

REACH MR-6: Green Point

SHORELINE LENGTH
11.40 Miles

REACH AREA
280.06 Acres

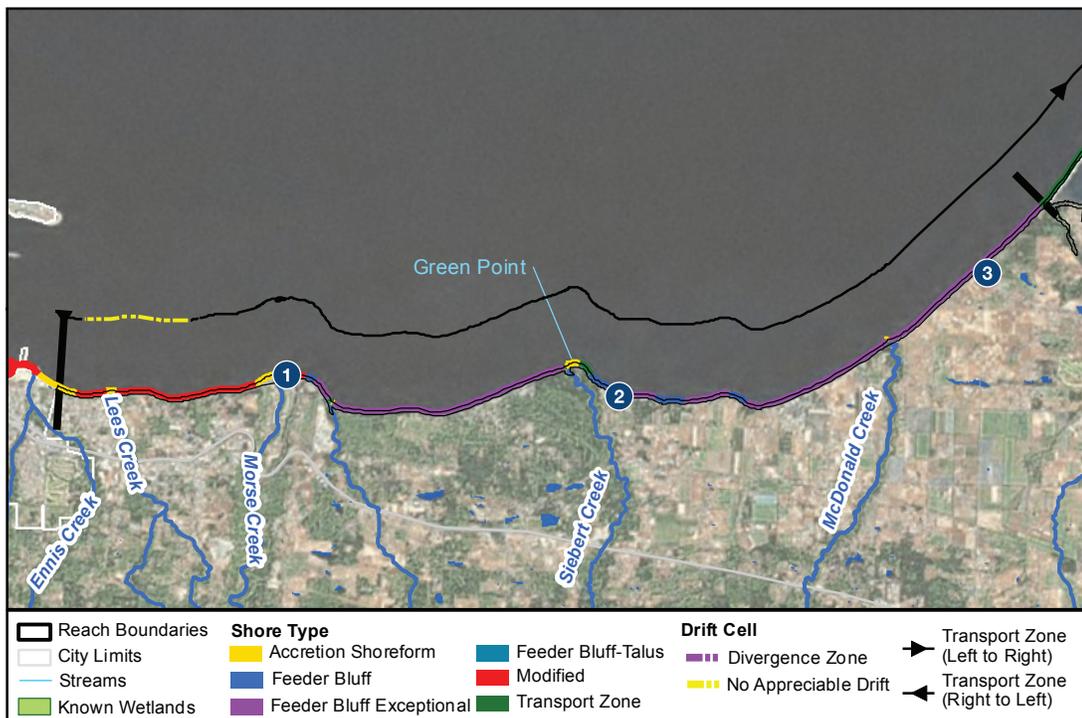
PSNERP PROCESS UNITS
SPU 1025

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. The shoreline generally consists of highly-erosive 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%).

REACH REACH MR-6: Green Point

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

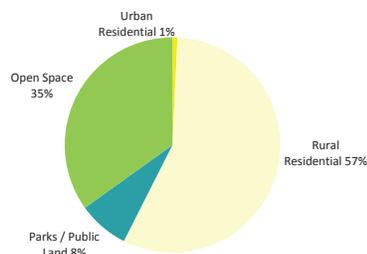
The portion of Lees Creek within the reach has a State impaired water quality listing for dissolved oxygen. The water quality of Morse and McDonald Creeks is listed by the Streamkeepers as "compromised" for B-IBI and "healthy" for WQI.

HUMAN ENVIRONMENT AND LAND USE

Existing Land Use and Ownership

Land usage in the shoreland area is residential (37%), open space (24%), vacant (14%), timber (11%), agriculture (2%), and roads (2%). Land ownership within the reach is 93% private and 7% public.

Zoning and Parcel Data



Of the total shoreland area within the reach, 32% is vacant, 7% is occupied - dividable, 36% is occupied - nondividable, and 24% is non-residential.

Public Access

15% of the shoreline in the reach is publically 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

(to be completed)

1 subdivided under current zoning regulations. The existing homes are located more than 300 feet
2 back from the shoreline; therefore, there is a low chance of future armoring.

3 There are no overwater structures mapped within the reach and new structures are not likely to
4 proliferate given the existing land use/land ownership patterns. The key management
5 considerations for this reach include preserving the existing forest cover within the reach and
6 maintaining the sediment delivery and transport process in the adjoining up-drift reaches to
7 ensure the sustainability of the Spit.

8 Extensive public use of the shoreline at the top and bottom of the feeder bluffs immediately west
9 of Dungeness Spit occurs because of public access and trails at the Dungeness Recreation Area.
10 These areas have been subject to erosion and trail areas have recently been moved. Future public
11 access and parking at this location will need to consider human safety as well as the impact to the
12 bluffs.

13 **4.6 Reach 6: Green Point (Maps 1a to 6a in Appendix A)**

14 The “Green Point” reach contains 11.4 miles of marine shoreline, which extends along the Strait
15 of Juan de Fuca from just west of Dungeness Spit to the Port Angeles city limits. The reach also
16 contains the mouths of McDonald, Siebert, Morse, and Lees creeks. McDonald and Morse
17 Creeks are shorelines of the state. The other streams that intersect this reach are not shorelines of
18 the state, except where they enter the Strait of Juan de Fuca. The western end of this reach (west
19 of Morse Creek) is within the Port Angeles urban growth area and may eventually be annexed by
20 the City. According to the City’s draft shoreline master program, this area would have a
21 dual/parallel designation of Urban Conservancy Recreation along the water and Shoreline
22 Residential inland if it were annexed.

