Cumulative Effects Analysis and No Net Loss Report

Normandy Park, Washington

Prepared for

City of Normandy Park

August 6, 2015

Job No. 12751-18

HARTCROWSER

Cumulative Effects Analysis and No Net Loss Report

Normandy Park, Washington

Prepared for

City of Normandy Park

August 6, 2015
Job No. 12751-18

Prepared by

Hart Crowser, Inc.

190 W Dayton Street, Suite 201
Edmonds, Washington 98020
Fax 425.778.9417
Tel 425.775.4682

Contents

INTRODUCTION **1**

CURRENT SHORELINE CONDITIONS **2**

Watershed and WRIA Context **2**

Hydrology (Surface Water, Groundwater, Floodplains) 2

Topography, Geology, Soils 3

Land Cover (Vegetation), Wetlands and Imperviousness 4

Reach-Level Shoreline Characterization **5**

Segment 1: Des Moines Beach 6

Segment 2: Marine View Park/Beaconsfield 8

Segment 3: Beaconsfield to Edgecliff 9

Segment 4: Edgecliff 10

Segment 5: Edgecliff to the Cove 12

Segment 6: North City Limits 13

Land Use Patterns **14**

Existing Land Use **14**

Comprehensive Plan/Zoning Designations **14**

Comprehensive Plan 14

Zoning Designations 15

Roads and Transportation Facilities **15**

Wastewater and Stormwater Utilities **16**

Existing and Potential Public Access Sites **16**

REASONABLY FORESEEABLE FUTURE DEVELOPMENT AND USE **17**

CHANGES TO SHORELINE ENVIRONMENT DESIGNATIONS AND REGULATIONS **19**

Changes to Shoreline Environment Designations **19**

Changes to Development Standards and Use Regulations **20**

BENEFICIAL EFFECTS OF ANY ESTABLISHED REGULATORY PROGRAMS UNDER OTHER LOCAL, STATE, AND FEDERAL LAWS **21**

City Programs and Planning Documents **21**

State and Federal Regulations **22**

National Pollutant Discharge Elimination System (NPDES) 23

SUMMARY OF CURRENT AND FUTURE PERFORMANCE OF SHORELINE ECOLOGICAL FUNCTIONS **23**

SUMMARY OF CUMULATIVE IMPACTS AND NO NET LOSS 24

REFERENCES 25

TABLES

1 – Total and Percent of Various Land Cover Classes Within the City of Normandy Park Based on 2007 Landsat Imagery 4
2 – City of Normandy Park's Ecological Segments 6
3 – Total Parcels, Developable Parcels, and Completely Encumbered Parcels Within the Shoreline Areas of Normandy Park 18
4 – Assessment of Current and Future Shoreline Ecological Functions

Cumulative Effects Analysis and No Net Loss Report

Normandy Park, Washington

INTRODUCTION

The City of Normandy Park (City) is conducting a comprehensive Shoreline Master Program (SMP) update with the assistance of a grant administered by the Washington State Department of Ecology (Ecology). According to Substitute Senate Bill (SSB) 6012, passed by the 2003 Washington State Legislature, cities and counties are required to update their SMPs consistent with the state Shoreline Management Act (SMA), Revised Code of Washington (RCW) 90.58 and its implementing guidelines, and Washington Administrative Code (WAC) 173-26. A final step of the SMP update process is to evaluate the locally approved program in light of the requirements of the 2003 shoreline guidelines for cumulative impacts. The purpose of this report is to evaluate the "cumulative impacts" of future development and to verify that the policies and regulations included in the City's SMP are adequate to achieve "no net loss" of shoreline ecological functions. The SMA requires the City to evaluate cumulative impacts of "reasonably foreseeable future development" throughout shoreline jurisdiction with the following considerations:

> *(i) Current circumstances affecting the shorelines and relevant natural processes;*
> *(ii) Reasonably foreseeable future development and use of the shoreline; and*
> *(iii) Beneficial effects of any established regulatory programs under other local, state, and federal laws (WAC 173-26-186.8(d)).*

In addition, the cumulative impact analysis should address:

> *. . . the effect on the ecological functions of the shoreline that are caused by unregulated activities, development and uses exempt from permitting, effects such as the incremental impact of residential bulkheads, residential piers, or runoff from newly developed properties. Accordingly, particular attention should be paid to policies and regulations that address platting or subdividing of property, laying of utilities, and mapping of streets that establish a pattern for future development that is to be regulated by the master program (WAC 173-26-201(3)(d)(iii)).*

The Shoreline Guidelines establish the standard of no net loss of shoreline ecological functions as one of the central tenets of shoreline management.

