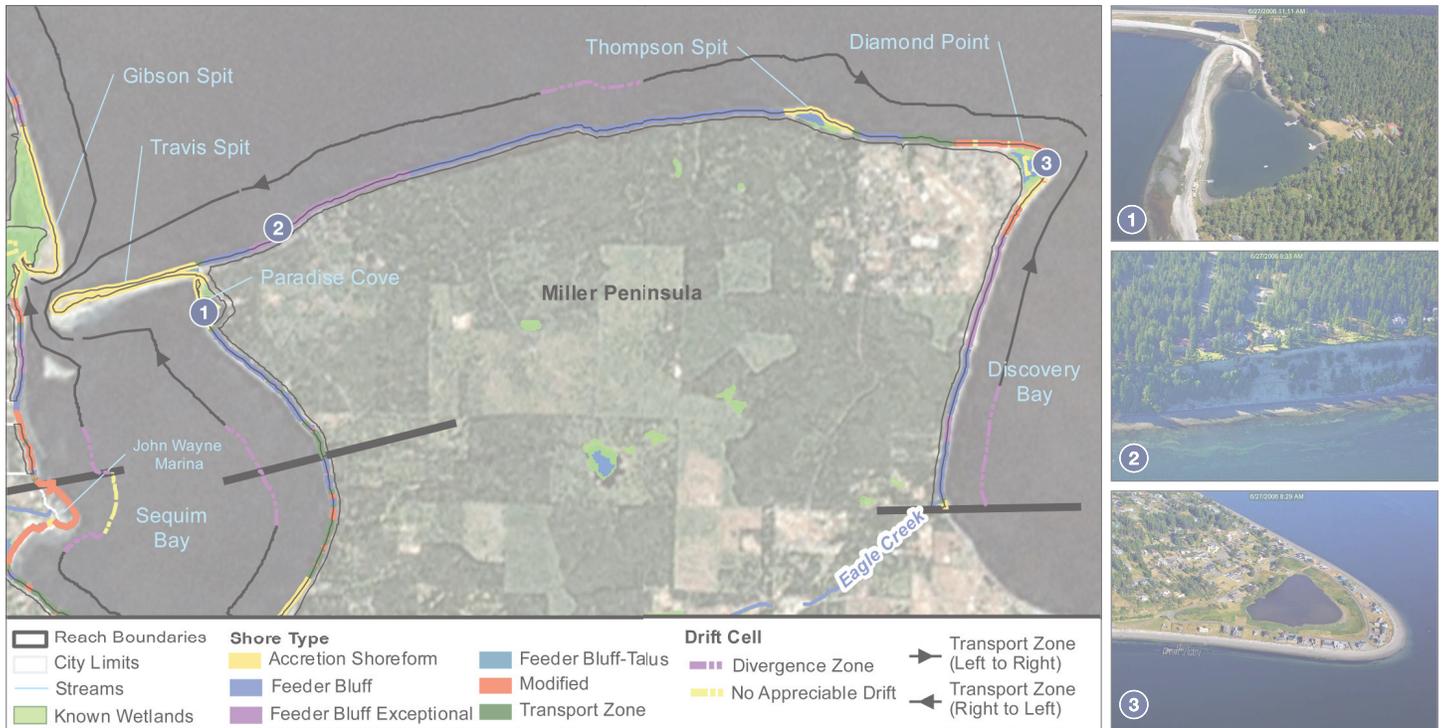


Reach Sheet Data Descriptions and Sources

Marine Reach Sheet Explainer

REACH MAP

The reach maps show the physical features of each “reach” or inventory segment—there are 18 segments on the marine shore overall, excluding incorporated areas and the Makah Reservation. Geologic shore type and drift cell components are depicted to help illustrate the location of feeder bluffs, sediment transport zones, accretion shores and modified shores. The maps also show the direction of net shore-drift, divergent zones and areas of no appreciable drift. Shoreline oblique photos taken by Ecology in 2006 are provided to help orient the reader to key localities. The aerial photo base map is from 2009.



Shoreline Oblique Photos (Ecology, 2005)

PHYSICAL

Shoreform and Shoretype

The shoreform and shoretype information describes the geologic characteristics of the shoreline as they relate to nearshore process such as the erosion, transport and accretion / deposition of sediment. The shoreform classifications were provided by the Puget Sound Nearshore Ecosystem Restoration Project (PSNERP). Categories include barrier beach, bluff-backed beach, barrier estuary, barrier lagoon, delta, closed lagoon marsh, open coastal inlet, pocket beach, rocky platform, plunging rocky shore and artificial. Shoretypes were determined by Coastal Geologic Services in 2011 using aerial photos and boat surveys. The shoretypes identify the feeder bluffs (sediment sources), transport zones, accretion shores and modified shores as defined in the report text.

Net Shore Drift

This dataset depicts littoral drift in Puget Sound. Each drift cell is described and mapped in terms of the direction of sediment transport, the location of divergent zones and areas where there is no appreciable drift. These data were provided by PSNERP (2009) and updated/refined by Coastal Geologic Services (2011).

Hazard Areas

This dataset contains information about geologic and coastal hazards, which include: areas of slope instability areas, landslide hazard areas, tsunami hazard areas, frequently flooded areas, and erosion hazard areas (Data sources: Clallam County; Ecology; FEMA; NRCS; and WDNR). In general, these data show where hazards are likely to occur or where they are known to have occurred. Some data are missing in undeveloped areas (such as commercial forest-zoned lands). Hazards may still be present in areas where none are mapped.

PSNERP Degradation Score

This score is an evaluation of the level of degradation (most degraded to least degraded) for each the following nearshore processes: sediment input, sediment transport, erosion/accretion, tidal flow, distributary channel formation, tidal channel formation, detritus import/export, freshwater input, physical disturbance, solar incidence. This is a relative analysis completed by PSNERP in 2009 which compares all the nearshore reaches of Puget Sound/ Strait of Juan de Fuca. The data are course-scale, and may not accurately represent conditions at a site- or parcel-scale.

ECOLOGY

Offshore Vegetation

Information on aquatic vegetation is from the Washington Department of Natural Resources Nearshore Habitat Program, which inventories and monitors seagrass and floating kelp beds as part of its program to track nearshore habitat health. The project is part of the Puget Sound Ambient Monitoring Program. Data collection and analysis are completed in collaboration with NOAA's Olympic Coast National Marine Sanctuary. The data were collected using video imagery, taken from a helicopter during low tides. The data are generally coarse-scale, and may not accurately represent conditions at a site- or parcel-scale. Some site-specific aquatic vegetation data, collected using underwater video technology, is available from the Clallam Marine Resources Committee and other organizations. However, these data are not described on the reach sheets as they are not available County-wide.

Onshore (Upland) Vegetation

This information describes the vegetation cover classification of uplands and shorelands within 300 feet of the ordinary high water line. The Point-No-Point Treaty Council (PNPTC) (2011) identified areas of closed canopy forest, other natural vegetation, non-forest (areas with human influence such as roads, agriculture, houses lawns, etc...), freshwater, and areas known to be off-shore. This analysis was performed using aerial photography, repeatability analyses, and some field surveys. The consultants further annotated the PNPTC data into more detailed categories, such as agriculture, lawn/landscaping, and natural herbaceous habitat, through air photo interpretation.

Habitats and Species

This describes the location of state-designated priority habitats and species in upland and aquatic areas as reported by the Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species Program and the Washington Department of Natural Resources (WDNR) Natural Heritage Program database. Priority habitat and forage fish spawning data are coarse-scale and based upon field biologist observations. More recent forage fish spawning habitat data is available from the Clallam Marine Resources Committee and other organizations. However, these data are not described on the reach sheets as they are not available County-wide.

Information on the approximate location and extent of known wetlands and streams is based on data from the US Fish and Wildlife Service (USFWS) and Clallam County wetland inventories and the WDNR and Clallam County stream inventories. Wetland data are somewhat coarse-scale, and often do not depict small wetlands, slope wetlands or wetlands in dense forest stands. A field wetland determination would be required to accurately determine the presence or absence of wetland habitat in a particular area.

Shellfish

The dataset depicts the locations of commercial shellfish beds and areas of recreational harvesting from WDFW (2010).

Water Quality

This dataset comes from the State of Washington's Water Quality Assessment (WQA) and list of impaired waterbodies. The State's WQA categories water quality into five categories, ranging from a Category 1 waterbodies which meets federal clean water standards to Category 5 waterbodies that are polluted and put on the EPA's impaired waterbodies (303(d)) list. Only Category 5 waterbodies are shown in the reach sheets. Data from Clallam County Streamkeepers monitoring (2010) is also reported. The Streamkeepers measured water quality using two different water quality indices: WQI and B-IBI.

HUMAN ENVIRONMENT AND LAND USE

Existing Land Use and Ownership

These data describes the use and ownership (i.e., public, private, etc.) of lands immediately adjacent to the marine shoreline. Ownership information includes reservation lands, areas within Olympic National Park, publicly owned tidelands, protected lands, National Wildlife Refuges, and aquatic parcels. Data sources: Clallam County, 2009-2010; WSDOT, 2009; WDNR, 2011; PSNERP, 2009; NPS, 2007; USFWS, 2009.

Zoning and Parcel Data

These data depict Clallam County zoning categories and development potential of land parcels within the reach. Data source: Clallam County, 2009-2010. Based upon this data, a qualitative estimate (i.e. high, moderate, and low) of development potential within the reach is provided.

Public Access

These data identify the existing public access sites on the marine shoreline. Information was provided by the Washington Department of Ecology's Shoreline Public Access Project. The dataset also includes the location of the existing Olympic Discovery Trail (data sources: Ecology (2010) and Clallam County). Some locally known, unpublished public access areas may be absent from the data set. Public lands that are outside the jurisdiction of the shoreline master program are not included.

Impervious Surfaces

This dataset depicts estimated percentages of impervious surfaces (e.g., pavement, buildings, etc.) covering the land surface. Estimates are based on digital images (data source: NLCD, 2001). Smaller areas of impervious surface, particularly in areas with adjacent forest cover, may not be included in the data set.

Shoreline Modifications

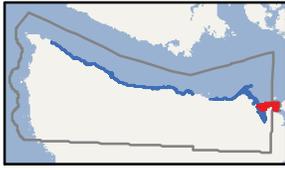
This dataset identifies locations of modifications to the shoreline environment including: bulkheads, jetties, docks, piers, marinas, buildings, tidal barriers, dams, bridges, stream crossings, and fish passage barriers. Data are from a variety of sources including: WDNR, 2001 and 2009; PSNERP, 2009; Battelle, 2008; and Clallam County, 2009.

Contaminated Sites

This dataset contains the locations of regulated hazardous materials facilities, spill sites, and cleanup projects. The list of regulated facilities as well as past and on-going cleanup projects is maintained and updated by the Washington Department of Ecology. Environmental compliance and cleanup status is also listed. Data source: Ecology, 2009.

Cultural and Archaeological Resources

This dataset contains known and recorded historic and prehistoric cultural and archaeological sites (Source: Washington State Department of Archaeology and Historic Preservation). Due to federal and state laws which preclude the release of site location information, only the number and type of cultural resources sites recorded within a reach are shown on the reach sheets.



REACH MR-1: Diamond Point

SHORELINE LENGTH
12.5 Miles

REACH AREA
268.16 Acres

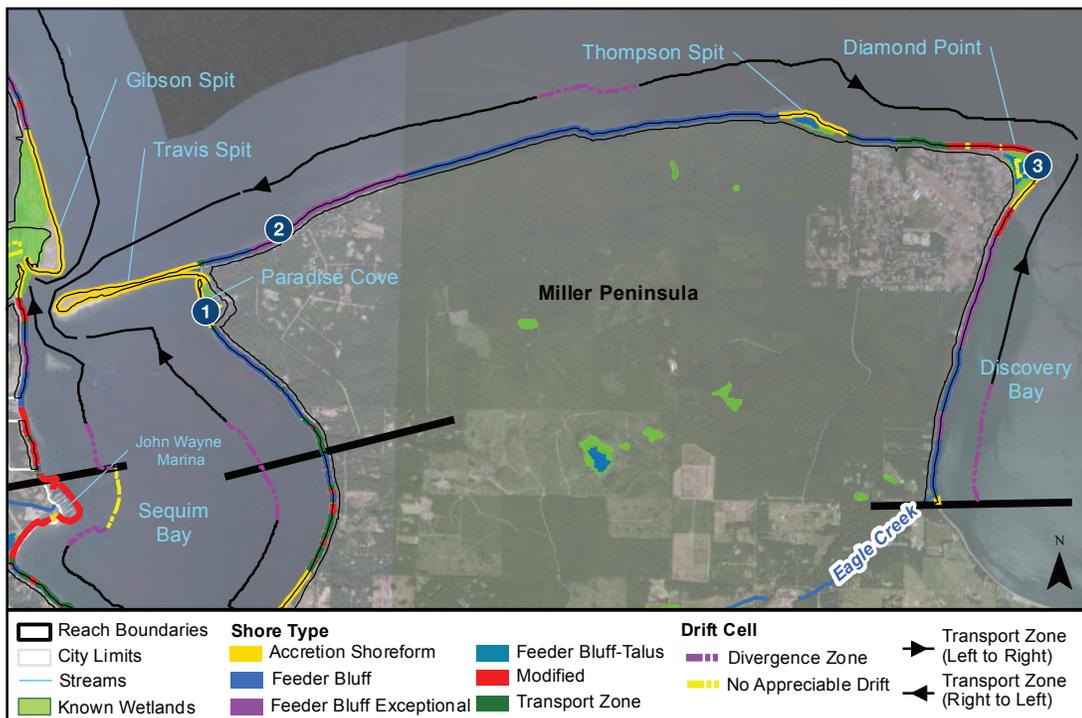
PSNERP PROCESS UNITS
SPU 1013 - 1017

REACH SUMMARY

The “Diamond Point” reach extends along Miller Peninsula, from the Clallam/Jefferson county line to the northwest corner of Sequim Bay. The reach borders Discovery Bay to the east, the Strait of Juan de Fuca to the north, and Sequim Bay to the west, and includes Diamond Point, Thompson Spit, Travis Spit, and Paradise Cove. Over half of the reach consists of feeder bluffs, which are erosion hazard areas. Minimal shoreline armoring and overwater structures are present in the reach, and half of the shoreline area is forested.

Dense residential development is present at Diamond Point, portions of which lie within mapped tsunami and flood hazard areas. Some low-density residential development is located along the feeder bluffs in the Travis Spit vicinity and bordering Discovery Bay. Approximately one-third of the shoreland area is in public ownership, managed by WSP (Miller Peninsula State Park [undeveloped]) and DNR.

Under current zoning regulations, approximately one-third of the reach area has potential for new residential development. The developable land is generally located in the eastern and western portions of the reach. Existing parcel boundaries at the southwestern portion of the reach (Discovery Bay feeder bluffs) have narrow shoreline frontages, which could lead to dense shoreline development in this area. Parcels in the Travis Spit vicinity are generally larger.



Shoreline Oblique Photos (Ecology, 2005)

PHYSICAL CHARACTERISTICS

Shoreform and Shoretype

Reach shoreform consists of bluff-backed beaches (54%), with barrier beaches (31%) along Kiapot Point, Thompson Spit, and Diamond Point. Geomorphic shoretypes in the reach are feeder bluffs (30%), exceptional feeder bluffs (14%) transport zones (4%), and accretion shoreforms (22%). Approximately 5% of the reach is mapped as artificial.

Net Shore Drift

The reach contains 4 net shore-drift cells. A cell with northward drift extends from the Clallam county line and converges at Diamond Point with a drift cell with eastward drift at Diamond Point. A divergence zone located along the central, north-facing shore of the Miller Peninsula marks the origin the cell with eastward drift. Westward drift from that same divergence zone supports the north shore of Travis Spit. The leeward side of Travis Spit and the barrier protecting Paradise Cove are maintained by a net shore-drift cell with north then westward drift along the northeast shore of Sequim Bay.

Hazard Areas

Most bluff areas are unstable (58%) with recent slides into Discovery Bay and the Strait of Juan de Fuca (10%). Some recent slides are near existing homes. Diamond Point, Thompson Spit, and Travis Spit are in a tsunami hazard zone (39%) and FEMA coastal 100-year floodplain (51%).

REACH REACH MR-1: Diamond Point

Degree of Process Degradation

The sediment input, sediment transport, tidal flow, tidal channel formation, and freshwater input processes within the reach have low degradation levels. In the western portion of the reach, the erosion/accretion of sediment, detritus import and export, and exchange of aquatic organisms processes also have low degradation levels, but these processes are moderately degraded in the western portion.

ECOLOGY

Offshore Vegetation

Eelgrass is mapped throughout 77% of the reach (continuous along Discovery Bay and Sequim Bay and patchy along the Strait). Kelp is mapped along the Strait (7%), but absent along Discovery Bay and Sequim Bay.

Onshore Vegetation

50% of the shoreland area in reach is mapped as forest habitat; 29% is mapped as natural shrub, herbaceous, and aquatic bed vegetation; and 13% is mapped as lawn/landscaping.

Habitats and Species

Wetland habitat (10% of landward portion of reach) is mapped at Travis Spit, Thompson Spit, and Diamond Point. Designated priority habitats within the reach include bald eagle, shorebird and waterfowl concentrations at Travis Spit, and cliffs/bluffs along Miller Peninsula. In addition, a marine mammal haulout area is mapped at the end of Travis Spit.

Forage fish habitat (herring and sand lance) is mapped along the shoreline bordering Sequim Bay, and a lesser amount along Discovery Bay. Both coho salmon and cutthroat trout are mapped in Eagle Creek, at the southeast portion of the reach.

The nearshore areas in the reach provide habitat for a wide variety of salmonids and other marine species. The Sequim Bay and Discovery Bay shorelines are particularly important rearing areas for salmonids.

Shellfish

Hardshell clam is mapped along Discovery and Sequim bays (29% of reach). Patches of geoduck (15%) and pandalid shrimp (11%) are also mapped in the reach. Recreational shellfishing is available on the north shore of Miller Peninsula.

Water Quality

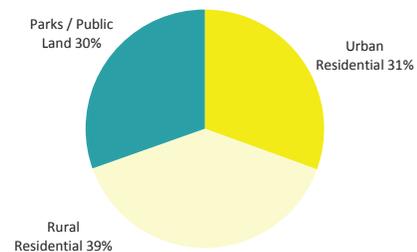
The reach has no State impaired water quality listings. However, shellfish harvesting in Discovery Bay was closed in 2007 because of elevated fecal coliform levels. Harvesting has since reopened.

HUMAN ENVIRONMENT AND LAND USE

Existing Land Use and Ownership

Land usage in the shoreland area includes open space (43%), residential (28%), vacant (21%), timber (5%), and roads (3%). The densest concentration of residential development is located in the Diamond Point vicinity, while the central portion of the reach is primarily undeveloped open space. Land ownership within the reach is 70% private and 30% public.

Zoning and Parcel Data



Under current zoning regulations the reach has moderate potential for significant new residential development, particularly within the Travis Spit and Diamond Point vicinities.

Public Access

55% of the shoreline in this reach is publicly owned, and 52% is public shoreline that is accessible from land. Public shoreline in the northern portion of the reach can be accessed via trail from Panorama Vista County Park. The shoreline along Discovery Bay can be accessed at one location, via an informal trail at Miller Peninsula State Park.

Impervious Surfaces

Approximately 6% of the shoreland area is covered by impervious surfaces.