23 4.6.1 Summary of Baseline Conditions

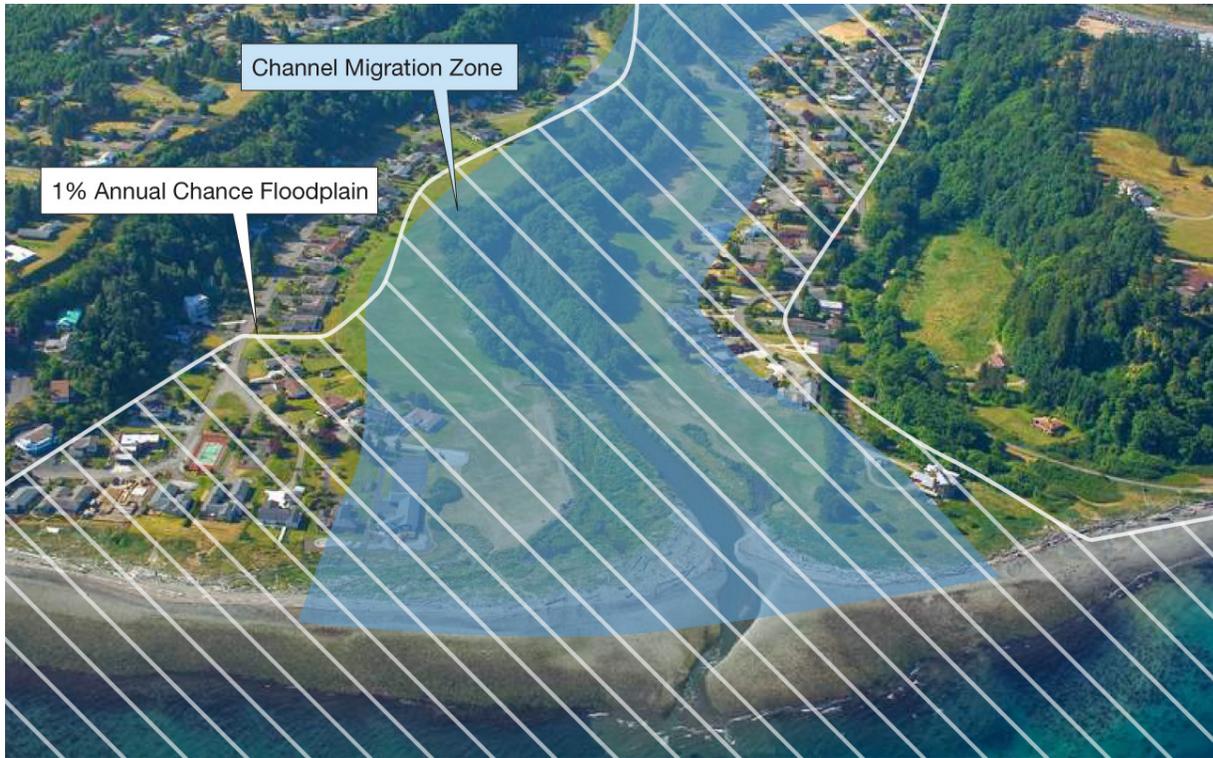
24 The predominant shoretype in the reach is bluff backed beach, with smaller portions of barrier
25 beach and barrier estuary. Over 70% of this reach is mapped as feeder bluff or feeder bluff
26 exceptional (Figure 4-3). From Lees Creek, net shore-drift is eastward along the feeder bluffs,
27 transporting sand, gravel, and cobble that maintains Dungeness Spit. These feeder bluffs are
28 subject to the high wind and wave energy. There is very minimal armoring within this drift cell,
29 which allows unimpeded drift and natural beach building processes to occur to occur along
30 Dungeness Spit. The area just west of Green Point is a landslide hazard area. Recent landslides
31 have been mapped along the feeder bluffs within the reach, and many homes along the edge of
32 the bluffs could be at risk. A second drift cell flows west from Lees Creek towards Port Angeles.
33 The shoreline within this drift cell is heavily modified. There are no overwater structures
34 identified within the reach.



1
2 **Figure 4-3. Segment of exceptional feeder bluff west of Dungeness Spit lacking native riparian forest cover**
3 **(Photo: Ecology Coastal Atlas)**
4

5 The mouths of Morse and McDonald Creek are in tsunami hazard areas and mapped FEMA 100-
6 year floodplains (coastal and stream). There is limited development adjacent to the McDonald
7 Creek mouth; however, dense residential development is located near the Morse Creek mouth,
8 and many of these homes are within the floodplain and/or channel migration zone of the creek
9 (Figure 4-4). The mouth of Siebert Creek has been the focus of a coordinated program by the
10 North Olympic Land Trust and other organizations to acquire conservation easements.

11



1

2 **Figure 4-4. Development at the mouth of Morse Creek with the mapped floodplain and channel migration**
 3 **zone. (Photo: Ecology Coastal Atlas)**

4

5 Approximately one-third of the shoreland area in the Green Point reach is forested, and another
 6 third contains natural shrub and herbaceous vegetation. Forest cover is generally absent in the
 7 heavily developed areas. The forest cover that remains in the reach helps stabilize the erosive
 8 bluffs, and provides habitat for a diversity of wildlife species. Wetland areas associated with the
 9 mouth of Morse Creek provide important habitat for waterfowl and other wildlife, and a gray
 10 whale feeding area is identified near the mouth of Siebert Creek. The reach also provides habitat
 11 for bald eagle and peregrine falcon.

12 Patches of kelp and eelgrass are mapped throughout the reach, and patches of smelt spawning
 13 habitat are mapped east of Morse Creek. No smelt habitat areas are located in the armored
 14 shoreline areas west of the creek. The marine shores in the area, and in particular the unarmored
 15 areas east of Morse Creek, provide feeding grounds for juvenile salmonids, which use the
 16 shallow nearshore waters for migration and rearing. The streams within the reach provide habitat
 17 for resident cutthroat trout; steelhead; and coho, Chinook, chum, , and pink salmon.

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

21 Land ownership within the reach is 93% private and 7% public. The primary land use within the
 22 reach is residential development, with lesser amounts of open space, commercial timber land,
 23 agriculture, and vacant land. The existing land uses do not align fully with the existing zoning as

1 none of the reach is zoned for Commercial Forestry or agriculture. Most of the land is zoned for
2 residential development (mostly R5 or rural character conservation with a few pockets of R1
3 near Kitchen-Dick Road and near Morse Creek).

4 Over 10% of the shoreline in the reach is publicly owned and accessible by land. Public
5 shoreline in the eastern portion of the reach can be accessed from the Dungeness Recreation
6 Area (via trails), and shoreline in the western portion can be accessed via the Olympic Discovery
7 Trail.

8 4.6.2 Future Land Use and Potential Effects on Shoreline Ecology

9 Under current zoning regulations, approximately 40% of the shoreland area has potential for new
10 residential development. The undeveloped and underdeveloped land within SMP jurisdiction is
11 distributed fairly evenly throughout the reach. Much of the vacant land within the reach has
12 already been subdivided into 1 to 3 acre lots. These lots are rectangular in size with narrow water
13 frontages; varying from approximately 75 to 150 feet. In addition, there are several larger parcels
14 (approximately 20 acres in area) that could be subdivided into 3 or 5 acre lots. Development in
15 these lots could result considerable clearing/loss of forest cover, increased stormwater runoff,
16 and other changes that could exacerbate landslide and erosion hazards and diminish ecological
17 functions.

18 4.6.3 Management Issues and Opportunities

19 The Green Point reach has potential for substantial new residential development in the future,
20 which is a potential management concern considering the highly erosive feeder bluffs and the
21 importance of these bluffs to down-drift shores. Development that involves vegetation removal
22 or increased rates of stormwater runoff could accelerate erosion and potentially put homes and
23 other structures at risk. Given the height, steepness, and sediment composition of these bluffs, as
24 well as their exposure to wind and wave energy on the Strait of Juan de Fuca, it is unlikely that
25 shoreline armoring along the toe of the bluffs would effectively protect homes or other
26 structures. Attempts to armor these shorelines could impede natural sediment recruitment and net
27 shore-drift, thus putting Dungeness Spit at risk.