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

addressing cumulative impacts among development opportunities (WAC 173-26-186.8(d)).

No net loss assumes that some impacts may occur but that adequate measures are in place within the overall shoreline master program to offset them such that the post development conditions are no worse overall than pre-development conditions. The challenge is in maintaining shoreline functions while allowing appropriate new development. Success requires due diligence to ensure that new developments are located and designed to avoid and minimize impacts to shoreline ecological functions. This report assesses the cumulative impacts that would result from development and activities in the shoreline over time under the provisions contained in the locally approved SMP. This report also describes how the City will achieve no net loss through the adoption and implementation of the Draft SMP.

CURRENT SHORELINE CONDITIONS

Watershed and WRIA Context

Hydrology (Surface Water, Groundwater, Floodplains)

In Washington State, the major river watersheds were delineated into Watershed Resource Inventory Areas (WRIA) and numbered (Williams et al. 1975). Areas that had direct drainage into Puget Sound were lumped into the closest major WRIA. The City is located within WRIA 9, or the Green/Duwamish Watershed. None of the water draining out of the City flows into the Green River itself, but flows directly into Puget Sound through three small streams and various undefined overland flow. Most previous efforts at mapping stream basins lump areas without defined channels into areas with defined drainage, generally creating an agglomeration of drainages. A recent effort by the Puget Sound Nearshore Ecosystem Restoration Project (PSNERP) created much finer scale subbasin boundaries that broke out actual direct drainages to Puget Sound from larger defined stream drainages. PSNERP data shows that there are two larger subbasins with defined streams that flow into Puget Sound (Miller, Walker, and Normandy Creeks) and three smaller subbasins that have no primary flow path to Puget Sound (PSNERP 2009) (see Inventory and Characterization Report, Map 7 [King County 2011]). The three small unnamed basins are only 167, 103, and 82 acres in size and located in the southern half of the City. Normandy Creek has a basin size of 865 acres. Miller and Walker Creeks are combined into one basin of 6,000 acres.

The combined low numbers of wetlands, high amounts of development and imperviousness has tremendous impacts on the hydrology of the City's streams. The Miller and Walker Creeks Basin Plan (King County Conservation District 2006) states, "Under forested conditions, it is expected that six cubic feet of water per second would flow past the mouth during a one-year return period (storm flow from a rain event likely to occur on average once a year). Currently storm flows at the mouth for the same type of rain event are at about 95 cubic feet per second, or about sixteen times higher than under forested conditions." The plan also noted that most of the runoff is conveyed to the creek by a series of pipes and ditches which are intended to speed up delivery of water to the creek. This type of change to the hydrology clearly has impacted flooding, erosion,

and deposition patterns throughout the basin. This stormwater pattern also has the added problem of not allowing for natural rates of recharge, which would keep the streams flowing in summer. Thus aquatic habitat first experiences damaging high flows during the winter, and then reduced flow levels in summer, both of which greatly limit the amount of physical habitat available.

As noted above, some recharge of groundwater can happen in areas that have appropriate soils and have not been impacted by impervious surfaces. The highly permeable Everett soils occur mostly in the southern part of the City on the plateau, providing recharge potential to Normandy Creek. Critical Aquifer Recharge Areas are defined as "areas designated by WAC 365-190-080 (2) that are determined to have a critical recharging effect on aquifers used for potable water as defined by WAC 365-190-030 (2)." These areas include wellhead protection areas, areas within a 10 year time of travel and other areas that effect groundwater. There are no public wells or wellhead protection areas located within the City. The City has no Critical Aquifer Recharge Areas (BHC Consultants 2007).

Most of the major streams within the City have had their floodplains mapped (see Inventory and Characterization Report, Map 7 [King County 2011]). Miller and Walker Creeks have had their floodplains mapped for much of their length, and they are generally limited to the immediate stream corridor. The only substantial stream floodplain area is limited to the lower 1,500 feet of Miller and Walker Creeks, with a floodplain area about 800 feet wide. Normandy Creek's floodplain is mostly limited to the immediate stream channel, but it has broad forested floodplain at its headwaters. This area is mostly owned by the City. The marine shoreline has also had a floodplain/coastal inundation area mapped along the shore. In most places it is less than 100 feet wide. In Segment 5 there is one place where the inundation area goes in about 200 feet. Most of the houses in Segment 1 are entirely within the mapped floodplain of Puget Sound. Based on more recent topography, there appears to be at least two areas in Segment 3 that are likely within the 100-year inundation area of Puget Sound, but new mapping needs to be done to verify if this is the case.