Shoreline Modifications

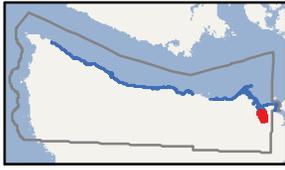
Shoreline armoring (7% of reach total) is mapped along Diamond Point and Paradise Cove. A small levee section (1%) is identified on Eagle Creek, at the southeast portion of the reach. Three docks are mapped in the Diamond Point vicinity.

Contaminated Sites

There are no identified contaminated sites within the reach.

Cultural Resources

The Surgeon's Residence (built 1893) associated with the Diamond Point US Quarantine Station is listed on the state and national historic registries. In addition, there are 2 inventoried pre-contact sites within the reach.



REACH MR-2: Sequim Bay

SHORELINE LENGTH
8.19 Miles

REACH AREA
254.80 Acres

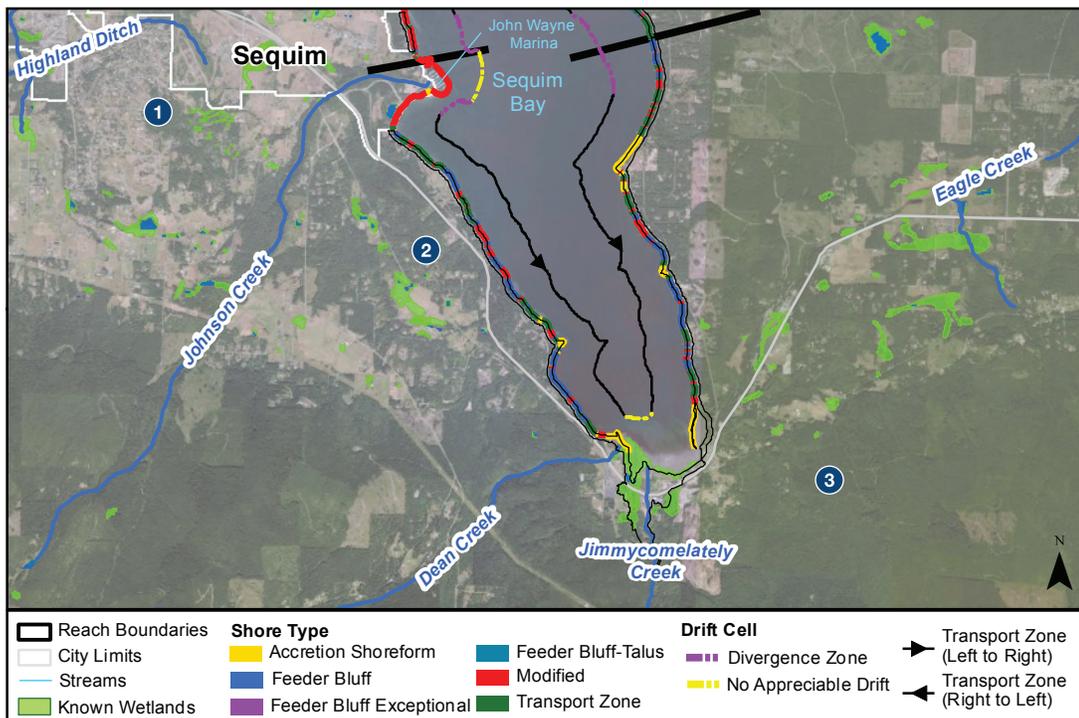
PSNERP PROCESS UNITS
SPU 1018 - 1020

REACH SUMMARY

The "Sequim Bay" reach consists of the bay shoreline, from south of Travis Spit to just south of the John Wayne Marina. The reach excludes shoreline within City of Sequim jurisdiction. Approximately one-third of the shoreline consists of feeder bluffs. However, because of the relatively sheltered position of the bay, the presence of significant erosion hazard areas is minimal. Approximately 20% of the shoreline is armored, and several overwater structures (docks and piers) are mapped throughout the reach. The Bay shoreline contains dense concentrations of submerged aquatic vegetation and significant forage fish spawning habitat, which provides important habitat for marine species, including juvenile salmonids.

The dominant land use within the reach is moderate- to low-density residential development. A commercial area is located at the Bay head. Sequim Bay State Park, a popular recreational shellfish area, is located in the western portion of the reach. Approximately half of the shoreline contains forest cover and other natural vegetation, while the other half has been altered by development.

Under current zoning regulations, approximately half of the reach area has potential for new residential development. Existing parcel boundaries vary in size, but many of the lots have narrow water frontages (approx. 75'), which could lead to dense shoreline development in these areas. With increased development, more over water structures could potentially be constructed over eelgrass and/or valuable forage fish spawning habitat.



Shoreline Oblique Photos (Ecology, 2005)

PHYSICAL CHARACTERISTICS

Shoreform and Shoretype

Bluff backed beaches are the most abundant shoreform in the reach (63%), followed by barrier beaches (17%). Embayments, including an open coastal inlet (11%) and a barrier estuary (9%) comprise the remaining shoreline in the reach. Geomorphic shoretypes in the reach are feeder bluffs (28%), transport zones (26%), and accretion shoreforms (18%). Accretion shoreforms account for 16% of the Reach 2 shoreline. 12% of the reach shoreline is artificial

Net Shore Drift

The reach contains two drift cells, both with southward drift that terminate at the head of Sequim Bay. No Appreciable Drift occurs within the southernmost head of the bay.

Hazard Areas

Several bluff areas are unstable (11%), but no recent slides are mapped. Most of Sequim Bay is in a tsunami hazard zone (43.6%) and FEMA coastal and stream (Jimmycomelately Creek) 100-year floodplains (45%).

Degree of Process Degradation

Within the reach, the exchange of aquatic organisms process has low degradation levels, and the sediment input and detritus import and export processes have moderate degraded levels. In the eastern portion of the reach, the erosion/accretion of sediment, tidal flow, tidal channel formation, and exchange of aquatic organisms processes have low degradation levels, but these processes are moderately degraded in the western portion. The sediment export process is moderately degraded in the eastern portion of the reach, and highly degraded in the western portion.

ECOLOGY

Offshore Vegetation

Eelgrass is mapped throughout 98% of the reach, continuous (66%) along Sequim Bay, patchy (32%) at the mouth of Jimmycomelately Creek. There is no kelp mapped within the reach.

Onshore Vegetation

44% of the shoreland area of the reach is mapped as forest habitat, 21% is mapped as natural shrub and herbaceous vegetation, and 33% is mapped as lawn/landscaping.

Habitats and Species

Wetland habitat (9% of the shoreland portion of the reach) is mapped near Jimmycomelately Creek. This wetland habitat is identified as a priority shorebird and waterfowl habitat area.

Forage fish habitat (herring and sand lance) is mapped throughout the reach. Coho salmon, chum salmon, winter steelhead, and resident cutthroat trout are mapped in Jimmycomelately Creek and several other Sequim Bay drainages.

Sequim Bay provides habitat for a wide variety of marine species. The nearshore areas of the bay are very important migration and rearing areas for salmon species.

Shellfish

Hardshell clam is mapped throughout much of the reach (49% of reach total), as well as oyster beds (0.5%), geoduck (15%), and pandalid shrimp (12%). Recreational shellfish harvesting is available at Sequim Bay State Park, and a tribal oyster farm is located at the bayhead.

Water Quality

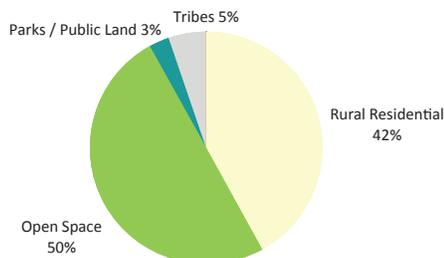
The portion of Jimmycomelately Creek within the reach has State impaired water quality listings for dissolved oxygen and fecal coliform. The Streamkeepers have listed Jimmycomelately water quality as "impaired" for both B-IBI and WQI.

HUMAN ENVIRONMENT AND LAND USE

Existing Land Use and Ownership

Land usage in shoreland area includes residential (43%), open space (10%), roads (5%), timber (4%), vacant (26%), agriculture (3%), lodging (3%), and tribe (5%). Land ownership within the reach is 93% private, 6% public, and 1% tribe.

Zoning and Parcel Data



Under current zoning regulations the reach has high potential for significant new residential development.

Public Access

15% of the shoreline in this reach is publicly owned, and 10% is public shoreline that is accessible from land. The publically owned shoreline is located on the west shore of Sequim Bay, and can directly accessed from Sequim Bay State Park.

Impervious Surfaces

Approximately 3% of the shoreland area is covered by impervious surfaces.

Shoreline Modifications

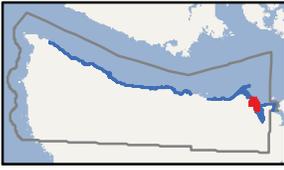
Portions of shoreline armoring (18% of reach total) are mapped throughout the reach. Tidal barriers (1%) and nearshore fill (3.1 acres) are located in the southern portion of the reach. Approximately 15 overwater structures (docks and piers) are mapped throughout the reach. There are 4 identified fish barriers (culverts) identified on an unnamed stream near Blyn Crossing.

Contaminated Sites

3 voluntary cleanup sites are mapped in the southern portion of the reach.

Cultural Resources

Port Williams (historic pier and associated structures; built 1896) is listed on the state historic registry. In addition, there are 3 inventoried pre-contact sites within the reach.



REACH MR-3: Gibson Spit

SHORELINE LENGTH
6.07 Miles

REACH AREA
616.68 Acres

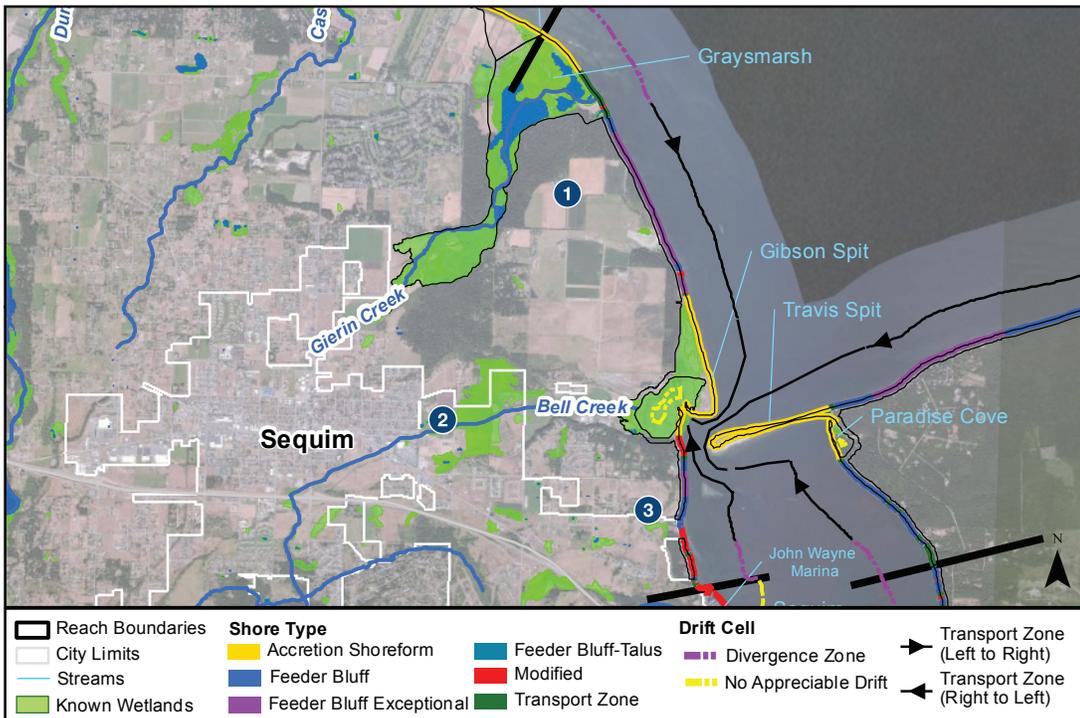
PSNERP PROCESS UNITS
SPU 1016, 1019-1021, & Delta DUN

REACH SUMMARY

The “Gibson Spit” reach extends from north of the John Wayne Marine in Sequim Bay to just north of Graysmarsh (Gierin Creek mouth). The reach excludes shoreline within City of Sequim jurisdiction. The southern end of reach borders Sequim Bay, and the northern portion borders the Strait of Juan de Fuca. The feeder bluffs along the central portion of the reach, combined with southward net shore drift, maintain the Gibson Spit beaches. Minimal shoreline armoring and overwater structures are present in the reach, and the majority of the shoreline area consists of natural vegetation. Graysmarsh and the Bell Creek estuary provide important habitat for a variety of wildlife species.

Moderate- to high-density development is present along Sequim Bay (which is within tsunami and coastal floodplain areas), but most of the shorelands in the reach are managed for timber or agriculture. All of the shoreland area and most of the shoreline is in private ownership.

Under current zoning regulations, over three-quarters of the shoreland zone has potential for new residential development. The undeveloped land is generally located north of Gibson Spit. Most of the undeveloped land cannot be subdivided into small (<5 acre) lots; therefore, there is low likely of future, dense shoreline development in the reach.



Shoreline Oblique Photos (Ecology, 2005)

PHYSICAL CHARACTERISTICS

Shoreform and Shoretype

The dominant shoreform within the reach is bluff backed beaches (35%). Barrier beaches (26%) and barrier estuaries (22%) also comprise a large portion of the reach. Delta shores associated with Dungeness river account for 17% of the reach. Geomorphic shoretype mapping identified feeder bluffs (10%) and exceptional feeder bluffs (28%). Only 5% of the reach is mapped as transport zones. The predominant shoreform in the reach is accretion shoreform (42%). Modified shores cumulatively account for 15% of the reach.

Net Shore Drift

Net shore drift in the reach is predominantly southward, north of Sequim Bay. The drift cell terminates at the barrier beach that embays Washington Harbor. A second barrier beach encloses the Harbor from the south. This barrier is supported by another drift cell with northward drift, which originates at the John Wayne marina. A region of No Appreciable Drift is mapped in the protected shores of Washington Harbor.

Hazard Areas

Several short bluff segments are unstable (5%) with no recent slides. Graysmarsh (Gierin Creek estuary), Gibson Spit, Bell Creek estuary and the northwest portion of Sequim Bay are in a tsunami hazard zone (61%) and FEMA coastal and stream (Gierin Creek) 100-year floodplains (59%).

REACH REACH MR-3: Gibson Spit

Degree of Process Degradation

The erosion/accretion of sediment, detritus import and export, and exchange of aquatic organisms processes are moderately degraded near Graysmarsh and along Sequim Bay, but have low degradation levels along the rest of the reach. The sediment transport process is moderately degraded near the marsh, highly degraded along the Bay, but has a low degradation level in the rest of the reach. The sediment input, tidal channel formation, and freshwater input processes have low degradation levels in the northern portion of the reach, and moderate levels in the southern portion. Throughout the reach, the solar incidence process and Distributary channel migration process have low degradation levels, and the tidal flow process is moderately degraded.

ECOLOGY

Offshore Vegetation

Eelgrass is mapped throughout 66% of the reach, continuous (10%) north of John Wayne Marina and patchy (56%) from Gibson Spit to Kulakala Point. There is no kelp mapped within the reach.

Onshore Vegetation

12% of the shoreland area of the reach is mapped as forest habitat, 71% is mapped as natural shrub and herbaceous vegetation, and 12% is mapped as lawn/landscaping and agriculture.

Habitats and Species

76% of the shoreland zone contains mapped wetland habitat, which is concentrated primarily at Graysmarsh and the Bell Creek estuary. Designated priority habitats mapped throughout the reach include bald eagle, shorebird and waterfowl concentrations, wood duck, and peregrine falcon. In addition, a marine mammal haulout area, harbor seal and Taylor's checkerspot butterfly habitat is mapped in the northern portion of the reach.

Forage fish habitat (sand lance) is mapped in the southern portion of the reach, in the Gibson Spit vicinity. Coho salmon, bull trout, winter steelhead, and resident cutthroat trout are mapped in Gierin and Bell creeks.

The marine nearshore areas in the reach (Strait of Juan de Fuca and Sequim Bay) provide important habitat for a wide variety of marine species that utilize nearshore habitat, including several salmon and trout species.

Shellfish

Dungeness crab is mapped at the northern portion of the reach (27% of reach total). Hardshell clam is mapped at the southern portion of the reach (24%) (Washington Harbor). Recreational shellfish harvesting is available at Port Williams beach

Water Quality

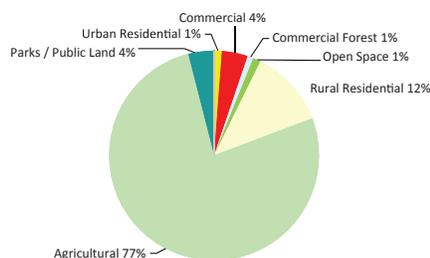
The portion of Bell Creek within the reach within the reach has impaired water quality listings for dissolved oxygen, fecal coliform, and biological impairment. The Streamkeepers have also listed the water quality of the creek as "impaired" for B-IBI and "highly impaired" for WQI.

HUMAN ENVIRONMENT AND LAND USE

Existing Land Use and Ownership

Land usage in the shoreland area includes timber (43%), residential (31%), agriculture (17%), open space (16%), roads (12%), commercial (2%), and vacant (1%). In general, the timber and agricultural lands are concentrated in the northern portion of the reach. Land ownership within the reach is 100% private.

Zoning and Parcel Data



Under current zoning regulations the reach has a high potential for significant new development, particularly in the areas north of Gibson Spit.

Public Access

14% of the shoreline in this reach is publicly owned, and 8% is public shoreline that is accessible from land. Public shoreline can be accessed directly from the end of Port Williams Road, at Marlyn Nelson County Park.

Impervious Surfaces

Approximately 1% of the shoreland area of the reach is covered by impervious surfaces.

Shoreline Modifications

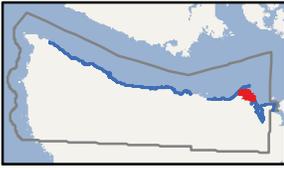
Four segments of shoreline armoring (15% of reach total) are mapped throughout the reach. Partial tidal barriers (20%) are mapped in the northern and southern portions of the reach, and 0.8 acres of nearshore fill is mapped at the end of Port Williams Road. Approximately 4 docks are mapped along the shoreline, and several bridges are identified within Graysmarsh.

Contaminated Sites

There are no identified contaminated sites within the reach.

Cultural Resources

One inventoried pre-contact village site is located within the reach.