28 There is limited opportunity for increased public shoreline access within this reach given the
29 topography and sensitivity of the bluffs. All of the publicly owned shoreline is already
30 accessible.

31 Key management considerations for this reach are:

- 32 • Shoreline property owners should be aware of the substantial risks to property and human
33 safety resulting from developing land near unstable feeder bluffs.
- 34 • Regulations should be streamlined to allow landowners whose homes are close to the
35 edge of the bluff to move structures back from the shoreline, if feasible.
- 36 • In order to protect natural sediment movement processes, as well as human health and
37 safety, new structures should be set back an adequate distance to account for the
38 potentially rapid rate of erosion.

- Removal of forest cover, which generally results in accelerated erosion, should be limited in and near erosion-prone areas. Preserving forest cover also helps maintain wildlife species and diversity in developing areas.

4.7 Reach 7: Angeles Point (Maps 1b to 6b in Appendix A)

The “Angeles Point” reach contains 7.3 miles of marine shoreline, which extends from the western Port Angeles city limits to just south of Observatory Point. The reach contains Freshwater Bay, the estuary of the Elwha River (a shoreline of statewide significance) and the mouth of Colville Creek (a shoreline of the state).

4.7.1 Summary of Baseline Conditions

Shoretotypes within the reach are primarily bluff backed beach and Elwha River delta shores. Net shore-drift within the reach is entirely eastward, originating along the west shore of Freshwater Bay. Approximately one-third of the shoreline consists of feeder bluffs, while the rest is accretion shoreforms and transport zones. Levee sections are mapped near the Elwha River mouth, but no other shoreline modifications, including overwater structures, are known to occur within the reach. Baseline conditions in this reach include the presence of two dams in the Elwha River (described further in freshwater sections) that block sediment transport from the Elwha River and migration of several species of fish. As the dams are dismantled from 2011 to 2014, baseline conditions will change.

There are reports of a pipeline along the base of the feeder bluffs to feed the mill in this reach which may have implications for sediment supply to Ediz Hook (Personal Communication R. Johnson). This issue needs further investigation.

The feeder bluffs within the reach, located east of Angeles Point and within Freshwater Bay, are unstable, but no recent slides are identified. The Freshwater Bay and Angeles Point shorelines are mostly within the tsunami hazard zone and FEMA coastal and/or river 100-year floodplains. With the exception of Angeles Point and an area just to the west of the Elwha River mouth, there is limited existing development within these identified hazard areas.

Within 300 feet of the shore, more than half of the shoreland area contains forest cover, and another quarter is natural shrub and herbaceous vegetation. These vegetation communities, along with the wetland habitat at the Elwha River estuary, provide habitat for a diversity of species. Designated priority habitats within the reach include bald eagle, harlequin duck (at the Elwha River estuary), and common loon (at west end of reach) (Figure 4-5). Outside of the shoreland zone, the majority of the surrounding land is forested, although some low-density residential development is present.

Eelgrass patches are present throughout a majority of the reach, from Angeles Point to Observatory Point. Continuous kelp stands are present from Port Angeles City limits to Observatory Point. A patch of forage fish (smelt) spawning habitat is located east of the Elwha River. Freshwater Bay provides habitat for crab and shellfish, and recreational shellfish harvesting and crabbing is available at the County Park. The entire reach provides habitat for abalone; however, this population has been greatly reduced by poaching (The Seattle Times 2009).



Dungeness River: Reach 2

SHORELINE LENGTH
5.4 Miles

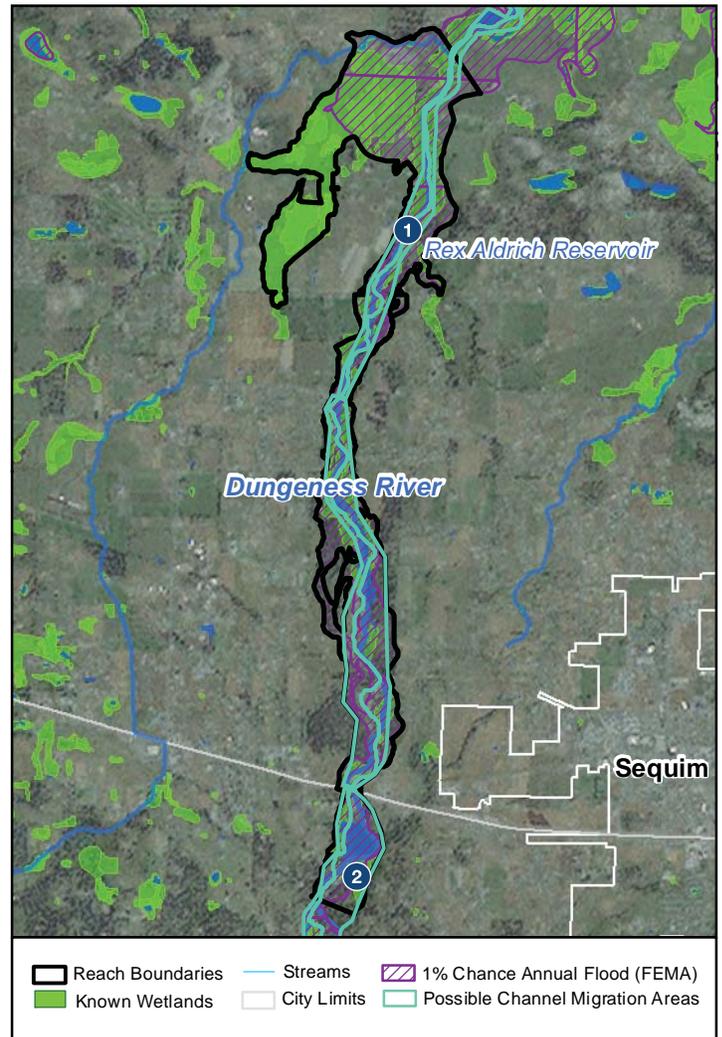
REACH AREA
1053.37

REACH SUMMARY

Reach 2 of the Dungeness River extends from the confluence of Matriotti Creek upstream approximately 5.6 miles (from RM 2 to RM 7). The channel profile through the reach is dynamic, supporting a high degree of sinuosity and braiding. The reach contains four road crossings in the upper, middle, and lower portion of the reach. The Hurd Creek Fish Hatchery is located in the western portion of the reach. The reach contains some forest and herb and shrub habitat, but much of the area has been converted to agriculture. A significant portion of the reach contains wetland habitat. The reach provides spawning and rearing habitat for Chinook, chum, coho, and pink salmon, in addition to steelhead, bull, and resident cutthroat trout. Sockeye salmon have also been documented in the reach. The reach also provides habitat for bald eagle, harlequin duck, peregrine falcon, and waterfowl concentrations.