Topography, Geology, Soils

The City is located along the broad, northerly trending Des Moines Plain, which is located between Puget Sound and the Duwamish River Valley (see Inventory and Characterization Report, Map 4 [King County 2011]). The upland plateau is generally between 290 feet and 340 feet above sea level in the southern half of the City. In the northern half of the City, the topography is lower due to the occurrence of a historic glacial outwash channel and the long term erosion caused by the down cutting of Miller and Walker Creeks (Booth and Waldron 2004). The City generally slopes towards Puget Sound, with all creeks within the City flowing towards Puget Sound versus towards the Duwamish Valley. Large portions of the marine shoreline are bounded by steep bluffs along the shore, while relatively few areas have gently sloped shores.

The geology of the area was summarized by Booth and Waldron (2004). Some of the geologic features along the marine shoreline are summarized in Johannessen et al. (2005), but will be

discussed under coastal processes section. The steep bluffs along the shore are the result of past glaciations, with the most recent glaciation (The Vashon Stade of the Fraser Glaciation), occurring only about 13,500 years ago. This most recent glaciation is responsible for most of the surficial deposits and generally north-south trending hills. Since the last glaciers left, upland erosion, coastal erosion, and landslides have weathered the landscape, creating the streams channels and floodplains and the steep bluffs along the shore that we see today.

The soils in the City are composed mostly of recessional outwash deposits and till. The till is present throughout most of the City, with relatively recessional outwash deposits on top of the till in many places (Booth and Waldron 2004). Till is generally a poorly sorted mixture of gravel, sand, and silts that was deposited at the base of a glacier and was compacted by the overriding ice. Till is extremely dense and generally has low permeability. There are deposits of advance outwash in the steep slopes along the shores of Puget Sound (Booth and Waldron 2004). Soils maps also show the highly permeable Everett soils in the southern part of the City on the plateau. These deposits are made up of mostly well sorted sand and gravel, which provide ideal beach building materials.

Land Cover (Vegetation), Wetlands and Imperviousness

Much of the City has been developed for residential use. Land cover data from 2007 for Normandy Park (KCDNRP 2009) showed that almost 60 percent of the City was classified as having low, medium, or high levels of development (Table 1) (see Inventory and Characterization Report, Map 5 [King County 2011]). Only about 35 percent of the City is covered in trees. Much of this vegetation is located along the steep bluffs along the shore and in stream corridors. The amounts and quality of the marine riparian area will be discussed in the reach level characterization. The generally low levels of forested areas in the City (and surrounding cities) have ramifications on the streams running through the City.

Table 1 – Total and Percent of Various Land Cover Classes Within the City of Normandy Park Based on 2007 Landsat Imagery

Land cover type	Acres	%
Bare Ground/Rock/Snow	6.49	0.41%
Cultivated	8.50	0.53%
Coniferous	0.33	0.02%
Deciduous/Mixed	551.70	34.66%
Immature Conifer	0.33	0.02%
Herbaceous	50.46	3.17%
Scrub/Shrub	40.67	2.55%
High Intensity Development	171.59	10.78%
Medium Intensity Development	584.12	36.69%
Low Intensity Development	172.92	10.86%
Water	4.78	0.30%
Total	**1,591.89**	**100.00%**

Mapped wetlands are limited to the marine shoreline where there are only two mapped wetlands present. If there were wetlands in the uplands historically, they have been lost to development. There are wetlands associated with Miller and Walker Creeks, but these are outside of Normandy Park's jurisdiction. Data collected in 2004 found four more small marshes located along the marine shoreline, but their boundaries have not been mapped (Anchor 2004).

As noted with the discussion of land cover, much of the City has been developed. Much of the development has brought with it impervious surfaces (see Inventory and Characterization Report, Map 6 [King County 2011]), areas where water cannot be absorbed and is instead shed quickly into stream systems. Impermeable surfaces include buildings, pavement, and other compacted surfaces (i.e., lawns). This has the effect of causing much higher stream flows during the rainy season, along with reduced flows in summer. The Miller and Walker Creeks Basin Plan (King County Conservation District 2006) indicates that this basin is about 22 percent impervious with a predicated increase to 30 percent in the future without changes in zoning. This basin is fairly indicative of the development and impervious patterns throughout the City.

Reach-Level Shoreline Characterization

There are six ecological segments that were identified through the Inventory and Characterization Report (King County 2011). The shoreline jurisdiction of the City was broken into six segments using zoning, land use patterns, habitat type, and geologic data. A general description, including extent, is included in Table 2 and shown on Map 12 in the Inventory and Characterization Report (King County 2011).