REACH MR-4: Kulakala Point

SHORELINE LENGTH
7.89 Miles

REACH AREA
920.11 Acres

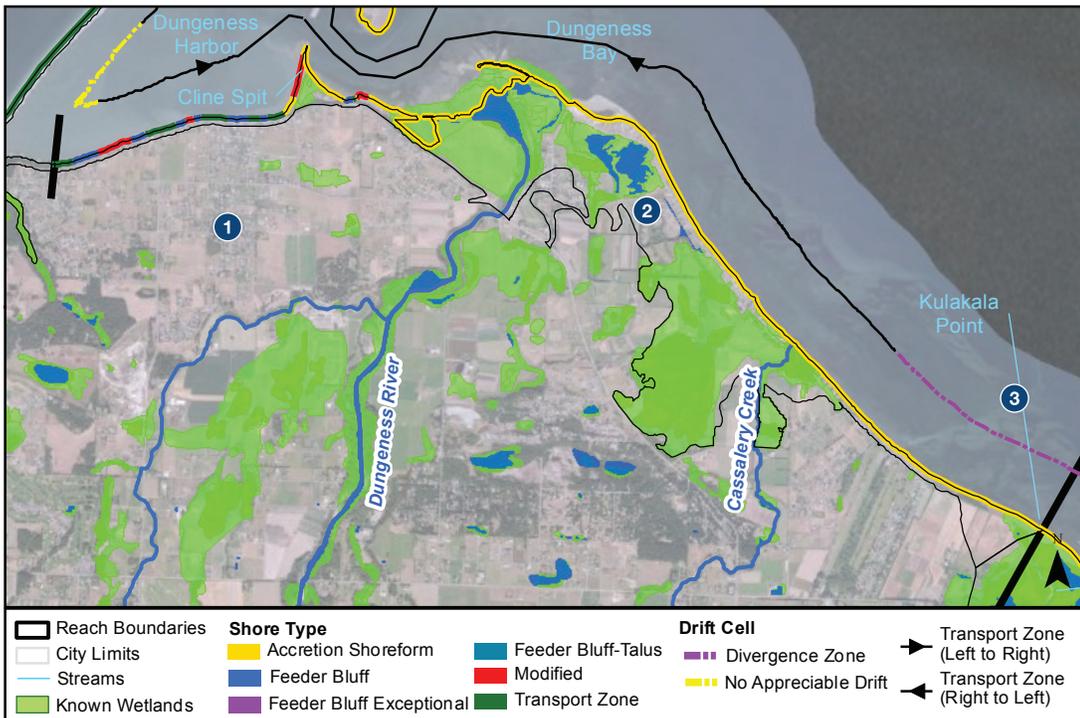
PSNERP PROCESS UNITS
SPU 1023 & Delta DUN

REACH SUMMARY

The "Kulakala Point" reach contains Strait of Juan de Fuca shoreline, extending from north of Graysmarsh (Gierin Creek mouth) to just east of the landward end of Dungeness Spit, and includes the Dungeness River delta, Cline Spit, and the south shorelines of Dungeness Bay and Dungeness Harbor. Much of the reach is within mapped tsunami and flood hazard zones. The Dungeness Harbor shoreline contains dense concentrations of submerged aquatic vegetation and significant forage fish spawning habitat, which provides important habitat for marine species, including juvenile salmonids.

High-density residential development is located along the low bank shores in the 3 Crabs Road vicinity, and several residences are protected by shoreline armoring. Land near the Dungeness River mouth is generally used for agriculture, but some residential development is present. Residential development is present along the feeder bluffs at the south shore of Dungeness Harbor. Approximately half of the shorelands contains forest cover and natural shrub/herbaceous vegetation, and the half has been impacted by development.

Under current zoning regulations, over half of the reach area has potential for new residential development, although the presence of wetlands in the Dungeness delta likely precludes intensive development in this area. Potential future development would likely be infill of existing subdivided parcels. In the event of sea level rise and increased storm activity, many landowners along 3 Crabs Road may feel the need to build bulkheads to protect property. There is also potential for an increase in overwater structures (docks) along the south shore of Dungeness Harbor.



Shoreline Oblique Photos (Ecology, 2005)

PHYSICAL CHARACTERISTICS

Shoreform and Shoretype

This reach consists primarily of delta shoreforms (79%) associated with the Dungeness River. Bluff backed beaches (15%) and barrier beaches (4%) represent considerably smaller portions of this reach. Geomorphic shoretypes in this reach are primarily accretion shoreform (80%), with small portions of transport zones (7%) and feeder bluffs (6%). Only 7% of the Reach 4 shoreline was mapped as modified.

Net Shore Drift

Reach 4 consists of two net shore drift cells. The southeastern drift cell exhibits northwestward drift and converges with another drift cell with eastward drift at Cline Spit. Both drift cells are protected from northerly winds and waves by Dungeness Spit. The eastern drift cell is also heavily influenced by the Dungeness River delta.

Hazard Areas

Several bluff areas are unstable (3%) with a small slide incident along Dungeness Harbor, near existing homes. Dungeness Harbor, Cline Spit, the Dungeness River floodplain, and Kulakala Point are in a tsunami hazard zone (96%) and FEMA coastal 100-year floodplain (82%).

REACH REACH MR-4: Kulakala Point

Degree of Process Degradation

The tidal flow and freshwater input processes have low degradation levels throughout the reach, but are moderately degraded in Dungeness Harbor. The detritus import and export, exchange of aquatic organisms, tidal flow, erosion/accretion of sediment, and sediment transport processes are moderate degradation levels throughout the reach, but have low degradation levels in the harbor. The sediment input, Distributary channel migration, and solar incidence processes are low degradation levels throughout the reach.

ECOLOGY

Offshore Vegetation

Eelgrass is mapped throughout 86% of the reach, patchy from Kulakala Point leading up to the Dungeness Spit. A few small patches of kelp (1%) are mapped southeast of the Dungeness River.

Onshore Vegetation

11% of the shoreland area of the reach is mapped as forest habitat, 37% is mapped as natural shrub and herbaceous vegetation, and 49% is mapped as lawn/landscaping and agriculture.

Habitats and Species

66% of the shoreland area of the reach consists of mapped wetland habitat, which is concentrated primarily near the Dungeness River delta. Designated priority habitats mapped throughout the reach include waterfowl concentrations, peregrine falcon, bald eagle, harlequin duck, and estuarine zone. In addition, Taylor's checkerspot butterfly habitat is mapped in the southern portion of the reach.

Extensive forage fish (herring, sand lance, and smelt) spawning habitat is mapped in Dungeness Harbor. Coho, pink, chum, sockeye, and Chinook salmon; bull trout; resident cutthroat trout; and steelhead are mapped in the Dungeness River and other streams within the reach.

The nearshore areas in the reach provide habitat for a wide variety of salmonids and other marine species. The Dungeness Harbor shoreline is a particularly important rearing areas for salmonids.

Shellfish

Dungeness crab is mapped throughout most of the reach (88% of reach total), as well as hardshell clam (85%). Recreational shellfish harvesting is available at Clint Spit.

Water Quality

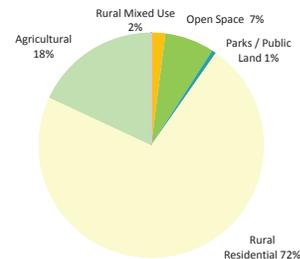
The portion of Cassalery Creek within the reach has State impaired water quality listings for dissolved oxygen, fecal coliform, and biological impairment. In addition, Cline Ditch is listed for fecal coliform; Cooper Creek for dissolved oxygen and fecal coliform; Meadowbrook Creek for dissolved oxygen, fecal coliform, and pH; and Meadowbrook Slough for pH. Dungeness River water quality within the reach is listed by the Streamkeepers as "impaired" for B-IBI and "compromised" for WQI.

HUMAN ENVIRONMENT AND LAND USE

Existing Land Use and Ownership

Land usage in the shoreland area includes open space (36%), residential (35%), agriculture (11%), vacant (9%), roads (4%), commercial (3%), utilities (2%), and developed parks (1%). The open space land is concentrated around the Dungeness River. Land ownership within the reach is 99.8% private and 0.2% public.

Zoning and Parcel Data



Under current zoning regulations the reach has moderate potential for significant new residential development. Development would likely be infill of existing subdivided parcels.

Public Access

31% of the shoreline in this reach is publicly owned, and 24% is public shoreline that is accessible from land. Small sections of public shoreline are accessible at the ends of Wilcox and Jamestown roads. Shoreline in the Cline Point vicinity is directly accessible from Pioneer Memorial Park and Cline Spit County Park.

Impervious Surfaces

Approximately 12% of the shoreland area is covered by impervious surfaces.

Shoreline Modifications

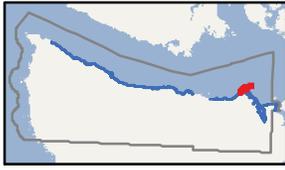
Several segments of shoreline armoring (7% of reach total) are mapped throughout the reach, and both complete and partial tidal barriers (levees) (20%) are mapped near the Dungeness River estuary. Approximately 10 overwater structures (docks, bridges, and buildings) are identified in the reach, primarily in the northwestern portion.

Contaminated Sites

1 voluntary cleanup site is mapped in the northern portion of the reach, adjacent to the mouth of the Dungeness River

Cultural Resources

McAlmond House (built 1861) is listed on the state and national historic registries, and 2 other structures are inventoried for historic significance (light station structure on Cline Spit and the Dungeness Wharf's historic remnant pilings). In addition, there are 2 inventoried pre-contact sites within the reach.



REACH MR-5: Dungeness Spit

SHORELINE LENGTH
15.74 Miles

REACH AREA
248.76 Acres

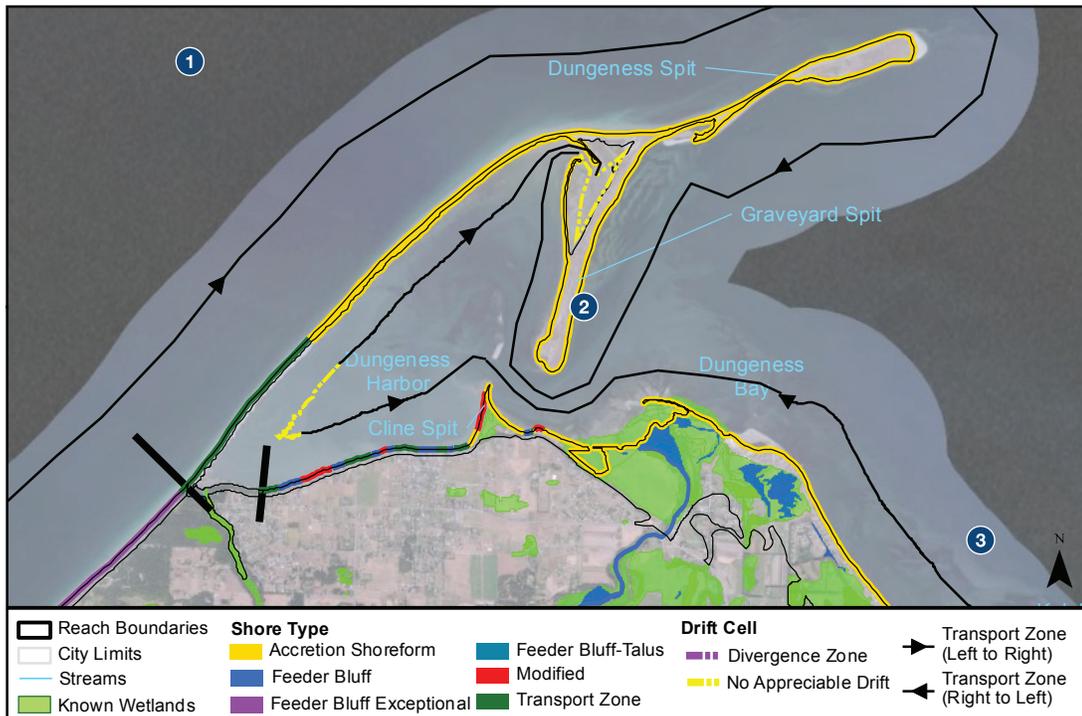
PSNERP PROCESS UNITS
SPU 1025

REACH SUMMARY

The "Dungeness Spit" reach includes the entire spit (including Graveyard Spit), and a small portion of the landward end of the spit. The spit is the longest natural sand spit in the United States. There are no shoreline modifications mapped within the reach.

The majority of the reach is within the Dungeness National Wildlife Refuge, which provides habitat for a wide variety of species. The portions of the spit within Dungeness Harbor contain dense concentrations of submerged aquatic vegetation and significant forage fish habitat, which makes the area vital rearing habitat for salmonids.

A small portion of the reach, at the landward end of Dungeness Spit, is in private ownership. Most of the parcels are developed with homes, and cannot be further subdivided. There is generally a low risk of physical and ecological degradation of the reach.



Shoreline Oblique Photos (Ecology, 2005)

PHYSICAL CHARACTERISTICS

Shoreform and Shoretype

Barrier beaches associated with the greater Dungeness Spit shoreform comprise most of the Reach 5 shoreline (72%). The remaining shoreforms in the reach include the leeward barrier estuary (10%) and barrier lagoon shores (17%). Geomorphic shoretypes in the reach are accretion areas (91%) and transport zones (9%).

Net Shore Drift

Net shore drift along the Dungeness Spit shoreform is predominantly eastward, excluding the eastern, leeward portion of the spit, which exhibits westward drift to the terminus of Graveyard Spit. No Appreciable Drift occurs along the most sheltered shores and within embayments.

Hazard Areas

Several bluff areas are unstable (7%) with a small slide incident along Dungeness Harbor, near existing homes. Most of Dungeness Spit is in a tsunami hazard zone (90%) and the FEMA coastal 100-year floodplain (93%).

REACH REACH MR-5: Dungeness Spit

Degree of Process Degradation

Within the reach, the sediment input, sediment transport, erosion/accretion of sediment, tidal flow, tidal channel formation, detritus import and export, exchange of aquatic organisms, and solar incidence processes have low degradation levels. The freshwater input process has a low degradation level throughout most of the reach, but a moderate level in the portion of the reach bordering Dungeness Harbor.

ECOLOGY

Offshore Vegetation

Eelgrass is mapped throughout 17% of the reach, patchy on the Dungeness Harbor side of the spit. Kelp is mapped (14%) along the outer side of the spit.

Onshore Vegetation

4% of the shoreland area is mapped as forest habitat and 86% is mapped as natural shrub, herbaceous, and aquatic bed vegetation.

Habitats and Species

Wetland habitat (4% of the shorezone area) is mapped in Dungeness Harbor. The majority of the reach is within the Dungeness National Wildlife Refuge, which is mapped priority habitat for waterfowl concentrations, estuarine zone, peregrine falcon, black brant, and bald eagle. In addition, harbor seal habitat and several marine mammal haulout areas are mapped within the reach.

Forage fish habitat (herring, sand lance, and smelt) is mapped along the shoreline bordering Dungeness Harbor.

The nearshore areas in the reach provide habitat for a wide variety of salmonids and other marine species. The Dungeness Harbor shorelines are particularly important rearing areas for salmonids.

Shellfish

Dungeness crab (27% of reach total), hardshell clam (41%), and oyster beds (3%) are mapped in the reach, south of Dungeness Spit. Red sea urchin (5.4%) is mapped in the western portion of the reach.

Water Quality

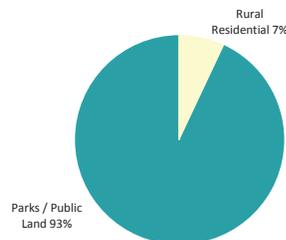
The reach has no impaired water quality listings.

HUMAN ENVIRONMENT AND LAND USE

Existing Land Use and Ownership

Land usage in the shoreland area is primarily open space (94%), with some residential (5%) and vacant land (1%) located near the landward end of Dungeness Spit. Land ownership within the reach is 93% public and 7% private.

Zoning and Parcel Data



Under current zoning regulations there is minimal potential for significant new development within the reach. Most of the land within the reach is a protected wildlife refuge.

Public Access

97% of the shoreline in the reach is publicly owned (Dungeness National Wildlife Refuge) and accessible from land. However, for the purposes of wildlife protection, portions of Graveyard Spit and Dungeness Spit are closed to public entry. Dungeness Spit beaches and trail systems can be accessed from the Dungeness Recreation Area, located at the north end of Kitchen-Dick Road.

Impervious Surfaces

Less than 1% of the shoreland area is covered by impervious surfaces.

Shoreline Modifications

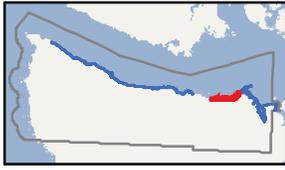
There are no shoreline modifications mapped within the reach.

Contaminated Sites

There are no identified contaminated sites within the reach.

Cultural Resources

New Dungeness Light Station (first built 1857) is listed on the state and national historic registries, and the New Dungeness historic town site (early development in 1860s) is listed on the state registry. A cabin within Dungeness Recreation Area is inventoried for historic significance but not listed. In addition, there is 1 inventoried pre-contact site within the reach.



REACH MR-6: Green Point

SHORELINE LENGTH
11.40 Miles

REACH AREA
280.06 Acres

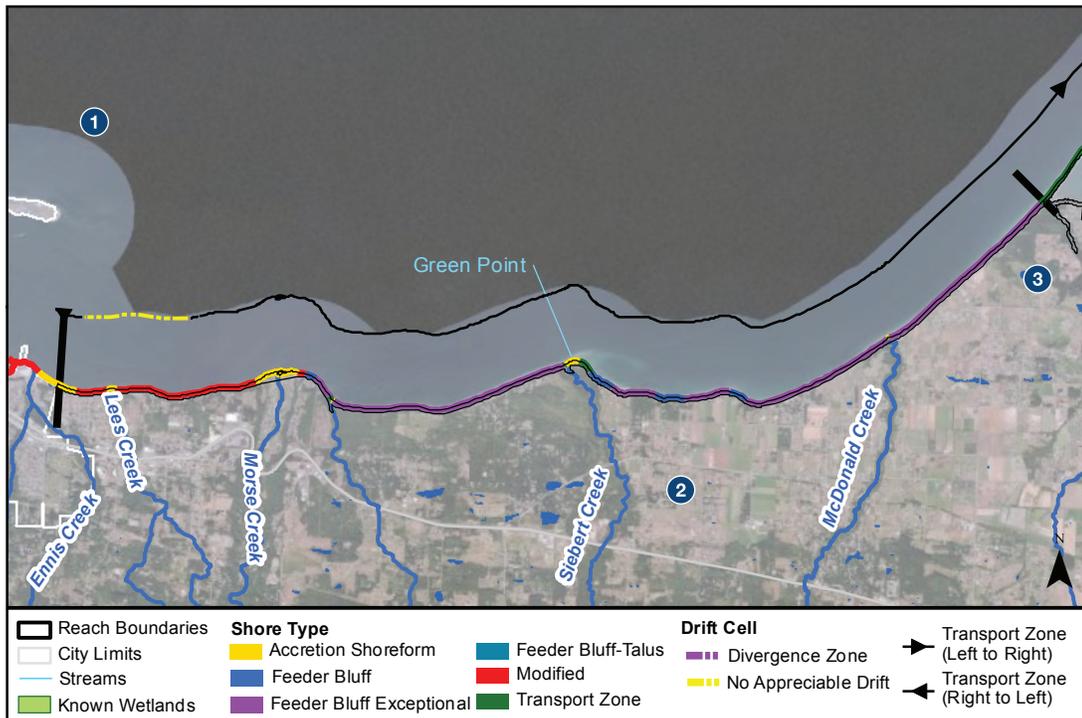
PSNERP PROCESS UNITS
SPU 1025

REACH SUMMARY

The "Green Point" reach contains Strait of Juan de Fuca shoreline, extending from just west of Dungeness Spit to the Port Angeles city limits. Over 70% of the reach consists of feeder bluffs, which along with westward net shore drift, supplies the sediments that maintain Dungeness Spit. The reach contains patches of submerged aquatic vegetation and forage fish spawning habitat, which supports salmonid rearing habitat and important habitat for other marine species.

Moderate-density residential development is located throughout the reach, with lesser amounts of open space, vacant, and timber land. Many existing homes on the shoreline are at risk because of their proximity to highly-erosive feeder bluffs. There are no overwater structures and minimal amounts of shoreline armoring mapped within the reach.

Under current zoning regulations, approximately 40% of the shoreland area has potential for new residential development. Parcel sizes vary, but many of the lots have narrow shoreline frontages (75 to 150 feet), which could lead to dense shoreline development in some areas. Placing structures too close to the feeder bluffs within the area is a substantial risk to property, as well as human health and safety.