The reach contains moderate- to low-density residential development and agricultural lands. The Mary Lukes Wheeler County Park provides public access to shorelines in this reach. Additionally, the Olympic Discovery Trail crosses in the northern portion of the reach. Most of the reach, including developed areas, are located in the FEMA 100-year floodplain and/or the channel migration zone.

Under current zoning regulations, approximately half of the reach has the potential for new rural residential development. Existing parcel boundaries vary in size and shape, but many are located directly adjacent to the river in flood and/or channel migration hazard areas. The significant presence of wetland habitat throughout the reach may preclude development in some areas.



PHYSICAL

Channel Configuration

The channel profile through the reach is dynamic, supporting a high degree of sinuosity and braiding.

Hazard Areas

Much of the reach is located within the channel migration zone (42%), and the FEMA 100-year floodplain (74%).



Shoreline Oblique Photos (2006)

ECOLOGY

Riparian Vegetation

Within 300 feet of the stream, 27% of the reach zone is forest habitat, 11% is herb and shrub habitat, and 5% is agricultural crops. Outlying the stream corridor vegetation is comprised mostly of agricultural lands intermixed with patches of forest and herb and shrub habitat.

Habitats and Species

49% of the reach is mapped as wetland habitat. Designated priority habitats mapped within the reach include bald eagle (6%), harlequin duck (91%), peregrine falcon (83%), and waterfowl concentrations (10%).

This reach provides spawning habitat for steelhead trout (40% of reach total) and Chinook (97%), chum (70%), coho (65%), and pink salmon (79%). The presence of bull trout, resident cutthroat, and sockeye salmon are also mapped within the reach.

Water Quality

The portion of the Dungeness River within the reach has a State impaired water quality listing for fecal coliform. In addition, Hurd Creek (tributary to the Dungeness River) is listed for fecal coliform. Dungeness water quality within the reach is listed by Streamkeepers as "compromised" for both B-IBI and WQI.

Dungeness River: Reach 2

HUMAN ENVIRONMENT AND LAND USE

Existing Land Use and Ownership

Land usage within the reach is residential (38%), open space (30%), vacant (15%), agriculture (8%), tribe (4%), timber (3%), commercial (2%), roads (trace), and unknown (trace). Residential lands are located in the north and in central portions of the reach. Open space is located in isolated pockets throughout the reach. Land ownership is 95% private, 4% tribe, and 1% public.

Zoning and Parcel Data

The reach is zoned for rural residential (54%), parks / public land (trace), and agriculture (46%).

Of the total land area within the reach, 18% is vacant - dividable, 10% is occupied - dividable, 34% is occupied - nondividable, and 38% is non-residential.

Public Access

Public shoreline access is available at Mary Lukes Wheeler County Park, located on Ward Road, north of Woodcock Road. In addition, the Olympic Discovery Trail crosses the river within this reach.

Impervious Surfaces

Approximately 3% of the reach is covered by impervious surfaces.

Shoreline Modifications

Four road crossings are located within the reach. The Hurd Creek Fish Hatchery is located in the western portion of the reach. South of Woodcock Road, most of the east side of the river is constrained by levees.

Contaminated Sites

No identified contaminated sites are located within this reach.

Cultural Resources

(to be completed)

6. FRESHWATER REACH SUMMARY

This chapter describes the freshwater shorelines that are within the jurisdiction of the County's SMP (in WRIAs 18, 19, and a portion of 17, excluding incorporated areas) (see Figure 5-1 for the reach locations). The 39 streams and 1 lake are described in terms of their physical attributes, ecological condition, and human environment / land use characteristics. Key features are summarized and depicted on individual "reach sheets" located at the end of this section. Maps are provided in Appendix A.

6.1 *Little Quilcene River (Maps 1a to 6a in Appendix A)*

The Little Quilcene River originates on the north side of Mount Townsend in Olympic National Forest, in the southeast corner of Clallam County (Cascadia 2003). The river flows in a southwesterly direction through Jefferson County and empties into Hood Canal at Quilcene Bay. Of the portion of the Little Quilcene River within Clallam County, 1.3 miles is considered a "shoreline of the state."

There is minimal existing information regarding habitat conditions of the upper Little Quilcene River. The upper watershed is forested and located on National Forest land. The portion of the riparian corridor within County's jurisdiction is primarily National Forest land, with a lesser amount of private timber land. The large tracts of continuous forest land within the watershed provide important wildlife habitat, and the riparian forest cover helps maintain cool water temperatures and provides large woody debris inputs to the stream channel.

The upper portion of the river provides habitat for resident cutthroat trout. Anadromous fish passage to the upper river is blocked by a natural falls at RM 7.0 (Correa 2002). Within Clallam County, there are no known shoreline modifications or water quality issues identified on the river.

Under current zoning regulations, there is no potential for parcel subdivision or residential development within the stream corridor.

6.2 *Dungeness River and Tributaries (Maps 1a to 6a in Appendix A)*

The Dungeness River headwaters are in Olympic National Park and Olympic National Forest, in Jefferson County. The watershed area is approximately 250 square miles. Major tributaries include the Gray Wolf River, Royal Creek, Silver Creek, and Gold Creek in the upper watershed, and Beard, Hurd, Canyon, and Matriotti Creek in the lower watershed.

The Dungeness River is classified as a "shoreline of the state," and the portion within County jurisdiction is divided into 6 reaches (26.0 miles total). Four of its tributaries within the County are also shorelines of the state under County jurisdiction (1 reach each): Royal Creek (0.3 miles), Silver Creek (0.7 miles), Gray Wolf River (8.3 miles), and Canyon Creek (1.7 miles). The Gray Wolf River, Royal Creek, and Silver Creek are largely located in Olympic National Forest.

1 6.2.1 Summary of Baseline Conditions

2 The Dungeness River is relatively short (31.9 miles) and steep; its average slope is 3.3 percent in
3 the upper half, flattening to 1.0 percent in the lower half (Bountry et al. 2002). The upper
4 Dungeness (defined as upstream of the Gray Wolf River confluence) contains steep, unstable
5 canyon slopes and high flow velocities, which carries gravel, large boulders, and large woody
6 debris downriver (Entrix 2005). Emerging from its upper watershed, approximately 11 miles
7 above its mouth, the river slows and drops its load of sediment as it flows north through an
8 extensive, flattened middle watershed and a broad lowland plain. The river drains into
9 Dungeness Bay, east of Graveyard and Cline spits. Tidal influence extends approximately 0.9
10 miles up the river.

11 The lower river channel is not confined by canyon walls, and has noncohesive bank material of
12 sand and gravel (Entrix 2005). As such, the lower river meanders and can shift channels
13 dramatically during floods, with recorded channel migrations of hundreds of feet during a single
14 flood event (Clallam County 2009).