Table 2 – City of Normandy Park's Ecological Segments

Segment Name	Reach Number	Length (ft)	General Description
Des Moines Beach	1	1,487	This reach extends north from the City's southern boundary with Des Moines to the last house that was built on the beach.
Marine View Park/Beaconsfield	2	5,745	This reach extends north from Reach 1 to end of R15 zoning.
Beaconsfield to Edgecliff	3	2,140	This reach contains mostly low bank accretionary shoreline and begins the R20 zoning that extends north through the rest of the City.
Edgecliff	4	3,540	This reach contains high bank shoreline, vegetated slopes, with houses at the top of the bluff.
Edgecliff to north end of the Cove	5	4,693	This reach is mostly low bank shoreline with houses located within 100 feet of a mostly bulkheaded shore.
North End of the Cove to North City Limits	6	764	This reach extends from the Cove at the north end of the mouth of Miller/Walker Creek to the northern boundary of the City with Burien
	Total	18,369	

The following briefly summarizes the overall health of ecological functions within each of the analysis segments of the City's shoreline jurisdiction. Within each reach, degraded areas, areas with potential for restoration, and areas with higher levels of shoreline function that should be conserved are identified, as appropriate.

Segment 1: Des Moines Beach

Segment 1 is the only reach that contains a portion of drift cell Ki-8-2 that extends north from Des Moines. Segment 1 was defined primarily by a dense cluster of houses that are located mostly on the beach, backed by a bluff with houses overhead. Given the uniqueness of this combination of development patterns, this segment was broken out into its own reach.

This segment has been completely bulkheaded except for one parcel which has not been developed. . The bulkhead types are a mix of riprap and cement walls. Since the entire segment is armored, there are no other current shore types present other than "modified" (Johannessen et al. 2005). Recent mapping classifying the historic nature of the shoreline showed that the majority of the segment was mapped as being an exceptional feeder bluff, with a small area mapped as feeder bluff. This indicates that this area used to provide sediment to the drift cell. Note that the southern 100 feet of this segment currently would supply sediment to the south under current conditions of the marina creating the wave shadow. Much of the armoring in this segment was classified as being located below the ordinary high water mark (OHWM) (Anchor

2006). As noted above, the deeper into the intertidal the armoring goes, the bigger impact and more spread out through the ecosystem the armoring impacts occur. This segment did not have any groins built to catch sediment; however, given that many of the bulkheads extend into the intertidal, many of the bulkheads act as groins, intercepting sediment moving along the shore. One boat ramp was observed within this segment. There are no known overwater structures or tidal barriers in this segment. Given the very close proximity of the houses in this reach to the water, there is a greater potential for artificial light pollution of the nearshore waters at night in this segment than most of the others within the City.

Previous forage fish surveys in this reach have not found any sand lance or surf smelt spawning on the beaches, however only one survey has been done in this reach (WDFW 2010) (Inventory and Characterization Report, Map 16 [King County 2011]). Surveys of submerged aquatic vegetation in the 1990s showed that there are no known kelp beds in Segment 1 (Berry et al. 2000). However, Department of Agriculture maps from 1911–1912 indicate that kelp may was more prevalent along the shore in King County than it is now (Thom and Hallum 1990). Surveys in the 1990s showed that eelgrass is found in patchy beds throughout the segment (Berry et al. 2000). Washington Department of Fish and Wildlife (WDFW) shellfish data indicate that hardshell clams can be found close to shore throughout this reach and that geoducks can be found in a parallel band between 700 and 2,000 feet offshore (WDFW 2010).

The marine riparian area has been heavily modified by the development that has occurred over the last 100 years. The trees that are present are limited to the area between the houses at the toe of the bluff and the houses at the top of the bluff, thus providing only a few of the potential benefits of vegetated buffers. The primary benefit the vegetation is providing is slope stabilization. However, it was observed that the trees along the top of the bluff slope have been thinned or removed throughout much of the segment. Also, most of the trees at the top of the bluff are gone and replaced with lawns. This was most likely done in order to provide unobstructed views of Puget Sound, but it is likely this has increased slope instability for the tall bluffs just above the houses on the shore. Given that nearly the entire reach has been bulkheaded and that most of the bulkheads are well below the ordinary high water line, there are no accumulations of drift logs on the beach. Similarly, there is also no ability for large woody debris (LWD) to accumulate and overhang the intertidal.

One of the primary means of accessing the houses is driving along the beach. Driving along the beach has the potential to cause variety kinds of damage to the beach. Any benthic or epibenthic organisms on the upper beach are likely to be crushed by vehicles. This includes any forage fish that might be spawning on the beaches. It is not known if residents drive along the lower intertidal areas during low tides; if so, there is the potential for heavy damage to any eelgrass patches present. Cars driving on the beach are also a source of consistent pollution through leaks of various car fluids (i.e., oil, antifreeze). The cumulative impacts of all the stressors on the ecology of this segment of shoreline are potentially fairly high.