Shoreline Oblique Photos (Ecology, 2005)

PHYSICAL CHARACTERISTICS

Shoreform and Shoretype

Shoretypes within the reach consist predominantly of bluff backed beaches (81%) with smaller portions of barrier beach (7%) and barrier estuary (3%). Predominant geomorphic shoretypes are feeder bluff exceptional (63%) and feeder bluff (8%). Transport zones account for only 3% of the reach and accretion shoreforms represent 10% of the shoreline. 16% of the reach shoreline is modified.

Net Shore Drift

Net shore drift is predominantly eastward throughout this reach. Bluff derived sediment from this reach maintains the Dungeness spit barrier complex. A very small region of No Appreciable Drift is mapped at the mouth of Lees Creek, west of which is entirely westward drift towards Port Angeles.

Hazard Areas

Several bluff areas are unstable (55%) with recent slides mapped near Port Angeles city limits, in addition to central and northeast portions of the reach (6%). Some recent slides are near existing homes. Most of Morse and McDonald Creek shoreline areas are in a tsunami hazard zone (28%) and FEMA coastal and stream 100-year floodplains (36%).

Degree of Process Degradation

The sediment input, sediment transport, erosion/accretion of sediment, tidal flow, detritus import and export, and exchange of aquatic organisms have low degradation levels throughout most of the reach, but are highly degraded west of Morse Creek. The tidal channel formation, freshwater input, and solar incidence processes have low degradation levels throughout most of the reach, but are moderately degraded west of Morse Creek.

ECOLOGY

Offshore Vegetation

Eelgrass is mapped throughout 4% of the reach, patchy directly east of Green Point. Patches of kelp (37%) are mapped throughout the reach.

Onshore Vegetation

30% of the shoreland area of the reach is mapped as forest habitat, 42% is mapped as natural shrub and herbaceous vegetation, and 19% is mapped as lawn/landscaping.

Habitats and Species

3% of the landward portion of the reach consists of mapped wetland habitat, which is concentrated primarily around stream mouths. Designated priority habitats within the reach include bald eagle, peregrine falcon, waterfowl concentrations, and cliffs/bluffs. In addition, a gray whale feeding area is identified near the mouth of Siebert Creek.

Patches of forage fish habitat (smelt) are mapped within the reach, primarily east of Morse Creek. Coho, chinook, chum, and pink salmon; bull trout; rainbow and residential cutthroat trout; and steelhead are mapped in the streams within the reach.

The marine nearshore areas in the reach (Strait of Juan de Fuca) provide important habitat for a wide variety of marine species that utilize nearshore habitat, including several salmon and trout species.

Shellfish

Abalone (57% of reach total) and red sea urchin (59%) are mapped throughout a majority of the reach. Hardshell clam is mapped near the western portion of the reach (2%).

Water Quality

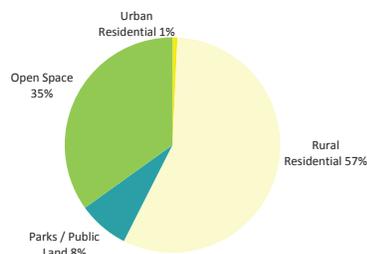
The portion of Lees Creek within the reach has a State impaired water quality listing for dissolved oxygen. The water quality of Morse and McDonald Creeks is listed by the Streamkeepers as "compromised" for B-IBI and "healthy" for WQI.

HUMAN ENVIRONMENT AND LAND USE

Existing Land Use and Ownership

Land usage in the shoreland area is residential (37%), open space (34%), vacant (14%), timber (11%), agriculture (2%), and roads (2%). Land ownership within the reach is 93% private and 7% public.

Zoning and Parcel Data



Under current zoning regulations there is moderate potential for significant new development within the reach.

Public Access

15% of the shoreline in the reach is publicly owned and accessible by land. Public shoreline in the eastern portion of the reach can be accessed from the Dungeness Recreation Area (via trails), and shoreline in the western portion can be accessed via the Olympic Discovery Trail.

Impervious Surfaces

Approximately 10% of the shoreland area is covered by impervious surfaces.

Shoreline Modifications

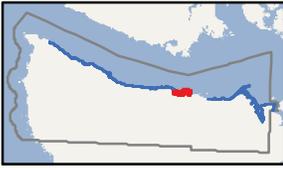
Shoreline armoring (7% of reach total) and nearshore fill (11.0 acres) is mapped in the western portion of the reach, near Port Angeles city limits. There are no mapped overwater structures within the reach.

Contaminated Sites

There are no identified contaminated sites within the reach.

Cultural Resources

The Bagley Lake Farm Tunnel (built approximately 1870) is listed on the state registry; built to drain historic lake behind bluff to create farmland (runs from back beach up to landward of bluff).



REACH MR-7: Angeles Point

SHORELINE LENGTH
7.31 Miles

REACH AREA
322.07 Acres

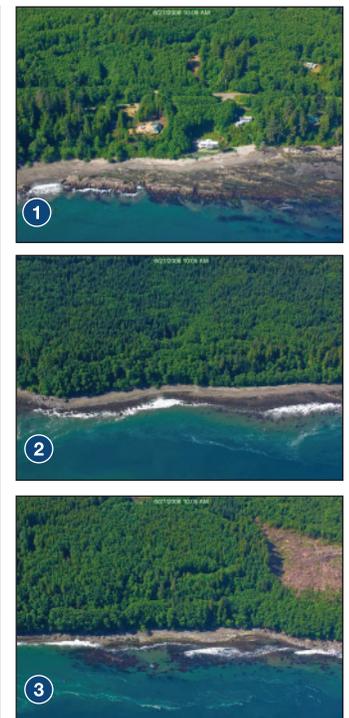
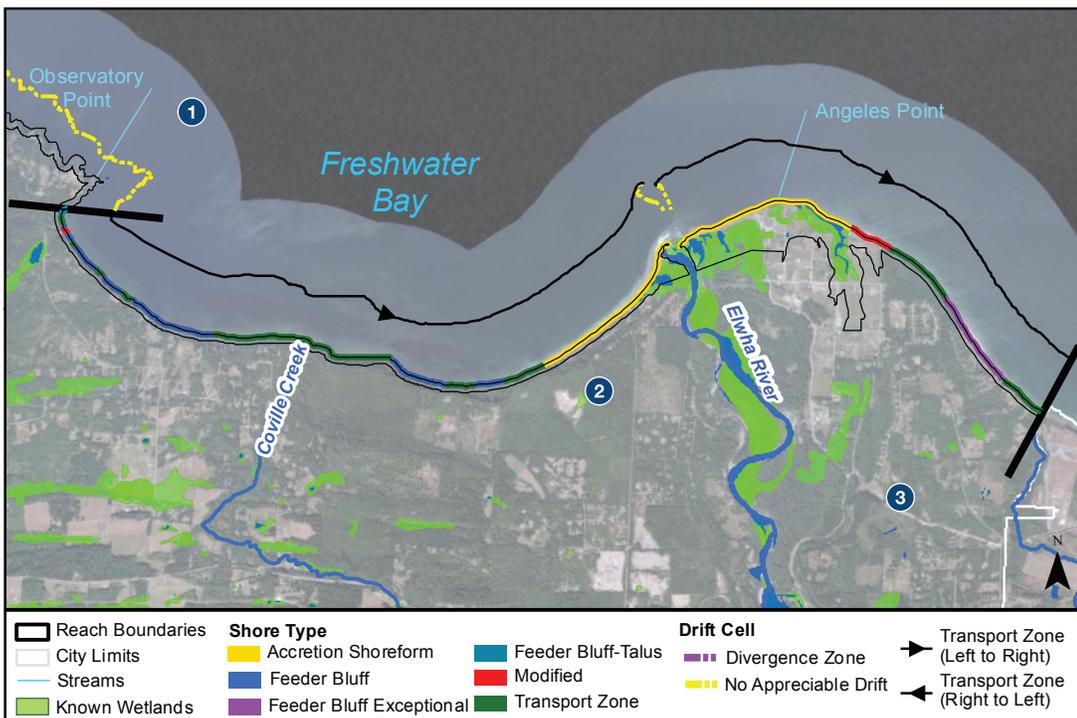
PSNERP PROCESS UNITS
SPU 1027, 1400, & Delta ELW

REACH SUMMARY

The "Angeles Point" reach extends from the western Port Angeles city limits to just south of Observatory Point. The reach contains Strait of Juan de Fuca and Freshwater Bay shoreline, and the Elwha River delta. With the exception of levees at the Elwha River mouth, the shoreline within the reach is unmodified. The reach contains patches of submerged aquatic vegetation and forage fish spawning habitat, which supports salmonid rearing habitat. The wetland habitat at the Elwha River estuary provides important habitat for waterfowl and other species.

Major land uses within the reach are high- and moderate-density residential, commercial forestry, and agriculture. Some of the residential areas are located within mapped tsunami and coastal flood areas. The majority of the shoreland area is undeveloped, and in forested condition. The forest land within the reach provides habitat for a variety of wildlife species.

Under current zoning regulations, approximately two-thirds of the shoreland area has potential for new residential development. Existing parcel boundaries vary in size and shape.



Shoreline Oblique Photos (Ecology, 2005)

PHYSICAL CHARACTERISTICS

Shoreform and Shoretype

Bluff backed beaches are the predominant shoretype within the reach (48%), followed by Elwha River delta shores (28%). Barrier beaches represent 10% of the reach. Transport zones are the most abundant geomorphic shoreform within the reach (39%), followed by accretion shoreforms (31%). Exceptional feeder bluff (3%), feeder bluff (22%), feeder bluff-talus (1%), and modified shoreform (4%) comprise the remainder of the reach.

Net Shore Drift

Net shore drift within the reach is entirely eastward, originating along the west shore of Freshwater Bay, and flowing across the mouth of the Elwha River to the terminus at the tip of Ediz Hook. Ediz Hook is located within City of Port Angeles jurisdiction.

Hazard Areas

Several bluff areas are unstable (26%) mapped east of Angeles Point and within Freshwater Bay with no recent slides. Freshwater Bay and Angeles Point are mostly within the tsunami hazard zone (69%) and FEMA coastal and stream 100-year floodplains (72%).

REACH REACH MR-7: Angeles Point

Degree of Process Degradation

Within the reach, the sediment input and freshwater input processes have low degradation levels in Freshwater Bay, high levels at Angeles Point, and moderate levels east of the point. The sediment transport process has a low degradation level in the bay, moderate level at the point, and high level east of the point. The erosion/accretion of sediment, detritus import and export, tidal flow, and exchange of aquatic organisms processes have low degradation levels throughout most of the reach, but are highly degraded east of Angeles Point. The tidal channel process has a low degradation level throughout most of the reach, but is moderately degraded east of the point. The solar incidence and Distributary channel migration processes have low degradation levels throughout the reach.

ECOLOGY

Offshore Vegetation

Eelgrass is mapped throughout 74% of the reach, patchy primarily from Angeles Point to Observatory Point. Kelp is mapped (61%) throughout the reach.

Onshore Vegetation

52% of the shoreland area is mapped as forest habitat, 25% is mapped as natural shrub and herbaceous vegetation, and 13% is mapped as lawn/landscaping.

Habitats and Species

28% of the landward portion of the reach consists of mapped wetland habitat, which is concentrated around the Elwha River delta. Designated priority habitats within the reach include bald eagle, harlequin duck (at the Elwha River estuary), common loon (at west end of reach), and cliffs/bluffs.

A patch of forage fish habitat (smelt) is mapped to the east of the Elwha River. Coho, chinook, chum, pink, and sockeye salmon; bull trout, resident cutthroat trout, and steelhead are mapped in Colville Creek and the Elwha River.

The marine nearshore areas in the reach (Strait of Juan de Fuca and Freshwater Bay) provide important habitat for a wide variety of marine species that utilize nearshore habitat, including several salmon and trout species.

Shellfish

Abalone is mapped throughout the reach (100% of reach total). However, the abalone population in the area has been heavily impacted by poaching. Dungeness crab is mapped at the western portion of the reach (21%) and red sea urchin at the eastern portion (40%).

Water Quality

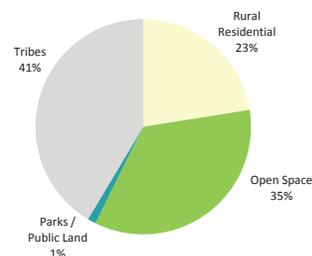
The portion of the Elwha River within the reach has a State impaired water quality listing for temperature. Elwha water quality is listed by the Streamkeepers as "compromised" for WQI. Coville Creek is listed as "healthy" for WQI.

HUMAN ENVIRONMENT AND LAND USE

Existing Land Use and Ownership

Land usage in the shoreland area is residential (29%), open space (20%), tribe (29%), vacant (9%), timber (8%), agriculture (5%), and roads (trace). Land ownership within the reach is 58% private, 18% public, and 24% tribe.

Zoning and Parcel Data



Under current zoning regulations there is high potential for new residential development within the reach.

Public Access

75% of the shoreline in this reach is publicly owned, and 33% is public shoreline that is accessible from land. Public shoreline near the Elwha River mouth can be accessed directly from the north end of Elwha Dike Road, and limited public parking is available. Shoreline at the western end of the reach (Freshwater Bay) can be accessed directly from Freshwater Bay County Park.

Impervious Surfaces

Approximately 1% of the landward portion of the reach is covered by impervious surfaces.

Shoreline Modifications

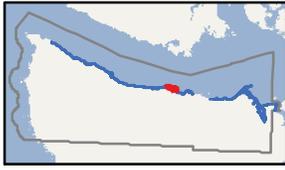
Sections of shoreline armoring (9% of reach total) are mapped at the western end of the reach and near the Elwha River. In addition, a small levee section (1%) is identified on the Elwha. No overwater structures or areas of nearshore fill are mapped within the reach.

Contaminated Sites

There are no identified contaminated sites within the reach.

Cultural Resources

Inventoried sites include 1 pre-contact site, 2 pre-contact isolates, and 1 historic residential site.



REACH MR-8: Observatory Point

SHORELINE LENGTH
4.85 Miles

REACH AREA
107.29 Acres

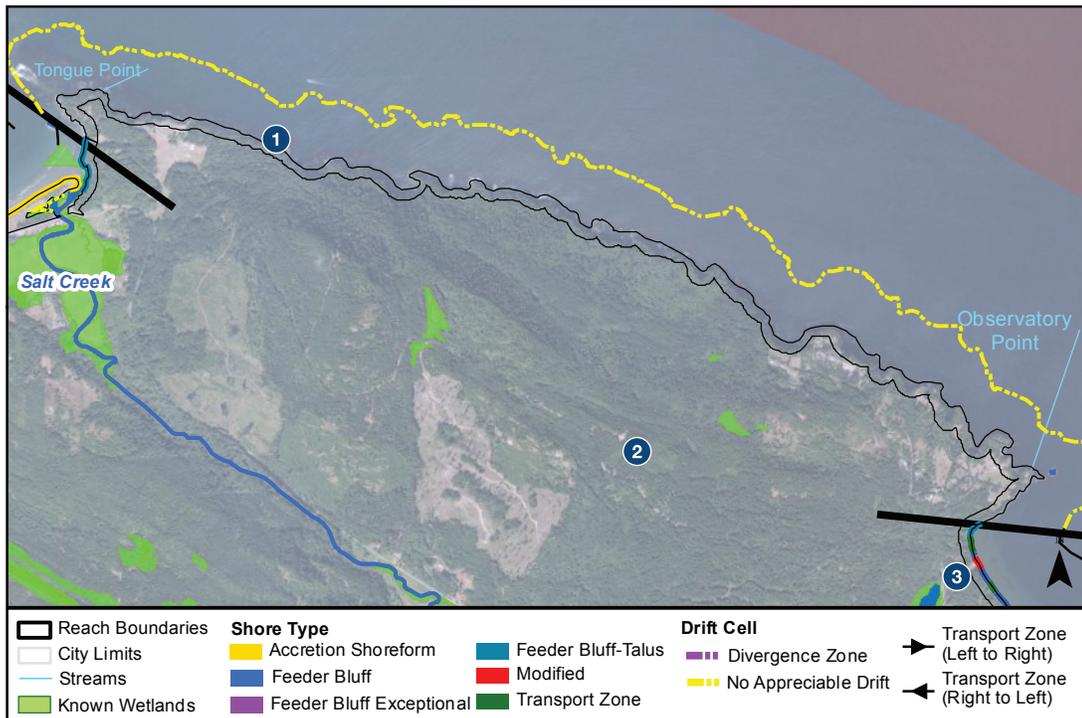
PSNERP PROCESS UNITS
SPU 1027

REACH SUMMARY

The "Observatory Point" reach extends from Observatory Point to Tongue Point, along the Strait of Juan de Fuca. The reach consists of bedrock shores, with no appreciable net shore drift along the shoreline. No shoreline modifications are mapped within the reach. Most of the shoreland area is forested, and the nearshore area contains dense concentrations of submerged aquatic vegetation which provides important habitat for marine species, including juvenile salmonids.

The majority of the reach is public land, contained within the Salt Creek and Striped Peak Recreation Areas. The eastern third of the reach contains moderate-density residential development. Most of the homes are set back more than 200 feet from the shoreline.

Under current zoning regulations, only 6% of the reach has potential for new residential development. Future development would consist of residential infill adjacent to existing developed parcels. Given the relatively limited area of potential development in the reach, and the stable adjacent bedrock shores, potential future development impacts to shoreline ecology are likely minimal.



Shoreline Oblique Photos (Ecology, 2005)

PHYSICAL CHARACTERISTICS

Shoreform and Shoretype

Rocky platform shores comprise over 96% of the reach, most of which consists of bedrock ramp shore. A single plunging bedrock shore (3%) and a single bluff backed beach (1%) are located in the eastern portion of the reach.

Net Shore Drift

Because of the bedrock geology, there is no appreciable net shore drift within the reach.

Hazard Areas

An unstable bluff area (8%) is mapped in the eastern portion of the reach. However, no recent slides are mapped. A portion the shoreline between Observatory Point and Tongue Point are in a tsunami hazard zone (33%) and FEMA coastal and stream 100-year floodplains (42%).

REACH REACH MR-8: Observatory Point

Degree of Process Degradation

Within the reach, the sediment input, sediment transport, erosion/accretion of sediment, tidal flow, tidal channel formation, detritus import and export, exchange of aquatic organisms, exchange of aquatic organisms, and solar incidence processes have low degradation levels.

ECOLOGY

Offshore Vegetation

Eelgrass is mapped throughout 45% of the reach, patchy from Observatory Point halfway towards Tongue Point. Kelp is mapped (45%) throughout the reach.

Onshore Vegetation

59% of the shoreland area is mapped as forest habitat, 26% is mapped as natural shrub and herbaceous vegetation, and 7% is mapped as lawn/landscaping.

Habitats and Species

No wetland habitat is mapped in this reach. Designated priority habitats within the reach include cliffs/bluffs, harbor seal, bald eagle, and harlequin duck (near Tongue Point). In addition, 5 marine mammal haulout areas are mapped within the reach.

No forage fish presence is mapped within the reach. There are no streams within the reach; therefore, there is no mapped freshwater fish use.

The marine nearshore areas in the reach (Strait of Juan de Fuca) provide important habitat for a wide variety of marine species that utilize nearshore habitat, including several salmon and trout species.

Shellfish

Abalone (100% of reach total), Dungeness crab (97%), and red sea urchin (88%) are mapped throughout the reach.

Water Quality

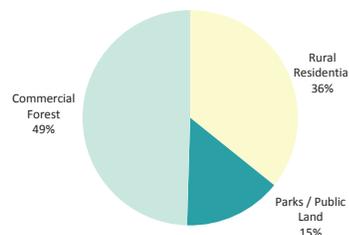
The reach has no impaired water quality listings.