15 Upstream from RM 10.8 (confluence with Canyon Creek), the watershed and riparian corridor of
16 the Dungeness River and its tributaries consists almost entirely of forest habitat. Forest cover
17 dramatically decreases downstream, as the river flows through residential developments and
18 agricultural lands. Downstream from RM 10.8, the width of the forested riparian corridor varies
19 from 0 to approximately 500 feet (Figure 6-1).

20 The Dungeness River watershed supports breeding populations of bald eagle, harlequin duck,
21 peregrine falcon, red-tailed hawk. Significant wetland habitat is present in the floodplain of the
22 lower Dungeness; however, much of the historic wetland habitat has been drained and/or filled
23 by agriculture and development activities. Wetland habitat is generally absent in the upper,
24 steeper portion of the watershed.

25 The Dungeness and Gray Wolf rivers provide spawning and rearing habitat for Chinook and
26 coho salmon, and two distinct steelhead runs (Table 6-1). The rivers also provide spawning
27 habitat for pink salmon: a lower-spawning fall run, and a summer run which spawns in the Grey
28 Wolf and the upper Dungeness. A few sockeye salmon have been reported in the Dungeness in
29 very small numbers; no accessible lakes typical of sockeye habitat exist in the Dungeness
30 watershed (Dungeness River Audubon Center, n.d.) The Dungeness is also located within the
31 designated unit for Hood Canal/Eastern Strait of Juan de Fuca summer chum salmon, which
32 listed as threatened under the Endangered Species Act. All of the streams in the Dungeness
33 watershed provide habitat for resident cutthroat and rainbow trout.

34 Two fish hatcheries operated by WDFW are located on the Dungeness River—the Dungeness
35 Hatchery at mainstem river mile 10.6 and the Hurd Creek hatchery, a satellite facility located on
36 a lower river tributary. The two hatcheries are managed jointly to produce coho salmon for
37 release into the Dungeness River and local creeks, and fall Chinook for the Elwha River. The
38 hatcheries are also used for captive broodstock and other restoration programs for threatened
39 populations of Chinook and summer chum in the Elwha and Dungeness Rivers and
40 Jimmycomelately Creek.

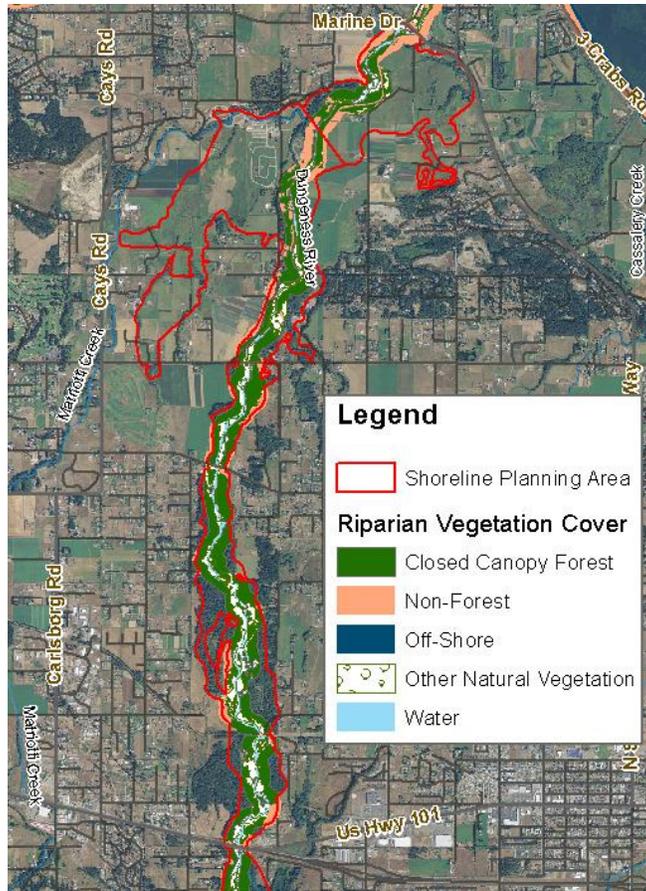


Figure 6-1. Riparian vegetation cover along the lower Dungeness River.

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Table 6-1. Regulatory Status of Dungeness Salmonids, 2011

Dungeness Salmonids	Federal status under the Endangered Species Act	WA State/Tribal status under the Salmon and Steelhead Stock Inventory & Assessment
Chinook	Threatened (Puget Sound Chinook)	Critical
Chum	Summer chum threatened (Hood Canal/Strait of Juan de Fuca summer chum) (population viability unknown in Dungeness)	Summer depressed Fall unknown
Coho		Depressed
Pink		Upper – Critical Lower – Depressed
Steelhead	Threatened (Puget Sound DPS)	Summer/Winter Depressed
Cutthroat/Dolly Varden		Unknown
Bull trout	Threatened	Unknown

1 The upper reaches of the Dungeness River are located in Olympic National Forest and Olympic
2 National Park. The lower 11 miles of the Dungeness watershed contains mixed use of timber,
3 agriculture and rural residential development.

4 While commercial agriculture still occurs in the lower Dungeness watershed, there has been
5 substantial conversion of agricultural land to dispersed rural and retirement development and
6 urbanization. Urbanization in and around the City of Sequim has changed water and land use
7 through increased impervious surfaces, reduced aquifer recharge, increased runoff, and increased
8 withdrawal from the Dungeness area aquifers. The City of Sequim uses groundwater as a source
9 of the municipal water supply, but an infiltration system to withdraw water from the Dungeness
10 River at RM 10.8 is maintained as a back-up supply. Land and structures near the active river
11 channel and its floodplain are periodically threatened by erosion and flooding. The Dungeness
12 River Flood Plan (2009) states that residential developments along River's End Road, Kaiser
13 Road, and Kinkade Island present exceptional risks to property damage and human safety.
14 Another area of potential catastrophic risk is the area behind the US Army Corps of Engineers
15 Levee, which is in jeopardy of being overtopped at 100-year flood levels. The Bureau of
16 Reclamation and US Army Corps of Engineers have initiated an analysis of levee setback
17 options in the lower 2.6 miles of the river.

18 The State has listed the lower Dungeness River as impaired for temperature and fecal coliform.
19 Sources of fecal coliform in the Dungeness and its tributaries include failing septic systems,
20 stormwater runoff, and livestock waste (Ecology 2009). At its mouth, the river water quality is
21 reported by the Streamkeepers of Clallam County as "impaired" for benthic biodiversity (B-IBI)
22 and "compromised" for overall water quality (WQI). Water quality improves upstream; just
23 downstream of the National Forest boundary the river is reported as "compromised" for B-IBI
24 and "healthy" for WQI. At its confluence with the Dungeness, Gray Wolf River water quality is
25 reported as "healthy" for B-IBI.