Segment 2: Marine View Park/Beaconsfield

This mile-long reach includes mostly steep bluffs throughout the segment, with about 600 feet of low bank shoreline in the northern portion of the segment. The development pattern in this segment is fairly different from Segment 1 due the fact that the generally straight shoreline bluff has been interrupted by multiple reentrants created by localized surface and groundwater discharge. Since the bluff face undulates greatly in this segment, most of the development at the top of the bluff was set back much farther from shoreline than in Segment 1. In Segment 2, the top of the bluff is generally much greater than 300 horizontal feet away from the OHWM, in comparison to Segment 1, where it is generally less than 200 feet. There are 52 shoreline parcels in this reach. Only seven of these parcels have houses within 200 feet of the shoreline, and there are 34 vacant parcels. Two of the houses are located on the shore, at the toe of bluff, and are located fairly close to Segment 1. Unlike the houses in Segment 1, these two houses have upland access via a road cutting across a steep slope. Many of the vacant parcels are found in the Beaconsfield area and are very narrow, some only 20 feet wide, and contain only steep slopes. This segment also includes Marine View Park, which is the only physical public access point to shore for residents of the City.

Bulkheads cover approximately 50 percent of the shore. Other shoretypes present include a modified accretion shoreform, a few hundred feet of transport zone, and roughly half a mile of active feeder bluff (Johannessen et al. 2005). Recent mapping classifying the historic nature of the shoreline showed that the majority (47 percent) of the armored area was mapped as being an exceptional feeder bluff, with a smaller area (30 percent) mapped as feeder bluff. This indicates that this area used to provide a significant amount of sediment to the drift cell. The accretion areas located in this segment have a heavily modified backshore due to houses and clearing. The bulkhead types are a mix of riprap, old creosote pilings and cement walls. Much of the armoring in this segment was classified as being located below the OHWM (Anchor 2006). All of this information indicates that the physical impacts of the bulkheading in this reach are high.

This segment did not have any groins built to catch sediment; however, given that many of the bulkheads extend deep into the intertidal, many of the bulkheads act as groins, intercepting sediment moving along the shore. There are three mapped boat ramps in this segment. Two of the ramps are quite extensive, with one extending 110 waterward of the OHWM and the other extending 65 feet out. There are no known overwater structures or tidal barriers in this segment. Given the highly vegetated slopes and the general lack of proximity of houses in this reach to the water, there is a very low potential for artificial light pollution at night in this segment.

There are at least two small stream mouths that are highly visible in most aerial and oblique photographs. The southerly stream mouth is highly constrained due to being located between the two houses that are located on the beach. The two houses and their bulkheads create a roughly 60-foot-long by 10-foot-wide flume. Given the steepness of the hillside, it is unlikely that this stream could provide salmonid spawning habitat, but the stream mouth would provide rearing habitat. The other stream is located between Marine View Park and the Beaconsfield

development and appears to have mostly a natural outlet. A survey done in 2003 of an upstream segment classified the water type as perennial with no fish (Washington Trout 2004).

Previous surveys in this reach have not found any sand lance or surf smelt spawning on the beaches (WDFW 2010). Given that some of the beaches in this segment could support surf smelt and sand lance (i.e., have appropriate physical space and appropriate substrate), it is unclear why they are currently not spawning in this segment. Surveys of submerged aquatic vegetation in 1990s the showed that there are no known kelp beds in Segment 2 (Berry et al. 2000). The same surveys showed that eelgrass is found in patchy beds throughout the segment.

WDFW shellfish data indicate that hardshell clams can be found close to shore in the southern portion of this segment and that geoducks can be found in a band parallel to shore more than 700 feet offshore (WDFW 2010). It should also be noted that the two large boat ramps in this segment extend fairly deep into the water and appear to be cement structures that would preclude most naturally occurring subtidal organisms (i.e., various clams).

The marine riparian area in this segment is probably the most intact within the City. Trees make up slightly over 90 percent of the shoreline vegetation. While the trees are a fairly even mix of dense and patchy stands, most of the trees do not overhang the intertidal. The lack of overhanging vegetation is created by a combination of natural steep bluffs along the shore and shoreline armoring that interrupts the ability of the trees to overhang the intertidal. Given the fairly broad area covered by steep slopes, this area is one of the more heavily treed areas in the City. Similar to Segment 1, many of the trees at the top of the bluff have been replaced with lawns.