HUMAN ENVIRONMENT AND LAND USE

Existing Land Use and Ownership

Land usage in the shoreland area is timber (50%), residential (30%), open space (15%), and vacant (6%). The timber land is in the center of the reach, with open space to the west and residential land to the east. Land ownership within the reach is 70% private and 30% public.

Zoning and Parcel Data



Under current zoning regulations there is minimal potential for significant new development within the reach. Most of the land is zoned for commercial forestry.

Public Access

63% of shoreline in the reach is publicly owned and accessible from land. Public shoreline in the western portion of the reach can be directly accessed from the Salt Creek Recreation Area. From the recreation area, access to eastern shoreline (Striped Peak Recreation Area) is available via a trail.

Impervious Surfaces

No impervious surface is mapped within the reach.

Shoreline Modifications

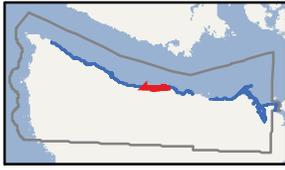
There are no shoreline modifications mapped within the reach.

Contaminated Sites

There are no identified contaminated sites within the reach.

Cultural Resources

At Tongue Point, at the border of Reaches 8 and 9, Fort Hayden (built in 1940s for military purposes) is listed on the state historic registry. There are also 3 inventoried pre-contact sites within the reach, including a pre-contact camp site.



REACH MR-9: Crescent Bay-Low Point

SHORELINE LENGTH
10.73 Miles

REACH AREA
252.67 Acres

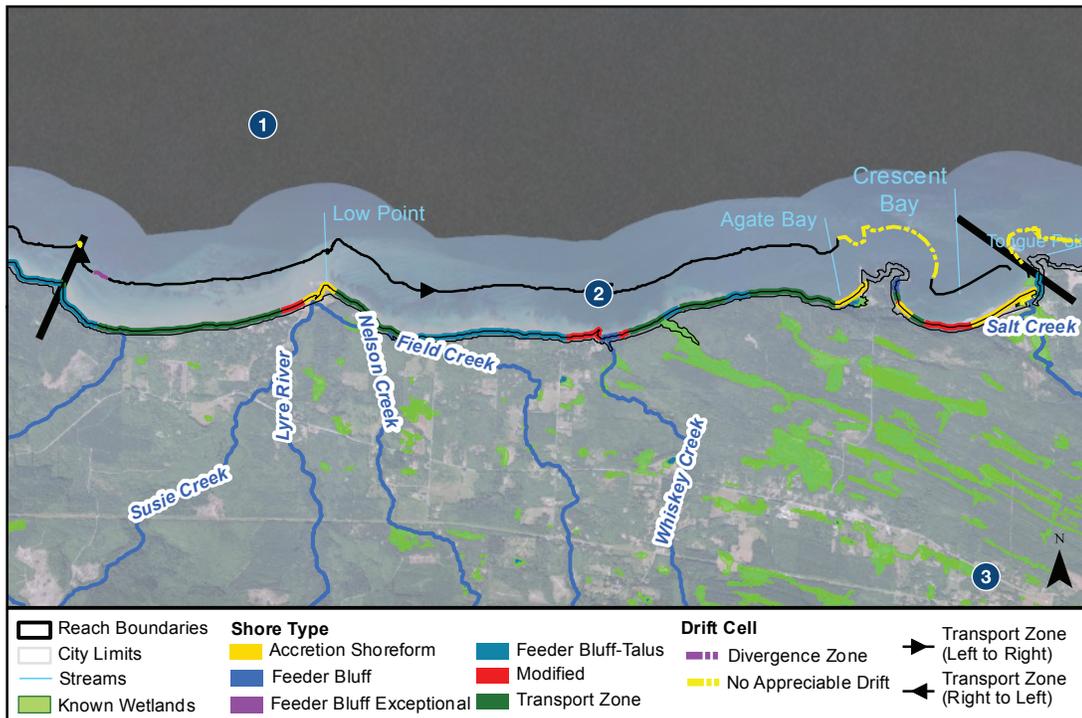
PSNERP PROCESS UNITS
SPU 1027

REACH SUMMARY

The "Crescent Bay-Low Point" reach extends from the east end of Crescent Bay to approximately 2 miles west of Low Point along the Strait of Juan de Fuca. The feeder bluffs at the western portion of the reach, combined with eastward net shore drift, maintain the beaches at Crescent Bay. There are no identified shoreline modifications within the reach. Most of the shoreland area is forested, and the nearshore area contains dense concentrations of submerged aquatic vegetation which provides important habitat for marine species, including juvenile salmonids.

Land uses and ownership within the shoreland zone vary throughout the reach. The reach contains DNR-managed forest land, privately-owned campgrounds, residential development, and a large amount of undeveloped, privately owned land. Most of Crescent Bay, Agate Bay, and Low Point are in tsunami hazard zones and FEMA-mapped floodplain.

Under current zoning regulations, almost three-quarters of the shoreland area has potential for new residential development. Undeveloped parcel sizes, shapes, and zoning categories vary throughout the reach. Many of the parcels are large in area, and could be subdivided into 2 to 20 acre lots, depending upon the zoning category.



Shoreline Oblique Photos (Ecology, 2005)

PHYSICAL CHARACTERISTICS

Shoreform and Shoretype

The most common shoretype within the reach is bluff backed beaches (43%) followed by rocky platform shores (23%). Other shoretypes mapped within the reach include barrier beaches (13%), pocket beaches (9%), and barrier estuaries (5%). Mapped geomorphic shoreforms within the reach are feeder bluffs (4%), talus feeder bluffs (35%), transport zones (33%), and accretion shoreforms (17%). 12% of the reach is mapped as modified.

Net Shore Drift

Net shore drift is predominantly eastward throughout the reach, but with one short drift cell exhibiting westward drift is located in the western end of the reach. A small area of No Appreciable Drift occurs at the bedrock headland that separates Crescent and Agate Bays.

Hazard Areas

Most bluff areas are unstable (53%) with recent slides (1%) mapped in Agate Bay and the southwestern portion of the reach. Most of Crescent Bay thru Agate Bay, and Low Point is in a tsunami hazard zone (51%) and FEMA coastal and stream 100-year floodplains (46%).

REACH REACH MR-9: Crescent Bay-Low Point

Degree of Process Degradation

Within the reach, the sediment input, sediment transport, erosion/accretion of sediment, tidal flow, tidal channel formation, detritus import and export, exchange of aquatic organisms, exchange of aquatic organisms, and solar incidence processes have low degradation levels.

ECOLOGY

Offshore Vegetation

Eelgrass is mapped throughout 17% of this reach, patchy (14%) followed by continuous (3%) from Tongue Point to the western end of Crescent Bay. Kelp is mapped throughout the reach (42%), but is somewhat sparse in Crescent Bay.

Onshore Vegetation

56% of the shoreland area of the reach is mapped as forest habitat, 12% is mapped as natural shrub and herbaceous vegetation, and 10% is mapped as lawn/landscaping.

Habitats and Species

6% of the landward portion of the reach consists of wetland habitat. Designated priority habitats within the reach are bald eagle and cliffs/bluffs. In addition, harbor seal habitat and a marine mammal haulout are mapped at Low Point, and a gray whale feeding area (1%) is mapped at Crescent Bay.

Patches of forage fish spawning habitat (smelt) are mapped east of Whiskey Creek and west of the Lyre River. Coho, chinook, and chum; resident cutthroat trout, and steelhead are mapped in the streams within the reach.

The marine nearshore areas in the reach (Strait of Juan de Fuca and Crescent Bay) provide important habitat for a wide variety of marine species that utilize nearshore habitat, including several salmon and trout species.

Shellfish

Red sea urchin is mapped throughout the reach (88% of reach total). Abalone is mapped at the eastern portion of the reach (41%), and Dungeness crab at the western and eastern portions (51%).

Water Quality

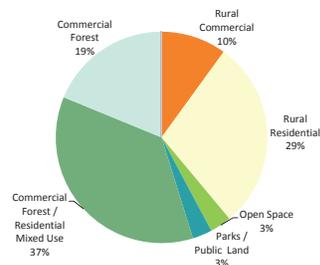
The reach has no State impaired water quality listings. However, Streamkeepers has listed Whiskey Creek water quality as "impaired" for WQI, and the Lyre River is listed as "impaired" for B-IBI but "healthy" for WQI. Salt Creek is listed as "compromised" for both B-IBI and WQI.

HUMAN ENVIRONMENT AND LAND USE

Existing Land Use and Ownership

Land usage in the shoreland area is timber (40%), residential (30%), lodging (14%), vacant (8%), open space (6%), and roads (2%). Land ownership within the reach is 81% private and 19% public.

Zoning and Parcel Data



Under current zoning regulations there is moderate potential for significant new development within the reach.

Public Access

52% of the shoreline in this reach is publicly owned, but only 3% of the reach is public shoreline that is accessible from land. Public shoreline in the far eastern portion of the reach can be directly accessed from the Salt Creek Recreation Area. Shoreline in the western end of the reach An additional 36.4% of the shoreline in the reach is not publically owned, but can be accessed by patrons of privately-owned campgrounds (Crescent Beach and RV Park, Whiskey Creek Campground, and Lyre River Campground).

Impervious Surfaces

Approximately 2% of the landward portion of the reach is covered by impervious surfaces.

Shoreline Modifications

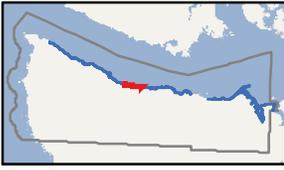
A breakwater, associated with a boat ramp, is located at the Whiskey Creek Beach Resort.

Contaminated Sites

There are no identified contaminated sites within the reach.

Cultural Resources

There are 7 inventoried pre-contact sites within the reach, including 2 pre-contact camp sites.



REACH MR-10: Twin Rivers

SHORELINE LENGTH
7.40 Miles

REACH AREA
174.99 Acres

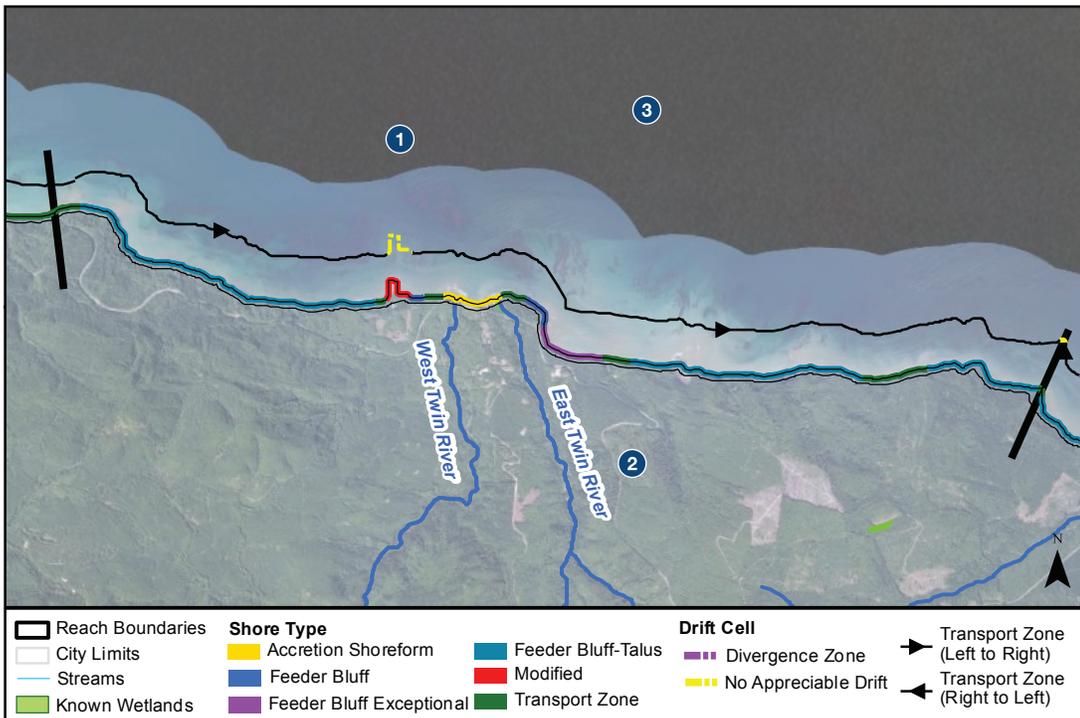
PSNERP PROCESS UNITS
SPU 1027

REACH SUMMARY

The "Twin Rivers" reach extends from approximately 2 miles west of Low Point to 1 mile east of the mouth of Deep Creek, along Strait of Juan de Fuca shoreline. The predominant shoretype within the reach is bedrock ramp shores, with some beach areas located at the Twin River mouths. Net shore drift is eastward through the reach; however, a large manmade obstruction is located in the western portion of the reach. Most of the shoreland area is forested, and the nearshore area contains dense concentrations of submerged aquatic vegetation which provides important habitat for marine species, including juvenile salmonids.

Most of the land within the shoreland zone is privately owned, and zoned for commercial forestry. Some DNR-managed forest land is located in the eastern portion of the reach. The shorelands within the reach are largely undeveloped.

Under current zoning regulations, approximately one-third of the shoreland area has potential for new residential development. However, most of this land is zoned for commercial forestry. Most of the forestry land in the reach is not eligible for subdivision. Actual development potential within this reach is minimal.



Shoreline Oblique Photos (Ecology, 2005)

PHYSICAL CHARACTERISTICS

Shoreform and Shoretype

The predominant shoretype in Reach 10 is bedrock ramp shores (84%), with portions of barrier beaches (4%) and bluff backed beaches (4%). Geomorphic shoreforms within the reach consists of feeder bluff (7%), feeder bluff exceptional (7%), and feeder bluff-talus (68%). 12% of the shoreline is mapped as transport zones and 6% is mapped as accretion shoreforms.

Net Shore Drift

Net shore drift is entirely eastward through Reach 10. A large, man-made obstruction to littoral drift occurs in the western portion of the reach, essentially bisecting drift into two separately functioning cells. This obstruction has been identified as a possible restoration site by state and federal agencies.

Hazard Areas

Most bluff areas are unstable (59%) with recent slides mapped in the southeastern portion of the reach (6%). The East and West Twin River shoreline areas are in a tsunami hazard zone (16%) and the FEMA coastal 100-year floodplain (16%).

REACH REACH MR-10: Twin Rivers

Degree of Process Degradation

Within the reach, the sediment input, sediment transport, erosion/accretion of sediment, tidal flow, tidal channel formation, detritus import and export, exchange of aquatic organisms, exchange of aquatic organisms, and solar incidence processes have low degradation levels.

ECOLOGY

Offshore Vegetation

Eelgrass is mapped throughout 39% of this reach, primarily in the eastern half. Kelp is mapped throughout the reach (52%), with the exception of near the mouths of the Twin Rivers.

Onshore Vegetation

63% of the shoreland area is mapped as forest habitat, 13% is mapped as natural shrub and herbaceous vegetation, and 5% is mapped as lawn/landscaping.

Habitats and Species

No wetland habitat is mapped in the reach. Designated priority habitats mapped throughout the reach include cliffs/bluffs, bald eagle, and harbor seal. In addition, 3 marine mammal haulout areas are located within the reach.

Two patches of forage fish spawning habitat (smelt) are mapped near the mouth of the Twin Rivers. Coho salmon, chum salmon, resident cutthroat trout, and steelhead are mapped in the rivers.

The marine nearshore areas in the reach (Strait of Juan de Fuca) provide important habitat for a wide variety of marine species that utilize nearshore habitat, including several salmon and trout species.

Shellfish

Red sea urchin is mapped throughout the reach (92% of reach total), and Dungeness crab is mapped at the western portion (42%).

Water Quality

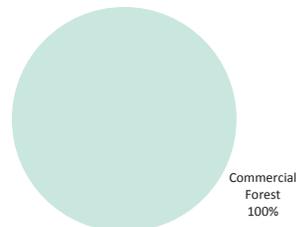
The reach has no State impaired water quality listings. However, within the reach boundary, Streamkeepers lists the water quality of the East Twin River as "impaired" for WQI, and the West Twin River is listed as "compromised" for B-IBI but "healthy" for WQI.

HUMAN ENVIRONMENT AND LAND USE

Existing Land Use and Ownership

Land usage in the shoreland area is timber (64%), vacant (21%), commercial (6%), residential (4%), roads (4%), and open space (2%). The majority of non-timber land is located in the center of the reach, near the Twin Rivers. Land ownership within the reach is 67% private and 33% public.

Zoning and Parcel Data



Under current zoning regulations there is minimal potential for significant new residential development within the reach. Land within the reach is zoned for commercial forestry.

Public Access

95% of the shoreline in this reach is publicly owned, but only 7% of the reach contains public shoreline that is accessible from land. This shoreline area (Twin Rivers) is accessible from Highway 112; however, there are no dedicated parking areas available.

Impervious Surfaces

Approximately 4% of the landward portion of the reach is covered by impervious surfaces.

Shoreline Modifications

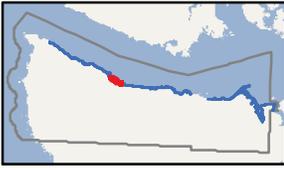
An area of nearshore fill (4.12 acres) is mapped to the west of West Twin River. There are no other shoreline modifications mapped within the reach.

Contaminated Sites

There are no identified contaminated sites within the reach.

Cultural Resources

There is 1 inventoried pre-contact site within the reach.



REACH MR-11: Deep Creek

SHORELINE LENGTH
5.30 Miles

REACH AREA
127.36 Acres

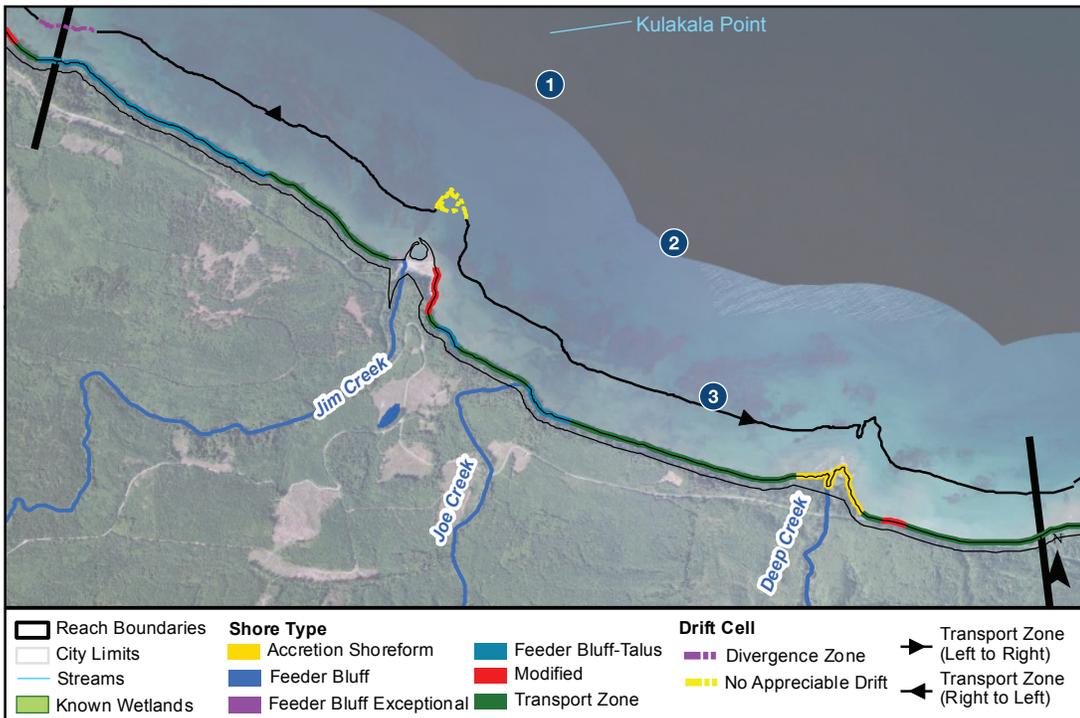
PSNERP PROCESS UNITS
SPU 1027

REACH SUMMARY

The "Deep Creek" reach extends from approximately 1 mile east of the mouth of Deep Creek to approximately 1 mile east of the Pysht River estuary, along the Strait of Juan de Fuca. The eastern half of the reach is composed of bluff backed beach, while the western half is comprised primarily of rocky platform shores. Net shore drift along the reach is entirely eastward; however, a large obstruction (the Silver King Resort breakwater) is located at the mouth of Jim Creek. Most of the shoreland area is forested, and the nearshore area contains dense concentrations of submerged aquatic vegetation that provides important salmonid rearing habitat, as well as habitat for other marine species.