26 There are five principal irrigation diversions on the river, located between RM 11.3 and the
27 Highway 101 Bridge at RM 6.5. Low flows, exacerbated seasonally by irrigation withdrawals,
28 are a factor limiting salmon production (Haring, 1999) and have been the focus of conservation
29 programs for 20 years. The five outtakes from the river have diversion, fish screen, and return
30 channel structures that require periodic maintenance by the irrigation districts and companies to
31 access adequate flow, and maintain appropriate velocity for proper screen operation. Combining
32 or re-designing some of these structures has been recommended in salmon recovery and
33 irrigation management plans.

34 Portions of the lower Dungeness River channel are constrained by levees, with the highest
35 concentration occurring downstream of RM 4.5. Levees cut off the active channel from access to
36 side channels and to the floodplain, where sediment and woody debris would normally be
37 deposited to create off-channel habitat (Entrix, 2005).

38 The upper Dungeness and tributaries are accessible from Olympic National Forest roads and
39 trails. Public access to the lower Dungeness is available in several locations, including the
40 Dungeness Fish Hatchery (WDFW), the Olympic Discovery Trail at Railroad Bridge Park
41 (Jamestown S'Klallam Tribe), and Mary Lukes Wheeler County Park.

1 6.2.2 Future Land Use and Potential Effects on Shoreline Ecology

2 Under current zoning regulations, the upper reaches of the Dungeness River under County
3 jurisdiction are zoned for commercial forest, and are generally not eligible for subdivision.
4 Downstream of the Dungeness hatchery, there is a mix of developed and undeveloped parcels
5 along both sides of the Dungeness River to the river mouth. A parcel by parcel analysis of the
6 lower river was completed by Dungeness River Restoration Work Group (Hals and DRRWG,
7 2003) with recommended priorities for acquisition and easements, and prescriptions for
8 landowner stewardship. The River Restoration Work Group and the Dungeness Flood Hazard
9 Management Committee (2009) have developed several recommendations related to new and
10 existing residential development in the lower Dungeness.

11 Key issues for shoreline management in the lower river are preservation and restoration of forest
12 cover, removing flood hazards in the channel migration zone, limiting or prohibiting placement
13 of new structures in the channel migration zone, and the removal or setback of levees and
14 shoreline armoring. The limiting factors analysis and restoration plans for the Dungeness also
15 focus on water quality clean-up/protection and water conservation.

16 6.2.3 Management Issues and Opportunities

17 Analysis of habitat conditions and restoration planning in the Dungeness watershed began in the
18 late 1980's due to the depressed condition of Chinook and other stocks. A key challenge in the
19 Dungeness watershed is maintaining the ecological health and habitat forming processes of the
20 river, as well as human health and safety, in light of the development potential in the river's
21 floodplain and channel migration zone.

22 There is significant restoration potential in the watershed, particularly in the lower reaches of the
23 river as identified by the Dungeness River Restoration Work Group (1997) and the Dungeness
24 River Management Team (Jamestown S'Klallam Tribe, 2003). The overall strategy for
25 Dungeness watershed restoration was summarized in the Puget Sound Salmon Recovery Plan
26 and proposed restoration actions include the following activities relevant to shoreline
27 management:

- 28 • Restoration of the lower river floodplain and delta to RM 2.6
- 29 • Protection of existing functional habitat through land/easement purchase from RM 2.6 to
30 11.3.
- 31 • Floodplain restoration and constriction abatement RM 2.6 – 11.3
- 32 • Water conservation and instream flow protection.
- 33 • Restoration of functional riparian and riverine habitat (revegetation of mainstem;
34 restoration of lower river tributaries).
- 35 • Large woody debris placement.
- 36 • Sediment management throughout the river and in the upper watershed.

1 Specific studies and plans have been developed for many activities in the Dungeness and
2 implementation has been in progress on the above categories since 1994 in combination with
3 salmon stock rehabilitation activities at the hatcheries. Existing parcelization along the river
4 corridor and associated residential development remain a challenge for protection and restoration
5 objectives as well as for flood hazard reduction (Clallam County, 2009).

6 **6.3 McDonald Creek (Maps 1a to 6a in Appendix A)**

7 McDonald Creek originates on the northeast flank of Blue Mountain, in Olympic National Park.
8 Its watershed area is approximately 23 square miles. The lower 7.6 miles of the creek,
9 downstream from Gellor Road, is considered a “shoreline of the state.”

10 6.3.1 Summary of Baseline Conditions

11 McDonald Creek is a short (13.6 miles), independent drainage that flows through a deeply
12 incised coastal upland and marine bluff into the Strait of Juan de Fuca between the western end
13 of Dungeness Spit and Green Point (Entrix, 2005). There is limited tidal influence at the mouth
14 of the creek, and the confined channel in the lower watershed combined with high wave energy
15 at the mouth combine to prevent a significant large estuary from developing. Located in a deep
16 ravine, the gradient of McDonald Creek ranges from 2.0 to 8.0 percent. Substrate generally
17 consists of large gravel/rock, sand, and bedrock.

18 The upper portion of the McDonald Creek watershed is predominately forested. Watershed forest
19 cover decreases approximately 1 mile upstream of Highway 101, and the lower portion of the
20 valley consists of moderate- to high-density residential and agricultural land uses. However, the
21 creek generally has a forested riparian corridor of at least 400 feet in width throughout the
22 developed areas. The riparian forest cover provides wildlife habitat, helps maintain cool water
23 temperatures, and provides large woody debris inputs to the stream channel. The lower portion of
24 the creek is identified as providing priority habitat for bald eagle, peregrine falcon, and wood
25 duck.

26 McDonald Creek provides spawning habitat for steelhead and coho salmon. McDonald Creek
27 has been used as a conveyance for a portion of the Dungeness irrigation system since the late
28 1920s. Dungeness River water from the Agnew Irrigation Ditch is put into the creek at RM 5 and
29 withdrawn downstream at RM 2. This system has raised ongoing concerns about attraction of
30 returning Dungeness salmon. Additionally the bypass and withdrawal system is a hazard to the
31 outmigration of juvenile salmon.

32 The portion of McDonald Creek within shoreline jurisdiction has no State impaired water quality
33 listings. Water quality of the lower portion of the creek is reported by the Streamkeepers of
34 Clallam County as “compromised” for B-IBI and “healthy” for WQI. Erosion and landslide areas
35 are mapped along the stream channel for most of its extent. However, these hazard areas are
36 generally confined to the creek’s forested riparian corridor on undeveloped land. Because of the
37 confined nature of the stream channel, flood hazard areas and channel migration zones along the
38 creek are minimal.