There are no mapped areas of LWD, likely for the same reasons noted above for the general lack of overhanging trees. However, there are significant areas (approximately 60 percent of the segment) of drift log accumulations. The areas of the segment that do not have drift logs are generally bulkheaded below the OHWM, providing no ability for the logs to accumulate.

Segment 3: Beaconsfield to Edgecliff

This 2,000-foot-long segment's geomorphology is fairly similar to Segment 2. This segment includes mostly low bank shoreline that is at the base of one of the areas that the bluff has substantially eroded inland due to localized surface and groundwater discharge. There is one short area (approximately 400 feet) of bluff in the middle of the segment which is fairly stable due to beach in front of it being accretionary. Although the bluff face undulates greatly in this segment, there were more substantial flat areas near the toe of slope where development of sizable houses has occurred. There are 10 shoreline parcels in this reach. Four of these parcels have houses within 200 feet of the shoreline, though it looks like another house was being rebuilt within 200 feet of the shoreline in 2009 aerial photographs. The houses are between 25 and 50 feet from the OHWM. There is only one vacant parcel. This is the only segment within the City that has a private road along the beach. The road is about 500 feet long and the waterward edge is located at about the OHWM. This segment is also one of the only segments with a coastal wetland.

The entire segment is mapped as an accretion shoreform, but almost 45 percent of it has been heavily modified by clearing, bulkheads, and a road (Johannessen et al. 2005). The bulkhead types are a mix of riprap and cement walls. The armoring in this segment was classified as being located at or above OHWM (Anchor 2006). This generally indicates the impacts of these bulkheads is less on the actual beach environment, but the upland portion of the segment has been heavily modified by the development. This segment does not have any groins or overwater structures and none were previously mapped (Anchor 2006). One parcel has a boat ramp that automatically surfaces when needed for use, otherwise it remains below the beach, so its impact on the shoreline is much reduced compared to an above-ground boat ramp. Given the general close proximity of houses in this reach to the water in the northern half and the most southern portion, there is a moderate potential for artificial light pollution at night in this segment.

There are at least two small streams that are highly visible in most aerial and oblique photographs and were mapped in 2004 by Washington Trout. The southerly stream flows into the mapped wetland in this reach. The wetland is roughly three acres in size and appears to be isolated from the marine environment by a private road that runs along the shore. Given the generally low-lying beach face, it appears that under natural circumstances there would be a connection to the Sound, creating a salt marsh versus a freshwater-dominated marsh. The northerly stream is highly constrained due to being located in a cement flume. This stream was classified by Washington Trout (2004) as being perennial without fish. It is unclear how much habitat would be opened up if the flume barrier were made passable, but given the steepness of the hillside, it is unlikely that this stream could provide salmonid spawning habitat. Washington Trout (2004) noted that the landowner said there was a salt marsh at the mouth 50 years ago before the houses were built on top of the marsh. If the mouth was restored, or at least the flume made more passable, it is likely that the area would be used by rearing salmonids.

Previous surveys in this reach found surf smelt spawning on the beaches, but no sand lance (WDFW 2010). Surveys of submerged aquatic vegetation in 1990s showed that eelgrass is found in patchy beds throughout the segment, with a continuous band of eelgrass in the northern 300 feet of the segment (Berry et al. 2000). WDFW shellfish data indicate geoducks can be found in a band parallel to shore more than 700 feet offshore (WDFW 2010).

The marine riparian area in this segment is some of the least intact within the City. Trees make up slightly over 22 percent of the shoreline vegetation. This single dense patch of trees does not overhang the intertidal, though it does extend up the slope and onto the plateau above. The rest of the vegetation in this segment is made up of lawns and landscaping. Given the accretionary nature of this shoreline and that bulkheads were mostly built above the OHWM, there are drift log accumulations throughout the segment. However, given the lack of trees along the shore, there are no mapped areas of potential LWD accumulation.

Segment 4: Edgecliff

This 3,500-foot-long segment's geomorphology is much more similar to Segment 1 than to Segments 2 and 3. The shoreline is typified by a vegetated, fairly steep, uniform bluff with no

houses at the toe of slope. The bluff height starts at around 250 feet in the southern end and slowly transitions to a 50-foot-tall bluff at the northern most end. There are 33 shoreline parcels in this reach, with one vacant parcel. Only four of these parcels have houses within 200 feet of the shoreline. Edgecliff Road is approximately 350 feet from shore and parallels the shore for most of the segment. There is generally a row of houses between the road and the slope of the bluff. The houses are set back from the edge of bluff on average 30 feet. This segment contains one historic house (the "Tracy House") that is located just outside of shoreline jurisdiction, while much of the property is located on the bluff face.