Land usage within the shoreland area is commercial forestry, with the exception of the Silver King Resort area. The shorelands within the reach are largely undeveloped.

Under current zoning regulations, almost the entire shoreland zone has potential for new residential development. However, most of this land is zoned for commercial forestry. Most of the forestry land in the reach is not eligible for subdivision. Actual development potential within this reach is minimal.



Shoreline Oblique Photos (Ecology, 2005)

PHYSICAL CHARACTERISTICS

Shoreform and Shoretype

Shoretypes within the reach include bluff backed beaches in the eastern portion of the reach (50%), while the western portion consists of rocky platform shores (34%) and barrier beaches (6%). Geomorphic shoreforms are feeder bluff-talus (47%), transport zones (34%), and accretion shoreforms (11%). 8% of the reach is mapped as modified.

Net Shore Drift

Net shore drift is entirely eastward and encompasses the origin or western extent of the same drift cell found in Reach 10. A large obstruction to littoral drift bisects the historic drift cell (breakwater) at the mouth of Jim Creek in the northern portion of the reach.

Hazard Areas

Most bluff areas are unstable (64%) with recent slides mapped directly west of Deep Creek (2%). Most of the Jim Creek and Deep Creek shoreline areas are in a tsunami hazard zone (53%) and FEMA coastal and stream 100-year floodplain (20%).

REACH REACH MR-11: Deep Creek

Degree of Process Degradation

Within the reach, the sediment input, sediment transport, erosion/accretion of sediment, tidal flow, tidal channel formation, detritus import and export, exchange of aquatic organisms, exchange of aquatic organisms, and solar incidence processes have low degradation levels.

ECOLOGY

Offshore Vegetation

Patches of kelp are mapped (37%) throughout the reach.

Onshore Vegetation

71% of the shoreland area of the reach is mapped as forest habitat, 9% is mapped as natural shrub and herbaceous vegetation, and 13% is mapped as lawn/landscaping.

Habitats and Species

No wetland habitat is mapped in this reach. Designated priority habitats mapped throughout the reach include cliffs/bluffs, bald eagle, and harbor seal. In addition, 3 marine mammal haulout areas are identified within the reach.

Two patches of forage fish spawning habitat (smelt) are mapped at the eastern and western ends of the reach. Coho, chinook, and chum salmon; resident cutthroat; and steelhead are mapped in Jim and Deep creeks.

The marine nearshore areas in the reach (Strait of Juan de Fuca) provide important habitat for a wide variety of marine species that utilize nearshore habitat, including several salmon and trout species.

Shellfish

Dungeness crab (90% of reach total) and red sea urchin (88%) are mapped throughout the reach. A patch of hardshell clam (3%) is mapped at the western portion of the reach.

Water Quality

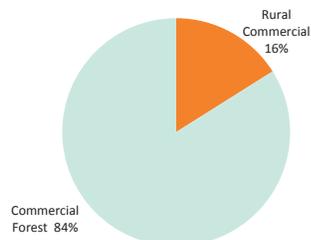
The portion of Deep Creek within the reach has State impaired water quality listings for dissolved oxygen and temperature. Water quality is listed by Streamkeepers as "healthy" for WQI.

HUMAN ENVIRONMENT AND LAND USE

Existing Land Use and Ownership

Land usage in the shoreland area is timber (61%), lodging (34%), roads (5%), and vacant (1%). The lodging area is located at the center of the reach, and is surrounded by timber land. Land ownership within the reach is 100% private.

Zoning and Parcel Data



Under current zoning regulations, there is a low potential for significant new residential and commercial development within the reach. Most of the land within the reach is zoned for commercial forestry.

Public Access

69% of the shoreline in this reach is publicly owned; however, none of this area is accessible from land. An additional 22% of the shoreline in the reach is not publically owned, but can be accessed by Silver King owners and guests.

Impervious Surfaces

Approximately 5% of the landward portion of the reach is covered by impervious surfaces.

Shoreline Modifications

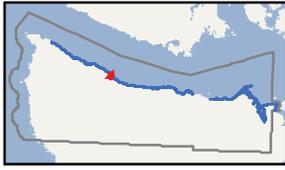
Shoreline armoring (9% of reach total), nearshore fill (1.86 acres), and 3 overwater structures (building, dock, and bridge) are mapped in the center of the reach, at Silver King boat launch. The remainder of the reach has no mapped shoreline modifications.

Contaminated Sites

There are no identified contaminated sites within the reach.

Cultural Resources

There is 1 inventoried pre-contact site within the reach.



REACH MR-12: Pysht River

SHORELINE LENGTH
2.38 Miles

REACH AREA
65.66 Acres

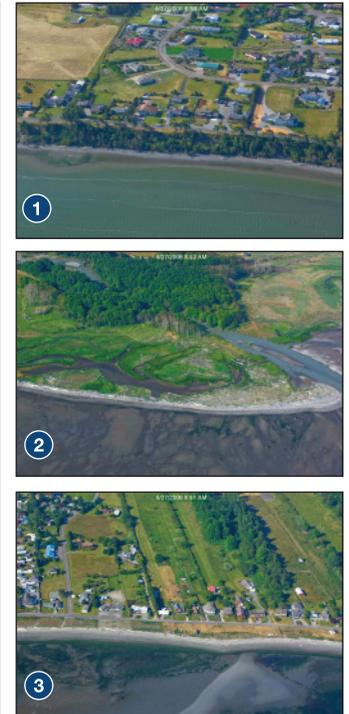
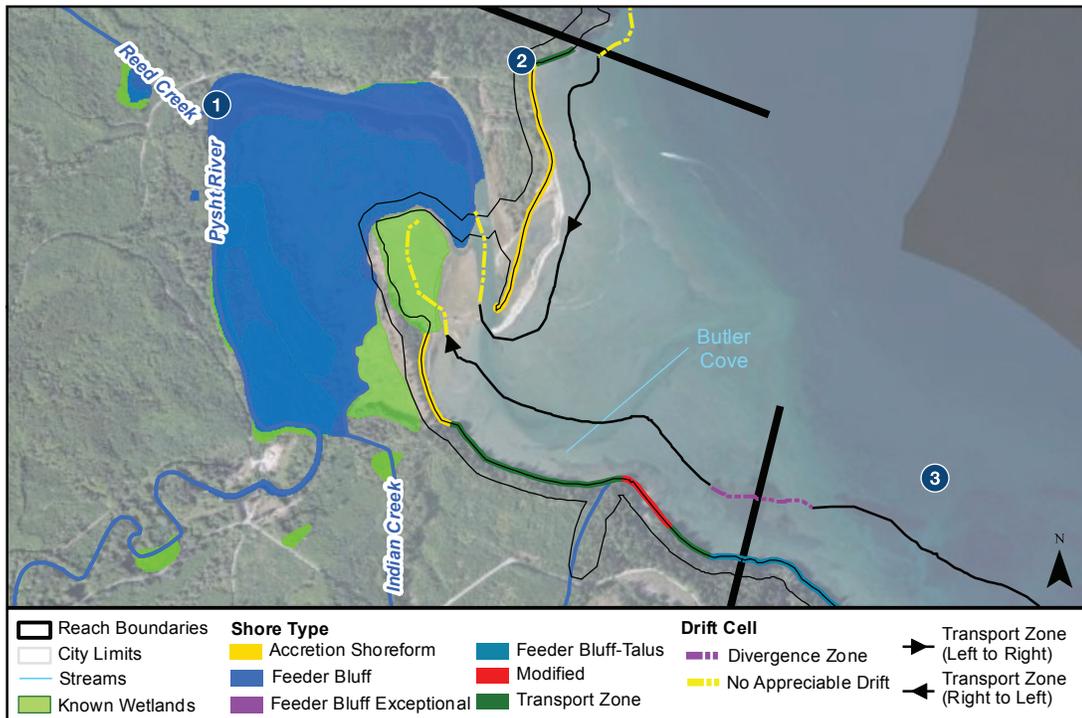
PSNERP PROCESS UNITS
SPU 1027

REACH SUMMARY

The "Pysht River" reach extends from approximately one-third of a mile east of the Butler Creek mouth to just south of Pillar Point, and includes the Pysht River estuary. A south-trending drift cell maintains barrier beach near the river mouth. Rocky platform shores comprise the eastern portion of the shoreline. The shoreline is unaltered, with the exception of levees at the river mouth. Most of the shoreland area is forested, and the nearshore area contains dense concentrations of submerged aquatic vegetation that provides important salmonid rearing habitat. The wetland habitat at the Pysht River estuary is an important waterfowl habitat area.

Land usage within the shoreland area is commercial forestry, low-density residential, and open space. The shorelands within the reach are largely undeveloped. A small portion of the shoreline is publically owned, and be accessed from Pillar Point Recreation Area (at Butler Cove).

Under current zoning regulations, almost the entire shoreland zone has potential for new residential development. However, most of this land is zoned for commercial forestry. Most of the forestry land in the reach is not eligible for subdivision. Actual development potential within this reach is minimal.



Shoreline Oblique Photos (Ecology, 2005)

PHYSICAL CHARACTERISTICS

Shoreform and Shoretype

The most abundant shoretype in the reach barrier estuary (54%) associated with the mouth of the Pysht River. The barrier itself represents 23% of the reach, and rocky platforms comprise the remaining 23%. Geomorphic shoreforms mapped within the reach are primarily accretion shoreforms (49%) and transport zones (37%), with a lesser amount of feeder bluff-talus (4%). 9% of the shoreline is mapped as modified.

Net Shore Drift

Short net shore-drift cells originating at Pillar Point and slightly east of Butler Cove converge at the Pysht River estuary.

Hazard Areas

Several bluff areas are unstable (27%) in the southeast and northern portion of the reach with no recent slides mapped. Nearly all of the Pysht River estuary is in a tsunami hazard zone (64%) and FEMA coastal and stream 100-year floodplains (76%).

REACH REACH MR-12: Pysht River

Degree of Process Degradation

Within the reach, the sediment input, sediment transport, erosion/accretion of sediment, tidal flow, tidal channel formation, detritus import and export, exchange of aquatic organisms, exchange of aquatic organisms, and solar incidence processes have low degradation levels.

ECOLOGY

Offshore Vegetation

There is no kelp or eelgrass mapped within the reach.

Onshore Vegetation

52% of the shoreland area is mapped as forest habitat, 41% is mapped as natural shrub and herbaceous vegetation, and 3% is mapped as lawn/landscaping.

Habitats and Species

11% of the shoreland area of the reach is identified as wetland habitat, primarily in the Pysht River estuary. Designated priority habitats within the reach include estuarine zone, harbor seal, and waterfowl concentrations.

A patch of forage fish spawning habitat (sand lance is mapped in the northern portion of the reach. Coho, chinook, and chum salmon; resident cutthroat trout; and steelhead are mapped in the Pysht River.

The marine nearshore areas in the reach (Strait of Juan de Fuca and Pysht River estuary) provide important habitat for a wide variety of marine species that utilize nearshore habitat, including several salmon and trout species.

Shellfish

Dungeness crab (80% of reach total) and red sea urchin (77%) are mapped throughout the reach. Hardshell clam is mapped along the reach, of which 7% is located within the reach boundary.

Water Quality

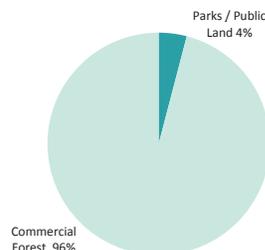
The portion of the Strait of Juan de Fuca within the reach has a State impaired water quality listing for fecal coliform. Pysht River water quality within the reach is listed by Streamkeepers as "compromised" for B-IBI.

HUMAN ENVIRONMENT AND LAND USE

Existing Land Use and Ownership

Land usage in the shoreline area is timber (33%), residential (33%) and vacant (30%), and open space (4%). The residential land is located in the northern portion of the reach, near the Pysht River. Land ownership within the reach is 100% private.

Zoning and Parcel Data



Under current zoning regulations, there is a low potential for significant new residential development within the reach. Most of the land within the reach is zoned for commercial forestry.

Public Access

5% of the shoreline in this reach is publicly owned, and can be directly accessed at Pillar Point County Park (located near Butler Cove). Recreational crab harvesting is available at the park.

Impervious Surfaces

No impervious surface is mapped within the reach.

Shoreline Modifications

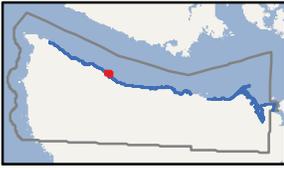
Tidal barriers (levees) (11% of reach total) are mapped in the reach, at the mouth of the Pysht River. A fish passage barrier (culvert) is mapped in the southern portion of the reach, at Butler Creek.

Contaminated Sites

There are no identified contaminated sites within the reach.

Cultural Resources

There are 2 inventoried pre-contact sites and 1 inventoried historic site (the Pysht River log camp – yard and log raft site for Merrill and Ring Company) within the reach.



REACH MR-13: Pillar Point

SHORELINE LENGTH

2.14 Miles

REACH AREA

48.60 Acres

PSNERP PROCESS UNITS

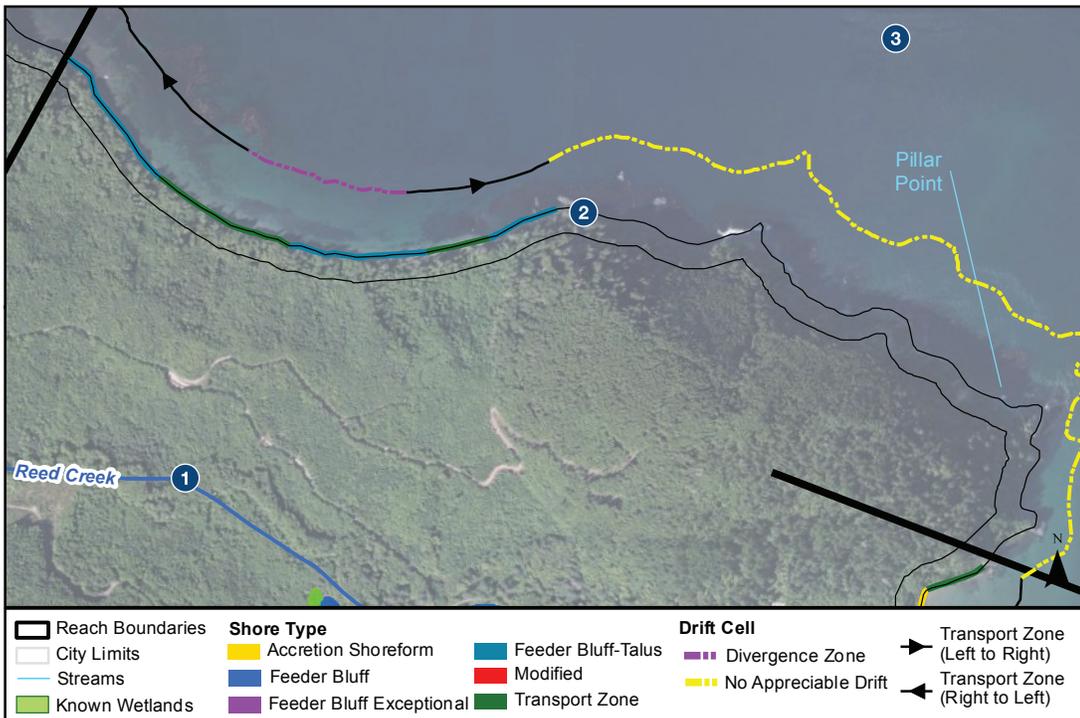
SPU 1027 & 1028

REACH SUMMARY

The "Pillar Point" reach extends from Pillar Point to approximately a mile and a half west of the point, along the Strait of Juan de Fuca. Almost the entire shoreline of the reach consists of bedrock shores, with rocky platforms comprising the eastern half and a broad pocket beach in the western half. There are no identified shoreline modifications within the reach. Most of the shoreland area is forested, and the nearshore area contains dense concentrations of submerged aquatic vegetation which provides important habitat for marine species, including juvenile salmonids.

Land ownership within the reach is almost entirely private, and usage is primarily timber, with a smaller amount of low-density residential located in the eastern portion of the reach. Most of the actual shoreline is publically owned, but cannot be accessed from land.

Under current zoning regulations, more than half of the entire shoreland zone has potential for new residential development. However, most of this land is zoned for commercial forestry. Most of the forestry land in the reach is not eligible for subdivision. Actual development potential within this reach is minimal



Shoreline Oblique Photos (Ecology, 2005)

PHYSICAL CHARACTERISTICS

Shoreform and Shoretype

Shoretypes within the reach consist primarily of rocky platforms (57%), with a broad pocket beach (41%) located in the western portion of the reach. Geomorphic shoreforms are feeder bluff-talus units (63%) backing the pocket beach, with No Appreciable Drift (41%) in the eastern portion of the reach. The remaining shoreline in the reach consists of transport zones (37%).

Net Shore Drift

This reach consists of 2 short drift cells and one area of no appreciable drift. West of Pillar Point, two short drift cells converge, both of which are adjacent to areas of No Appreciable Drift, where bedrock shores and deep water preclude beach development.

Hazard Areas

Many bluff areas are unstable (94%) with recent slides mapped in the northwestern portion of the reach (4%). A portion of Pillar Point and the northwestern shoreline of the reach is in a tsunami hazard zone (17%) and the FEMA coastal floodplain (10%).

REACH REACH MR-13: Pillar Point

Degree of Process Degradation

Within the reach, the sediment input, erosion/accretion of sediment, tidal flow, tidal channel, freshwater input, detritus important and export, exchange of aquatic organisms, and solar incidence processes have low degradation levels. The sediment transport process is moderately degraded in the western half of the reach, and has a low degradation level in the east half.

ECOLOGY

Offshore Vegetation

Kelp is mapped throughout the reach (54%).

Onshore Vegetation

84% of the shoreland area is mapped as forest habitat and 8% is mapped as natural shrub and herbaceous vegetation.

Habitats and Species

No wetland habitat is identified within the reach. Designated priority habitat habitats mapped throughout the reach include cliffs/bluffs, bald eagle, and harbor seal. In addition, 2 marine mammal haulout areas are mapped within the reach.

No forage fish presence is mapped within the reach. There are no streams within the reach; therefore, there is no mapped freshwater fish use.

The marine nearshore areas in the reach (Strait of Juan de Fuca) provide important habitat for a wide variety of marine species that utilize nearshore habitat, including several salmon and trout species.

Shellfish

Red sea urchin is mapped throughout the reach (59% of reach total). Hardshell clam (32%) and Dungeness crab (13%) are mapped in the eastern portion of the reach.