3.2 Establishing a Baseline to Measure and Track Marine Ecological Functions

To comply with the Shoreline Management Act, the County must demonstrate that the updated SMP achieves “no net loss” of shoreline ecological functions compared to the baseline conditions described in this report. Ecology explains the concept of no net loss as follows: *Over time, the existing condition of shoreline ecological functions should remain the same as the SMP is implemented*¹. In other words, no net loss means that as shoreline development occurs, ecological functions are not diminished.

Ecological functions are dependent on the structure of the shoreline, which is shaped by ecosystem processes (such as erosion and deposition of sediment), which are affected to greater or lesser degrees by the actions people take on the shoreline. This basic model applies to a wide range of actions—many different ecological functions are linked to human actions and therefore to SMP decision. In this way, SMP decisions can lead to increases or decreases in ecological functions over time (Figure 3-5).

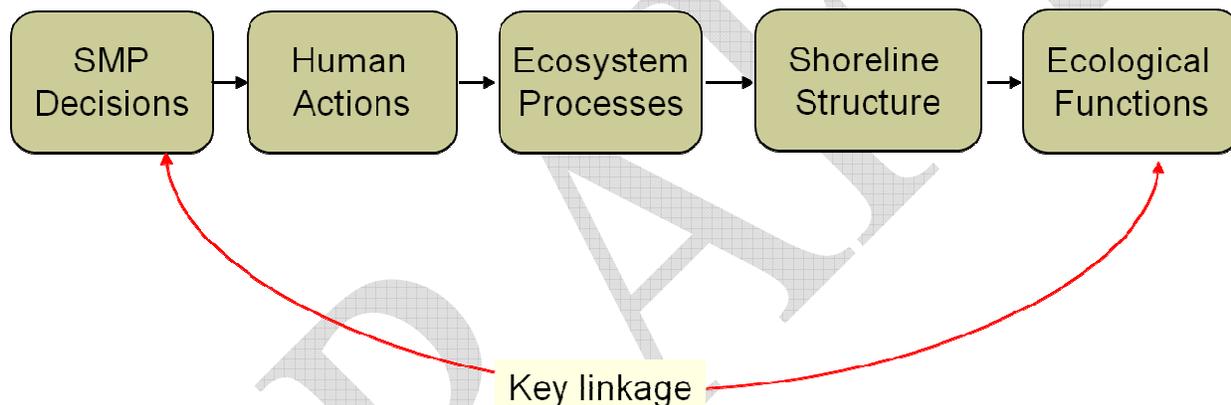


Figure 3-5. Relationship between human actions and shoreline ecological functions in the context of shoreline master programs

As an example, an SMP can regulate when and where bulkheads and other forms of shoreline stabilization are allowed. The construction of bulkheads can, in turn, have direct effects on sediment supply processes, which can affect beach substrates and profile, which can impact the suitability of the beach for forage fish spawning (Figure 3-6).

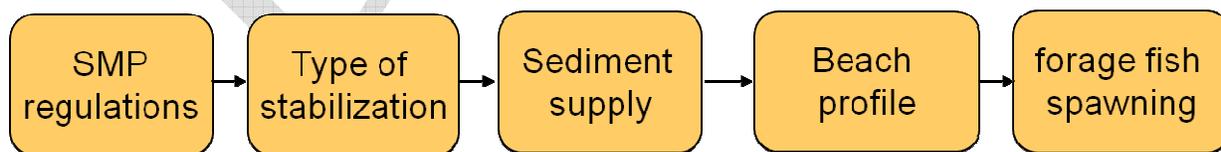


Figure 3-6. Relationship between shoreline stabilization regulations and forage fish functions

¹ See <http://www.ecy.wa.gov/programs/sea/shorelines/smp/handbook/Chapter4.pdf>

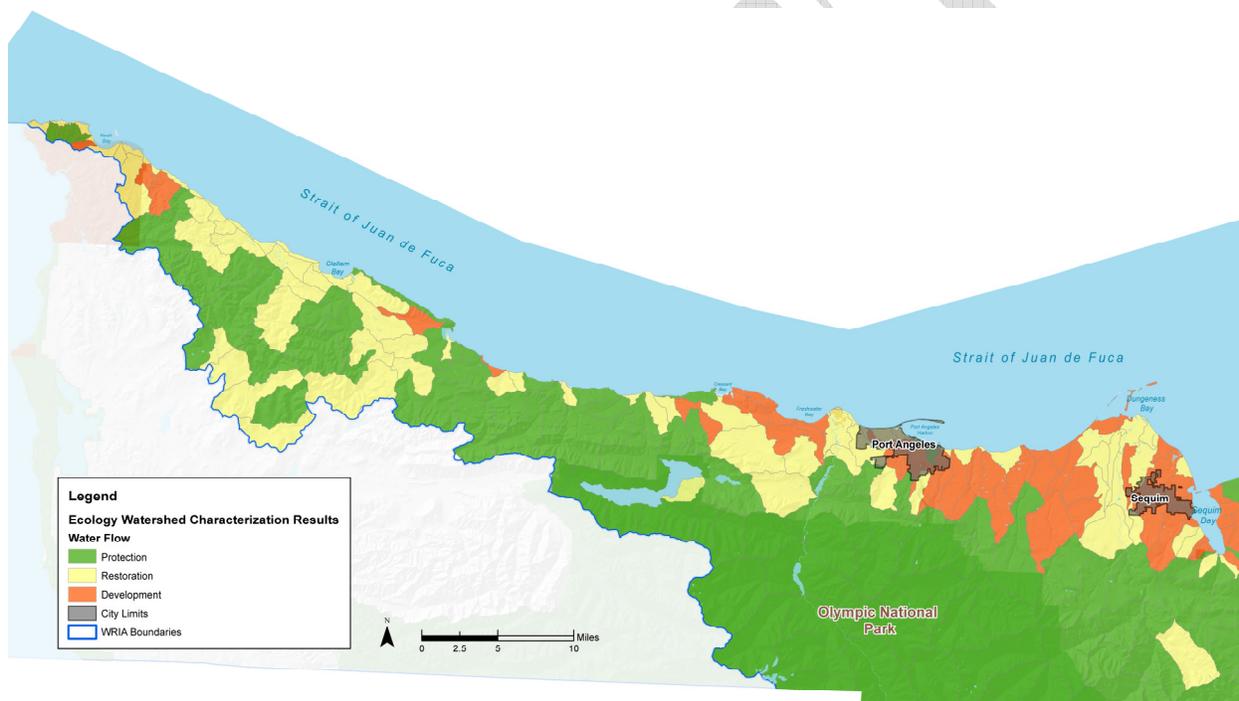
1 In order to document existing functions and track changes that occur over time, a set of
2 measurable **indicators** is needed to help determine if ecological functions are increasing
3 increased, decreased, or remaining the same. The set of indicators must be specific enough to be
4 tallied in a reliable and systematic way and data must be available through existing sources.
5 Table 3-2 contains a set of suggested indicators that could be used to assess ecological function
6 of Clallam County marine shorelines along the Strait of Juan de Fuca. Measuring these indicators
7 over time would provide an indication of whether, how and to what degree shoreline conditions
8 and functions are changing. The changes could then be reviewed in light of shoreline
9 management decisions to determine if the shoreline master program is achieving no net loss. The
10 Puget Sound Partnership has identified a similar set of indicators to determine how efforts to
11 restore, protect and prevent pollution in Puget Sound are going (see
12 http://www.psp.wa.gov/pm_dashboard.php for more information).