Most of the segment is mapped as either a feeder bluff or modified shoreline (Johannessen et al. 2005). Bulkheads are found along 54 percent of this segment. The bulkhead types are mostly low rock revetments and with some cement walls. The armoring in this segment was classified as mostly being located below OHWM (Anchor 2006). The bulkheads in this reach appear to have mostly been constructed to limit erosion of the toe of slope. One larger (approximately 350 feet) bulkhead was built fairly far into the intertidal and filled in behind the bulkhead in order to provide a level platform at the toe of the slope. Historical reconstruction of the armored sections indicates that they were previously acting as feeder bluffs (Johannessen et al. 2005). Given that the bulkheads are below OHWM and are blocking sediment from reaching the beach, they have a fairly significant impact on the nearshore environment. This segment had one groin mapped in the center of segment, but the groin appears to be falling apart and not effective. There are no boat ramps or overwater structures in this section, and none were mapped in 2005 (Anchor 2006). Given the general lack of proximity of houses in this reach to the water, there is a low potential for artificial light pollution at night in this segment.

Previous surveys in this reach found surf smelt spawning on the beach in the southern end of the segment, but no sand lance (WDFW 2010) (see Inventory and Characterization Report, Map 30 [King County 2011]). Surveys in 1994 found surf smelt amounting to a total of 700 feet of this segment being mapped as spawning beach. Surveys of submerged aquatic vegetation in 1990s showed that there are no known kelp beds in Segment 4 (Berry et al. 2000). The same surveys showed that eelgrass is found as a continuous band throughout the whole segment. WDFW shellfish data indicate geoducks can be found in a band parallel to shore more than 1,000 feet offshore (WDFW 2010).

The marine riparian area in this segment is some of the most intact within the City. Trees are found along the entire length of shoreline, though approximately 65 percent of the trees are patchy. Overhanging trees make up slightly over 73 percent of the shoreline, with much of overhanging vegetation being patchy in nature. Much of the vegetated area thins out as it gets to the top of the bluff, especially in the northern section of the segment. This is likely for views of Puget Sound, but the lack of trees and predominance of shrubs will likely affect the slope stability over the long term. There is one small area (approximately 200 feet) of LWD mapped in the southern portion of the segment. There are drift log accumulations in the southern and northern sections of the segment.

Segment 5: Edgecliff to the Cove

This almost mile long segment's geomorphology is fairly different than the other segments to the south. This segment includes mostly low bank shoreline that gently slopes towards Puget Sound and is likely part of a remnant glacial outwash channel (Booth and Waldron 2004). Given the gentle slope, the area is also highly built out by residential land use. There are 32 shoreline parcels in this reach. Twenty-eight of the parcels have houses within 200 feet of the shoreline. Most of the houses are set back 60 to 100 feet from the OHWM. There are several houses that are located less than 30 feet from the OHWM. This segment also contains three historic houses in the northern half. They are the "Hughett House," "Gustin House," and another unnamed house (KCDNRP 2010). Normandy Terrace SW parallels the shore in this segment, with a small portion of the road being in shoreline jurisdiction. This segment is also one of the only segments with a coastal wetland. The northern end of this segment also has a fairly large stream delta that protrudes out into Puget Sound 1,000 feet or more. The Southwest Suburban Sewer District has a direct outfall offshore of the delta. This outfall may be responsible for some of the unusual water quality data noted in the Inventory and Characterization Report.

The segment is mapped as a combination of accretion shoreforms and modified shorelines (Johannessen et al. 2005). Close to 50 percent of the shoreline has been bulkheaded (Anchor 2004). The bulkheading is concentrated in the residential area in the central and southern portions of the segment. Sixty percent of the armoring in this segment was classified as being below the OHWM (Anchor 2006). Combined this data indicates that the impact of these bulkheads is focused on the actual beach environment and backshore environments, and not on the sediment delivery functions. This segment has five groins throughout the segment. Most appear to be old and failing, but one appears to be relatively new and larger (20 feet wide by 80 feet long) and is clearly trapping a fair amount of drift logs and sediment on the updrift side. The groin protects a City stormwater outfall. This groin is affecting sediment transport to other properties downdrift. Immediately downdrift of this groin is the remnant of a boulder field. There are at least 7 boat ramps in this reach, most of which are fairly short and do not extend far into the intertidal. There are two overwater structures in this reach. The first one is at the southern end of the segment and is roughly 5 feet wide by 50 feet long. The northern one connects a private residence on the right bank of Miller Creek at its mouth to the very end of the beach berm spit where a helipad was constructed. Given the general close proximity of houses in this reach to the water in the southern and central portions, there is a moderate potential for artificial light pollution at night in this segment.