Water Quality

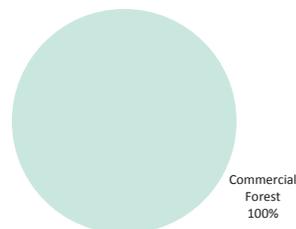
The reach has no impaired water quality listings.

HUMAN ENVIRONMENT AND LAND USE

Existing Land Use and Ownership

Land usage in the shoreland area is timber (62%) and residential (38%). The residential land is located at the eastern end of the reach, adjacent to Pillar Point. Land ownership within the reach is 97% private and 3% public.

Zoning and Parcel Data



Under current zoning regulations, there is a low potential for significant new residential development within the reach. Most of the land within the reach is zoned for commercial forestry.

Public Access

73% of the shoreline in this reach is publicly owned. However, the water can not be accessed from land.

Impervious Surfaces

No impervious surface is mapped within the reach.

Shoreline Modifications

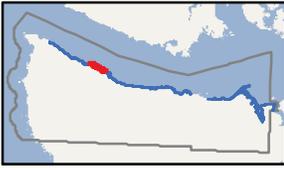
There are no shoreline modifications mapped within the reach.

Contaminated Sites

There are no identified contaminated sites within the reach.

Cultural Resources

There is 1 inventoried WWII-era historic site within the site.



REACH MR-14: Slip Point

SHORELINE LENGTH
6.77 Miles

REACH AREA
154.73 Acres

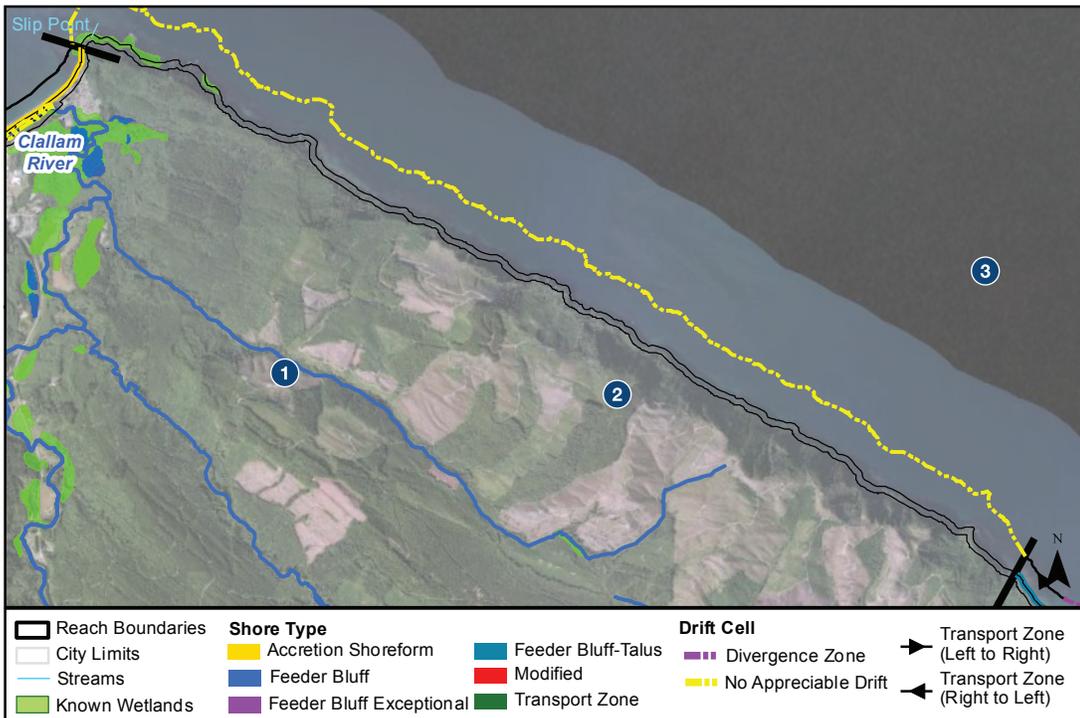
PSNERP PROCESS UNITS
SPU 1028

REACH SUMMARY

The "Slip Point" reach extends from approximately a mile and a half west of Pillar Point to Slip Point, along the Strait of Juan de Fuca. Bedrock rocky platform shores comprise the shoreline within the reach, and there is no appreciable net shore drift along the shores. There are no identified shoreline modifications within the reach. Most of the shoreland area is forested, and the nearshore area contains dense concentrations of submerged aquatic vegetation which provides important habitat for marine species, including juvenile salmonids.

Almost the entire shoreland area is privately-owned timber land. Nearly the entire shoreline is publically owned; however, the water can be accessed from land within the reach.

Under current zoning regulations, more than 90% of the entire shoreland zone has potential for new residential development. However, all of this land is zoned for commercial forestry. Most of the forestry land in the reach is not eligible for subdivision. Actual development potential within this reach is minimal



Shoreline Oblique Photos (Ecology, 2005)

PHYSICAL CHARACTERISTICS

Shoreform and Shoretype

Bedrock rocky platform shores comprise 98% of the reach shoreline.

Net Shore Drift

There is no appreciable net shore drift within the reach.

Hazard Areas

Many bluff areas are unstable (90%), but no recent slides are mapped within the reach. Most of the shoreline near Slip Point is in a tsunami hazard zone (15%) and the FEMA coastal floodplain (10%).

REACH REACH MR-14: Slip Point

Degree of Process Degradation

Within the reach, the erosion/accretion of sediment, freshwater input, detritus import and export, exchange of aquatic organisms, and solar incidence processes have low degradation levels. The sediment transport process is moderately degraded.

ECOLOGY

Offshore Vegetation

Kelp is mapped throughout the reach (57%).

Onshore Vegetation

92% of the shoreland area is mapped as forest habitat and 4% is mapped as natural shrub and herbaceous vegetation.

Habitats and Species

5% of the landward portion of the reach is mapped as wetland habitat, located primarily near Slip Point. Designated priority habitats mapped throughout the reach include cliffs/bluffs, bald eagle, and harbor seal. In addition, 4 identified marine mammal haulout areas are mapped throughout the reach.

No forage fish presence is mapped within the reach. There are no streams within the reach; therefore, there is no mapped freshwater fish use.

The marine nearshore areas in the reach (Strait of Juan de Fuca) provide important habitat for a wide variety of marine species that utilize nearshore habitat, including several salmon and trout species.

Shellfish

Red sea urchin is mapped throughout the reach (55% of reach total), and abalone is mapped at the western half (64%). Dungeness crab (10%) and hardshell clam (3%) are mapped at the western end of the reach, near Clallam Bay.

Water Quality

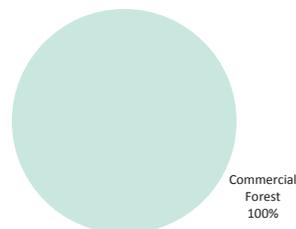
The reach has no impaired water quality listings.

HUMAN ENVIRONMENT AND LAND USE

Existing Land Use and Ownership

Land usage in the shoreland area is primarily timber (98%), with some open space (2%). Land ownership within the reach is 99.8% private and 0.2% public.

Zoning and Parcel Data



Under current zoning regulations, there is a low potential for significant new residential development within the reach. Most of the land within the reach is zoned for commercial forestry.

Public Access

97% of the shoreline in this reach is publicly owned; however, it can not be accessed from land.

Impervious Surfaces

No impervious surface is mapped within the reach.

Shoreline Modifications

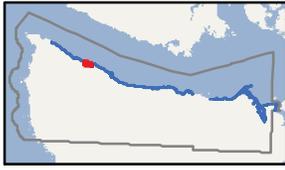
There are no shoreline modifications mapped within the reach.

Contaminated Sites

There are no identified contaminated sites within the reach.

Cultural Resources

There are no inventoried sites within the reach.



REACH MR-15: Clallam Bay

SHORELINE LENGTH
5.65 Miles

REACH AREA
96.06 Acres

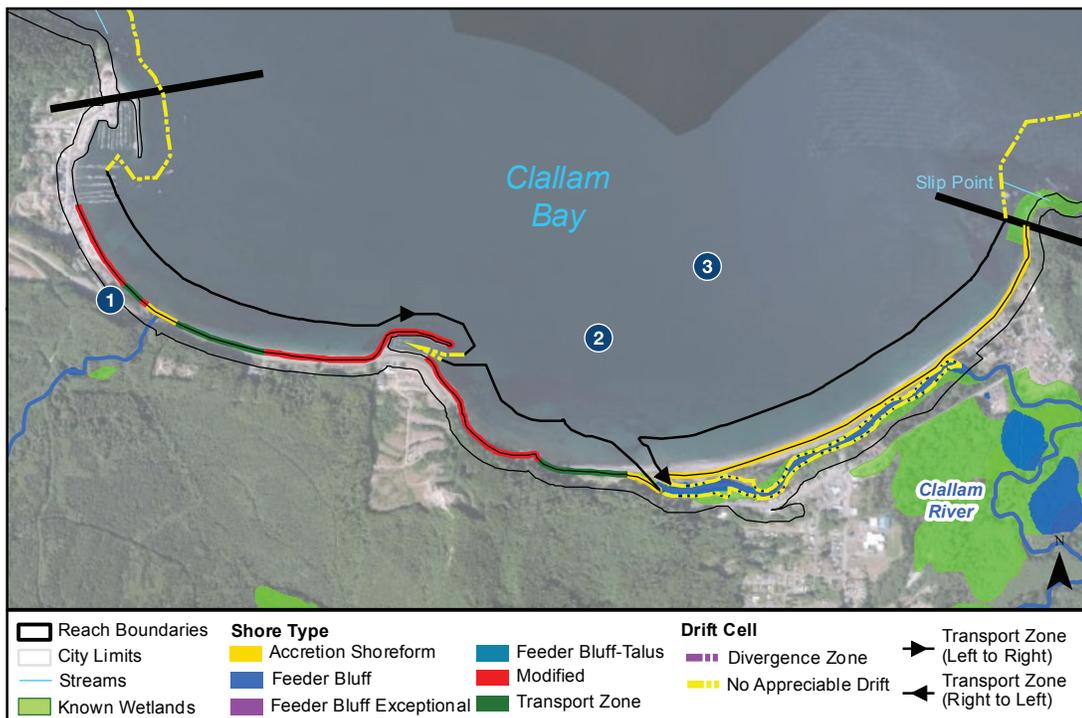
PSNERP PROCESS UNITS
SPU 1028 & 1029

REACH SUMMARY

The "Clallam Bay" reach consists of the shoreline in the entire bay. The eastern half of the shoreline consists of low beaches, which are maintained by two drift cells that converge near the mouth of the Clallam River. The western half of the shoreline is composed of bluff-backed beaches. Approximately 20% of the shoreline is armored, which is concentrated two marinas within the bay. The bay shoreline contains kelp stands and two patches of forage fish spawning habitat, which provides important habitat for marine species, including juvenile salmonids.

Major land uses within the shoreland area include open space, roads, lodging, high-density residential development, and commercial. Clallam Bay Spit Park is located at the eastern end of the reach. Approximately one-quarter of the reach contains forest habitat, which provides habitat for many species, including bald eagle. Most of the vegetation within the shorelands has been altered by development.

Under current zoning regulations, approximately half of the shoreland area has potential for new development. Most of the undeveloped land is zoned for lodging or commercial development. These undeveloped parcels are narrow in width, with wide water frontages. Development in these parcels would likely require the installation of shoreline armoring to protect structures, which may degrade salmon rearing habitat and impede natural sediment processes.



Shoreline Oblique Photos (Ecology, 2005)

PHYSICAL CHARACTERISTICS

Shoreform and Shoretype

Barrier estuary (32%) and barrier beach (19%) associated with the mouth of the Clallam River account for a large portion of the reach shoretype. Bluff backed beaches (36%) are present in the western portion of the bay. Geomorphic shoretypes mapped within the reach are primarily mapped transport zones (11%), with accretion shoreforms (48%) in the eastern half of the reach. Modified shores account for the remaining 41% of the reach.

Net Shore Drift

Two drift cells originating near that headlands at the eastern and western end of Clallam Bay converge in the central portion of the bay, near the mouth of the Clallam River.

Hazard Areas

Several bluff areas are unstable (27%) with recent slides mapped near the center of the reach. Recent slides are near existing buildings and marinas. Most of Clallam Bay and the Clallam River floodplain is in a tsunami hazard zone (70%) and FEMA coastal and stream 100-year floodplains (40%).

REACH REACH MR-15: Clallam Bay

Degree of Process Degradation

Within the reach, the erosion/accretion of sediment, freshwater input, and solar incidence processes have low degradation levels, while the sediment input and sediment transport processes have moderate degradation levels. The detritus import and export and exchange of aquatic organisms processes are moderately degraded in the western half of the reach, and have low degradation levels in the eastern half.

ECOLOGY

Offshore Vegetation

Kelp is mapped throughout the reach (57%).

Onshore Vegetation

23% of the shoreland area is mapped as forest habitat, 17% is mapped as natural shrub and herbaceous vegetation, and 54% is mapped as lawn/landscaping.

Habitats and Species

7% of the shoreland area is mapped as wetland habitat, primarily along the Clallam River. The designated priority habitat mapped within the reach is bald eagle (5%).

Two patches of forage fish spawning habitat are mapped in along the Clallam Bay shoreline. Sand lance is mapped near the mouth of the Clallam River, and smelt is mapped west of a marina in the central portion of the reach. Coho salmon, chum salmon, resident cutthroat trout, and steelhead are mapped in the Clallam River.

The marine nearshore areas in the reach (Clallam Bay) provide important habitat for a wide variety of marine species that utilize nearshore habitat, including several salmon and trout species.

Shellfish

Clallam Bay supports significant populations of shell fish. Abalone is mapped throughout the reach (100.0% of reach total), as well as Dungeness crab (80%), red sea urchin (74%), and hardshell clam (25%).

Water Quality

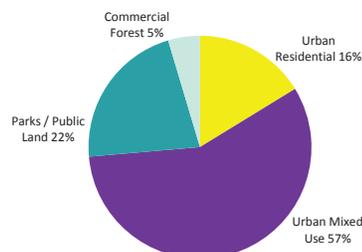
The portion of the Clallam River within the reach has a State impaired water quality listing for temperature. Water quality of the river within the reach boundary is listed by Streamkeepers as "impaired" for WQI.

HUMAN ENVIRONMENT AND LAND USE

Existing Land Use and Ownership

Land usage in the shoreland area is open space (23%), vacant (21%), roads (20%), lodging (14%), residential (13%), commercial (5%), timber (4%), and utilities (2%). Land ownership within the reach is 91% private and 9% public.

Zoning and Parcel Data



Under current zoning regulations, there is high potential for significant new residential and commercial development.

Public Access

50% of the shoreline in this reach is publicly owned and accessible from land. Public shoreline in the eastern portion of the reach is directly accessible from Clallam Bay Spit Community Beach County Park. The public tidelands near the western end of the reach are accessible from Highway 112; however, no dedicated parking is available. An additional 21.0% of the shoreline in the reach (private marinas) is not publically owned, but can be accessed by marina patrons.

Impervious Surfaces

Approximately 28% of the landward portion of the reach is covered by impervious surfaces.

Shoreline Modifications

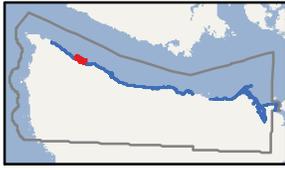
Shoreline armoring (22% of reach total) associated with two marina breakwaters is located at the western portion of the reach and at center of the reach. Several overwater structures (docks) are located behind the two breakwaters.

Contaminated Sites

There are no identified contaminated sites within the reach.

Cultural Resources

Sekiu School (built 1916) is listed on the state and national historic registries, and the Slip Point Light Station Keeper's Residence historic town site (built 1905) is listed on the state registry. Hotel structure along shoreline (built 1954) is inventoried for historic significance but not listed. In addition, there is 1 inventoried pre-contact site within the reach.



REACH MR-16: Sekiu-Kydaka Point

SHORELINE LENGTH
3.64 Miles

REACH AREA
93.42 Acres

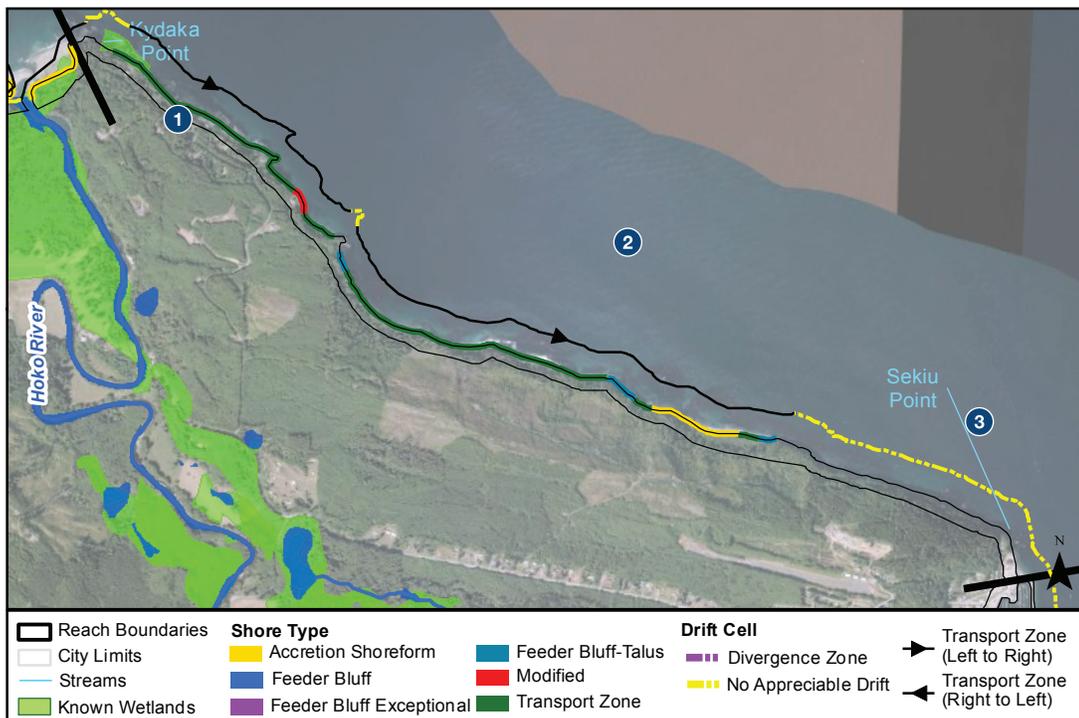
PSNERP PROCESS UNITS
SPU 1029

REACH SUMMARY

The "Sekiu-Kydaka Point" reach extends along the Strait of Juan de Fuca, from Sekiu Point to Kydaka Point. Bedrock ramp shores comprise a majority of the shoreline, with bluff backed beach in the center of the reach. Net shore drift is entirely eastward through the reach. With the exception of a small section of armoring at the east end, the shoreline is unaltered. Most of the shoreland area is forested, and the nearshore area contains dense concentrations of submerged aquatic vegetation which provides important habitat for marine species, including juvenile salmonids.

The eastern two-thirds of the reach is commercial timber land, with the exception of a WSP-managed parcel at the center of the reach. The western third of the reach consists of residential land (1 to 2 acre parcels), but most of the lots are undeveloped and forested.

Under current zoning regulations, approximately two-thirds of the shoreland area has potential for new residential development. However, most of this land is zoned for commercial forestry. Most of the forestry land in the reach is not eligible for subdivision. Development in the western end of the reach would consist of moderately-density residential infill. The waterward ends of these parcels are within mapped tsunami and coastal flood hazard area.