13 The text that follows describes current condition of each marine reach in terms of these
14 indicators (along with some related pertinent information). Some of the indicators illustrate the
15 intrinsic quality of the shoreline environment and other indicators are measures of the degree of
16 shoreline alteration. Readers are invited to suggest other indicators in addition to or in place of
17 the ones suggested here.

18

DRAFT

- 1 The results provide a relative ranking of sub basins into one of three categories (Figure 5-6):
- 2 • Protection – these sub basins are highly important in terms of infiltration, recharge, water
- 3 storage and other natural water flow processes and have minimal alteration. Protection of
- 4 the existing conditions is a high priority.
- 5 • Restoration – these sub basins areas are also very important to natural hydrology, but
- 6 have experienced alteration. Restoration in these areas could help to increase ecological
- 7 process and functions.
- 8 • Development – these sub basins are less important—on a relative scale—for hydrology
- 9 processes and they have been moderately to highly altered. Development in these areas
- 10 would generally have less impact on hydrology than in either of the other two categories.



11

12 **Figure 5-6. Ecology’s relative ranking of the water flow processes for each sub basin draining to the Strait of**

13 **Juan de Fuca**

14

15 In Clallam County most of the lowland sub basins are in the protection or restoration categories.

16 A few of the sub basins around Sequim Bay, McDonald Creek, Morse Creek, and Freshwater

17 Bay are considered to be more appropriate for development given existing levels of alteration.

18 **5.3 *Establishing a Baseline to Measure and Track Freshwater Ecological***

19 ***Functions***

20 As noted in Chapter 3, shoreline master programs regulate development actions, which can affect

21 shoreline processes, structure and functions. As an example, an SMP can regulate how much

22 streamside vegetation must be retained on a parcel slated for development. The amount of

1 vegetation will have a direct influence on the stability of the streambed and banks, which can
 2 affect the quality of the spawning habitat, which has a direct effect on the productivity of the
 3 salmon runs in that watershed (Figure 5-7). This basic model applies to a wide range of
 4 actions—meaning that many different ecological functions are affected by human actions and
 5 therefore have a direct link to SMP decisions. As a result, SMP decisions can lead to increases or
 6 decreases in ecological functions over time.



7
 8 **Figure 5-7. Relationship between vegetation retention regulations and salmon production in freshwater**
 9 **rivers and streams**

10 In order to document existing functions and track changes that occur over time, a set of
 11 measurable **indicators** is needed to help determine if ecological functions are increasing,
 12 decreasing, or remaining the same. The set of indicators must be specific enough to be tallied in
 13 a reliable and systematic way, using available data from existing sources. Table 5-1 contains a
 14 set of suggested indicators that could be used to assess ecological function of Clallam County’s
 15 freshwater shorelines. Measuring these indicators over time would provide an indication of
 16 whether, how and to what degree shoreline conditions and functions are changing. The changes
 17 could then be reviewed in light of shoreline management decisions to determine if the shoreline
 18 master program is achieving no net loss. The Puget Sound Partnership has identified a similar set
 19 of indicators to determine how efforts to restore, protect and prevent pollution in Puget Sound
 20 are going (see http://www.psp.wa.gov/pm_dashboard.php for more information).
 21

22 The text that follows Table 5-1 describes current freshwater shoreline conditions in terms of
 23 these indicators² (along with some related pertinent information). Some of the indicators
 24 illustrate the intrinsic quality of the shoreline environment and other indicators are measures of
 25 the degree of shoreline alteration. Readers are invited to suggest other indicators in addition to or
 26 in place of the ones suggested here.

27

² There are no indicators at this time for Lake Sutherland

1 **Table 5-1. Suggested indicators of freshwater ecological function that can be systematically tallied using**
 2 **existing data for Clallam County**

Metrics that Indicate Shoreline Quality	Why Selected?
<ul style="list-style-type: none"> ▪ Salmonid stock status (Table 5-2) ▪ Percent of reach area within 200 feet of the ordinary high water line with closed canopy forest (Table 5-3). 	<ul style="list-style-type: none"> ▪ Salmon species a culturally and economically significant species that require a wide range of freshwater habitats for spawning, rearing, and migration. Increasing the amount and quality of available habitat is a major goal. ▪ Streamside vegetation has a major influence on stream health. It provides habitat for wildlife, stabilizes streambanks, provides a source of large woody debris and organic matter, and provides shade to lower stream temperatures.
Metrics that Indicate Shoreline Alteration	Why Selected?
<ul style="list-style-type: none"> ▪ Percent of stream channel with levees or revetments (Table 5-4). ▪ Percent of impervious surface within shoreline jurisdiction (Table 5-5). 	<ul style="list-style-type: none"> ▪ Impervious surfaces adversely reduce infiltration which can impact groundwater recharge, stream baseflows, instream fauna and other functions. ▪ Levees disconnect stream channels from their banks can cause loss of beach and backshore habitat which important areas for forage fish spawning. Armoring also affects movement of materials and organisms between the riparian and the aquatic zone or alter natural drainage patterns.

3
 4 Freshwater rivers and streams in Clallam County are vital to the health of many Puget Sound
 5 salmon stocks, including Chinook salmon, summer chum salmon, bull trout and steelhead, which
 6 are listed as threatened under the federal Endangered Species Act (Table 5-2, Map 3 in Appendix
 7 A). Historically, the basins of the Dungeness, Elwha, and Lyre rivers and Morse Creek were
 8 among the most productive of the north Olympic coast (NOPL Strategy available at
 9 <http://www.noplegroup.org/nople/pages/strategy/PrioritizedWatersheds.htm>). These and other
 10 basins have experienced significant declines in stock productivity likely caused by habitat loss,
 11 harvest practices, and changes in ocean conditions. The Sekiu, Clallam, Pysht, Twin, Hoko,
 12 Deep Lyre-Crescent basins are all at risk of losing one or more runs of Chinook, chum and/or
 13 coho salmon (Table 5-2). The shoreline master program can play a role in helping to revise these
 14 trends by promoting effective land use practices, requiring mitigation to offset potential habitat
 15 impacts and encouraging restoration to improve the amount and quality of freshwater salmon
 16 habitat.