Shoreline Oblique Photos (Ecology, 2005)

PHYSICAL CHARACTERISTICS

Shoreform and Shoretype

Shoretypes in the reach are predominantly rocky platform shores (58%), with bluff backed beaches (36%) in the center of the reach. Two pocket beaches (4%) are mapped in the western portion of the reach. Geomorphic shoreforms within the reach are primarily transport zones (68%). Smaller portions of the shore are mapped as feeder bluff-talus (14%) and accretion shoreforms (11%). Modified shores comprised 6% of the reach.

Net Shore Drift

Net shore drift within the reach is eastward. Areas of no appreciable drift are found in both the east and west ends of the reach.

Hazard Areas

Most bluff areas are unstable (65%) with recent slides mapped southwest of Kydaka Point (3%). Most of the northwest portion of this reach is in a tsunami hazard zone (38%) and the FEMA coastal 100-year floodplain (88%).

REACH REACH MR-16: Sekiu-Kydaka Point

Degree of Process Degradation

Within the reach, the erosion/accretion of sediment, freshwater input, and solar incidence processes have low degradation levels. The sediment input, sediment transport, detritus important and export, and exchange of aquatic organisms processes are moderately degraded.

ECOLOGY

Offshore Vegetation

Kelp is mapped throughout the reach (64%).

Onshore Vegetation

81% of the shoreland area is mapped as forest habitat, 3% is mapped as natural shrub and herbaceous vegetation, and 6% is mapped as lawn/landscaping.

Habitats and Species

1% of the shoreland area consists of wetland habitat, which is located primarily near Kydaka Point. Designated priority habitats identified throughout the reach include cliffs/bluffs, bald eagle, and harbor seal. 3 marine mammal haulout areas are also mapped within the reach.

A patch of forage fish spawning habitat (smelt) is mapped at the east end of the reach. There are no streams within the reach; therefore, there is no mapped freshwater fish use.

The marine nearshore areas in the reach (Strait of Juan de Fuca) provide important habitat for a wide variety of marine species that utilize nearshore habitat, including several salmon and trout species.

Shellfish

Red sea urchin is mapped throughout the reach (80% of reach total). Abalone is mapped at the eastern end of the reach (17%), hardshell clam at the western end (17%), and a patch of geoduck is mapped near the center of the reach (8%).

Water Quality

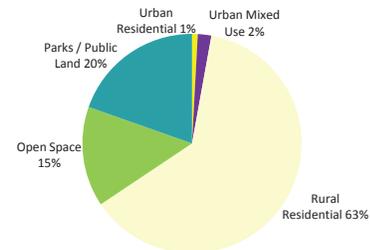
The reach has no impaired water quality listings.

HUMAN ENVIRONMENT AND LAND USE

Existing Land Use and Ownership

Land usage in the shoreland area is timber (45%), vacant (21%), open space (20%), residential (12%), and lodging (1%). In general, the timber land is located in the eastern half of the reach. Land ownership within the reach is 85% private and 15% public.

Zoning and Parcel Data



Under current zoning regulations there is moderate potential for significant new development within the reach, particularly in the western end of the reach.

Public Access

85% of the shoreline in this reach is publicly owned; however, it cannot be accessed from land.

Impervious Surfaces

Less than 2% of the landward portion of the reach is covered by impervious surfaces.

Shoreline Modifications

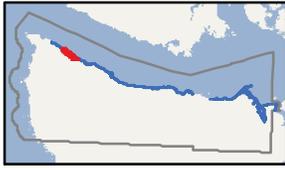
A portion of shoreline armoring (4% of reach total), is mapped at the east end of the reach, near Sekiu. There are no other shoreline modifications mapped within the reach.

Contaminated Sites

There are no identified contaminated sites within the reach.

Cultural Resources

There are no inventoried sites within the reach.



REACH MR-17: Shipwreck Point

SHORELINE LENGTH
6.89 Miles

REACH AREA
156.91 Acres

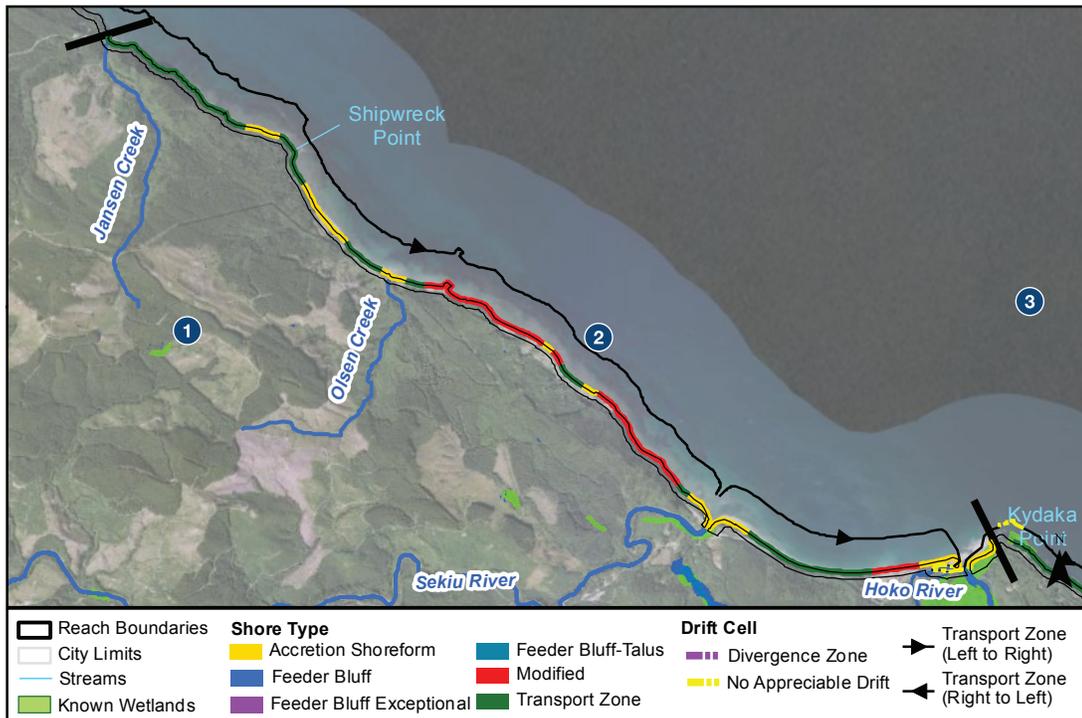
PSNERP PROCESS UNITS
SPU 1029

REACH SUMMARY

The "Shipwreck Point" reach extends from Kydaka Point to the Jansen Creek mouth, along the Strait of Juan de Fuca. The reach contains a diversity of shoretypes, including barrier beach, barrier estuary, bluff backed beach, and pocket beach. Net shore drift in the reach is entirely eastward. Nearly the entire eastern half of the reach is armored, which protected Highway 112. The shoreline contains dense concentration of submerged aquatic vegetation, which provides important habitat for marine species, including juvenile salmonids.

Land use within the shoreland area is predominantly timber, with other significant land uses being residential development, open space, and roads. Moderate- to high-density residential subdivisions are located in several locations within the reach. Many of these areas are located on low bank habitat, within tsunami and coastal flooding hazard areas. Most of the shoreline is publically owned, and can be informally accessed from Highway 112.

Under current zoning regulations, approximately one-third of the shoreland area has potential for new residential development. Most of the undeveloped parcels are located in a narrow strip of land between Highway 112 and the shoreline, within tsunami and floodplain hazard areas. In addition, given the shape and location of the parcels, shoreline armoring would likely be necessary to protect future structures.



Shoreline Oblique Photos (Ecology, 2005)

PHYSICAL CHARACTERISTICS

Shoreform and Shoretype

Rocky platforms are the most commonly occurring shoretype within the reach (45%). The remaining shoreline is comprised of barrier beaches (12%) and barrier estuary (13%) at the Hoko and Sekiu estuaries, bluff backed beaches (11%) between the estuaries, and a pocket beach in the western portion of the reach (20%). Geomorphic shoreforms in the reach are primarily transport zones (24%) and accretion shoreforms (29%). Most of the shoreline in the eastern half of the reach is mapped as modified (47%).

Net Shore Drift

Eastward net shore-drift occurs along the entire shore of the reach, from Jansen Creek just west of Shipwreck Point to Kydaka Point.

Hazard Areas

Several bluff areas in the reach are unstable (11%) no with recent slides. Most of the Sekiu and Hoko River shoreline areas are in a tsunami hazard zone (70%) and FEMA coastal and stream 100-year floodplains (28%).

REACH REACH MR-17: Shipwreck Point

Degree of Process Degradation

Within the reach, the erosion/accretion of sediment, freshwater input, and solar incidence processes have low degradation levels. The sediment input, sediment transport, detritus important and export, and exchange of aquatic organisms processes are moderately degraded.

ECOLOGY

Offshore Vegetation

Kelp is mapped throughout the reach (60%), and patchy eelgrass is mapped at the western end of the reach (19%).

Onshore Vegetation

36% of the shoreland area is mapped as forest habitat, 16% is mapped as natural shrub and herbaceous vegetation, and 36% is mapped as lawn/landscaping.

Habitats and Species

4% of the landward portion of the reach consists of wetland habitat, which is concentrated primarily at the Hoko and Sekiu river mouths. The designated priority habitat within the reach is bald eagle, and harbor seal (13.8%) near the center of the reach.. In addition, two marine mammal haulout areas are mapped in the reach.

No forage fish presence is mapped within the reach. Coho, chinook, and chum salmon; resident cutthroat trout; and steelhead are mapped in the streams within the reach.

The marine nearshore areas in the reach (Strait of Juan de Fuca) provide important habitat for a wide variety of marine species that utilize nearshore habitat, including several salmon and trout species.

Shellfish

Red sea urchin is mapped throughout the reach (89%). Abalone is mapped in the eastern half of the reach (36%), and a patch of hardshell clam is mapped near the center (9%).

Water Quality

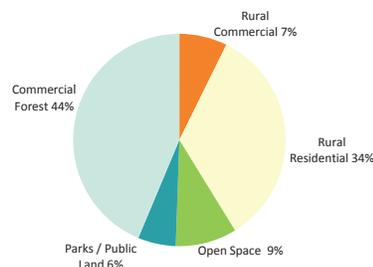
The portion of the Sekiu River within the reach has a State impaired water quality listing for temperature. Hoko River water quality is listed by Streamkeepers as "compromised" for B-IBI but "healthy" for WQI. The Sekiu River is listed as "compromised" for B-IBI.

HUMAN ENVIRONMENT AND LAND USE

Existing Land Use and Ownership

Land usage in the landward portion of the reach is timber (40%), residential (20%), open space (12%), vacant (12%), roads (9%), lodging (5%), and commercial (0.3%). The western two-thirds of the reach is primarily timber land. Land ownership within the reach is 75% private and 25% public.

Zoning and Parcel Data



Under current zoning regulations there is moderate potential for significant new residential development within the reach.

Public Access

84% of the shoreline in this reach is publicly owned and accessible from land. Shoreline access in the western and eastern portions of the reach is available from Highway 112; however, no dedicated parking areas are available. Washington State Parks recently acquired 1,000 acres near the Hoko Estuary, but no formal public access has been established.

Impervious Surfaces

Approximately 13% of the landward portion of the reach is covered by impervious surfaces.

Shoreline Modifications

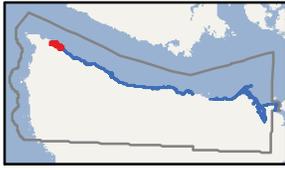
A significant amount of shoreline armoring (40% of reach total) associated with SR 112 is mapped in the eastern portion of the reach. Three fish passage barriers (SR 112 culverts) are identified on Jansen Creek and two small, unnamed streams. Two docks are mapped near the center of the reach.

Contaminated Sites

A leaking underground storage tank is mapped near the center of the reach.

Cultural Resources

Three inventoried structures, including a motel structure along Chito Beach (built 1930) are inventoried for historic significance, but not listed. In addition, there are 4 inventoried pre-contact sites within the reach.



REACH MR-18: Rasmussen (Bullman Creek)

SHORELINE LENGTH
4.55 Miles

REACH AREA
119.24 Acres

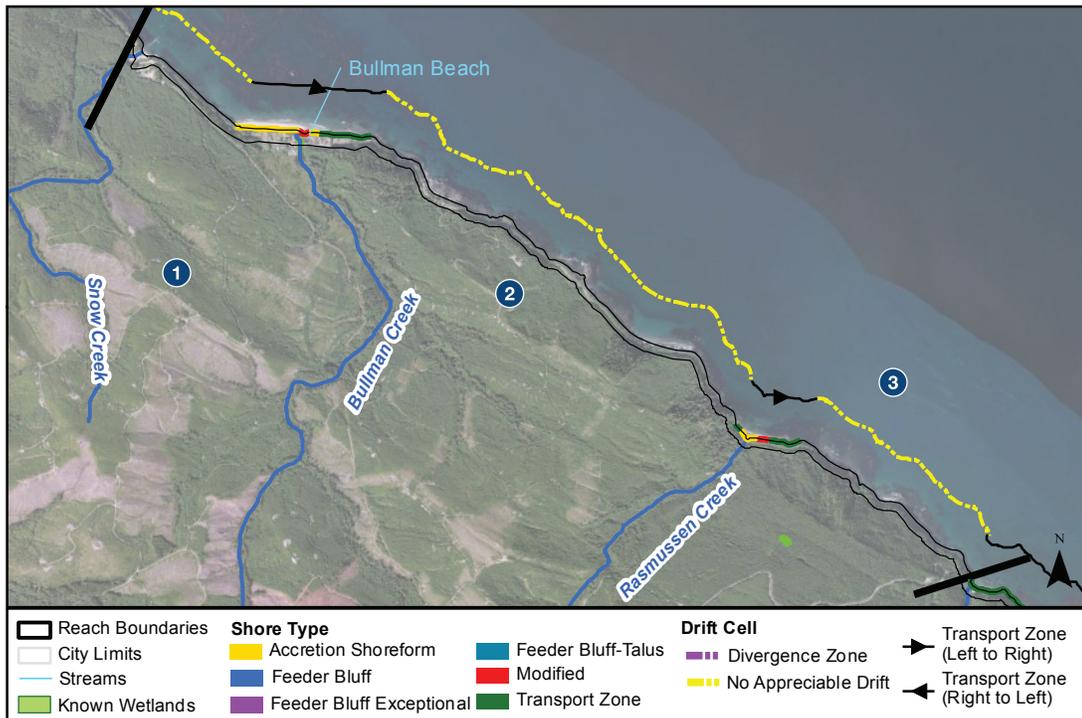
PSNERP PROCESS UNITS
SPU 1029 & 1100

REACH SUMMARY

The "Rasmussen (Bullman Creek)" reach extends along the Strait of Juan de Fuca from just west of the mouth of Jansen Creek to the Makah Tribe reservation boundary. The predominant shoretype within the reach is plunging rocky shoreline, with some intermittent pocket beaches. Most of the shoreline within the reach has no appreciable net shore drift. Two small segments of shoreline armoring and 1 dock are mapped in the western portion of the reach. Approximately half of the shoreland area within the reach is heavily forested, which provides habitat for a diversity of wildlife species. The nearshore areas have dense communities of submerged aquatic vegetation, which provides important habitat for marine species, including juvenile salmonids.

The predominant land usage within the reach is timber, with residential, lodging, and open space land at the west end of the reach. A high-density residential development is located at Bullman Beach. Nearly the entire shoreline is publically owned and accessible from land. Shoreline at the western end of the reach can be accessed from the Snow Creek boat launch.

Under current zoning regulations, approximately one-third of the shoreland area has potential for new residential development. However, most of this land is zoned for commercial forestry that is not eligible for subdivision. With the exception of a few undeveloped lots, the residential-zoned land at Bullman Beach is already fully developed. However, there is potential for an increase in shoreline armoring in this area.



Shoreline Oblique Photos (Ecology, 2005)

PHYSICAL CHARACTERISTICS

Shoreform and Shoretype

Shoretypes within the reach consist of rocky platform shores (80%) with intermittent pocket beaches (20%). Geomorphic shoreforms within the reach are transport zones (44%) and accretion shoreforms (44%) mapped in equal proportions. The remaining 11% of the reach is mapped as modified shores.

Net Shore Drift

Most of the shoreline within the reach No Appreciable Drift; however, eastward drift occurs along two beaches, both of which contain stream mouths (Bullman Beach and mouth of Rasmussen Creek).

Hazard Areas

Some slopes are mapped as unstable (33%) with recent slides mapped in the southeast portion of the reach and west of Bullman Creek (4%). Most of Snow and Bullman Creek shoreline areas are in a tsunami hazard zone (47%) and the FEMA coastal and stream 100-year floodplains (48%).

REACH REACH MR-18: Rasmussen (Bullman Creek)

Degree of Process Degradation

Within the reach, the freshwater input, erosion/accretion of sediment, and solar incidences processes have generally low degradation levels. The sediment input, sediment transport, detritus import and export, and exchange of aquatic organisms processes are moderately degraded.

ECOLOGY

Offshore Vegetation

Kelp (80%) and patchy eelgrass (74%) is mapped throughout the reach (80%)

Onshore Vegetation

42% of the shoreland area is mapped as forest habitat, 19% is mapped as natural shrub and herbaceous vegetation, and 28% is mapped as lawn/landscaping.

Habitats and Species

1% of the landward portion of the reach is mapped as wetland habitat, which is located at the mouth of Bullman Creek. The designated priority habitats within the reach are bald eagle (11%) and harbor seal (7%) at the west end of the reach. A marine mammal haulout area is also mapped at the west end.

A small patch of forage fish habitat (smelt) is mapped near the mouth of Bullman Creek. Steelhead and Coho, chinook, and chum salmon are mapped within the streams in the reach.

The marine nearshore areas in the reach (Strait of Juan de Fuca) provide important habitat for a wide variety of marine species that utilize nearshore habitat, including several salmon and trout species.

Shellfish

Red sea urchin (95% of reach total) and abalone (100%) are mapped throughout the reach. A patch of hardshell clam is mapped at the southern end of the reach (15%).

Water Quality

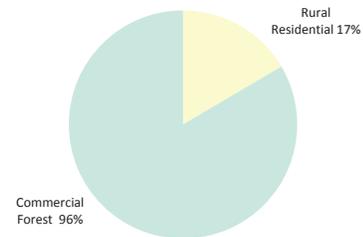
The portions of Rasmussen Creek and Snow Creek within the reach have State impaired water quality listings for temperature. Water quality within the streams is listed by the Streamkeepers as "compromised" for WQI.

HUMAN ENVIRONMENT AND LAND USE

Existing Land Use and Ownership

Land usage in the shoreland area is timber (72%), roads (13%), residential (9%), vacant (3%), open space (3%), and lodging (0.4%). The eastern three-quarters of the reach contains almost entirely timber land. Land ownership within the reach is 89% private and 11% public.

Zoning and Parcel Data



Under current zoning regulations there is low potential for significant new residential development within the reach. Most of the undeveloped land is zoned for commercial forestry.

Public Access

99.7% of the shoreline in this reach is publicly owned and accessible from land. Shoreline at the western end of the reach can be accessed from the Snow Creek boat launch. Other portions of the shoreline can be accessed informally from Highway 112.

Impervious Surfaces

Approximately 13% of the landward portion of the reach is covered by impervious surfaces.

Shoreline Modifications

Portions of shoreline armoring (8% of reach total) are mapped in the western portion of the reach, at Bullman Beach and the mouth of Snow Creek. In addition, there is one overwater structure (dock) mapped at Snow Creek.

Contaminated Sites

There are no identified contaminated sites within the reach.

Cultural Resources

There are no inventoried sites within the reach.