The three mapped streams in Normandy Park all outlet to Puget Sound in this segment. The southerly stream, Normandy Creek, is a fairly short stream that drains out of Nature Trails Park. While no fish were found during stream surveys in 2004, fish were believed to be present historically (Washington Trout 2004). The surveys were unable to classify if the piped outlet was a barrier to fish passage, but the habitat in the stream above the mouth was classified as having adequate spawning habitat. The outlet appears to be piped 80 feet waterward of the OHWM. This stream was most likely responsible for the historically mapped wooded marsh that was located at the mouth of this creek, but is not present today. The other two streams in this segment are Miller

and Walker Creeks, which join together to a single stream channel just before the creek enters saltwater. Historically, both creeks fed into a nine-acre wetland complex (Collins and Sheikh 2005). Portions of that wetland still remain. Approximately 2.3 acres appears to be scrub shrub wetland. Most of this area is part of the private park, "The Cove." An enhancement project in the recent past created a large pond along the channel of Walker Creek. The pond has a dam on its outlet in order to control water levels, but does not block fish passage (Batcho, Andy, Normandy Park resident, personal communication, 2014). Salt water exchange reaches the pond at a tide of approximately 11 feet (Batcho, Andy, Normandy Park resident , personal communication, 2014). At least two acres of the former wetland area is currently managed as a lawn. In 2004, Washington Trout's surveys showed high numbers of both coho salmon and cutthroat trout in both streams and they still use the stream in high numbers (Batcho, Andy, Normandy Park resident, personal communication, 2014).

All of the shoreline has mapped coastal floodplain along it. The wetland area around the mouths of Miller and Walker Creeks is mostly mapped as floodplain.

Previous surveys in this reach did not find any surf smelt or sand lance spawning on the beaches (WDFW 2010). Given that some of the beaches in this segment could support surf smelt and sand lance (i.e., have appropriate physical space and appropriate substrate), it is unclear why they are currently not spawning in this segment. Surveys of submerged aquatic vegetation in 1990s showed that there are no known kelp beds in Segment 2 (Berry et al. 2000). The same surveys showed that eelgrass is found in patchy beds throughout the segment.

The marine riparian area in this segment is some of the least intact within the City. Landscaping and grass make up over 80 percent of the riparian vegetation of this segment. There are two patches of trees in the center of the segment totaling 564 feet and one small patch at the northern edge of the segment. A large portion of the trees come from a single parcel that contains one of the historic houses. Drift log accumulations were mapped in almost 70 percent of the segment, mostly in the central and northern portions. However, given the lack of trees along the shore, there are no mapped areas of potential LWD recruitment.

Segment 6: North City Limits

This 750-foot-long segment's geomorphology is fairly similar to Segments 1 and 4. The shoreline is typified by a vegetated, fairly steep, uniform bluff with one house at the toe of the slope. The bluff height is about 100 feet throughout the segment. There are only six shoreline parcels in this reach, with two being vacant parcels. Portions of three houses are within the shoreline jurisdiction. One of these houses is built at the toe of the bluff and on the intertidal area. All of the segment is mapped as modified (Johannessen et al. 2005) and is bulkheaded. The bulkhead types are mostly low rock revetments and with some cement walls. The armoring in this segment was classified as mostly being located below the OHWM (Anchor 2006), though based on 2006 oblique photos, most of the armoring appears to actually be below the OHWM. Historical reconstruction of the armored sections indicates that they were probably acting as feeder bluffs (Johannessen et al. 2005). Given that the bulkheads are below the OHWM, and are blocking sediment from reaching

the beach, they have a fairly significant impact on the nearshore environment. This segment had no groins, boat ramps, or overwater structures mapped within it (Anchor 2004). Given the general lack of proximity of houses in this reach to the water and the highly vegetated bluffs, there is a low potential for artificial light pollution at night in this segment. Most of the segment is mapped as having a 50-foot strip of coastal floodplain

Previous surveys in this reach found no surf smelt or sand lance spawning on the beach (WDFW 2010). Surveys of submerged aquatic vegetation in 1990s showed that there are no known kelp beds in Segment 2 (Berry et al. 2000). The same surveys showed that patchy eelgrass was found throughout the whole segment.

The marine riparian area in this segment is composed mostly of trees. Patchy trees are found along the entire length of shoreline, though approximately 15 percent of the trees separated from the shoreline by a house. There are no overhanging trees within this segment. Unlike many of the other segments, there is a fair amount of vegetation along the top of the bluff. Given the shoreline armoring of the whole segment, no LWD was mapped in the segment. There is a very small area of drift log accumulations in the southern most edge of the segment (Anchor 2004).

Land Use Patterns

The city of Normandy Park is located in southwest King County. Normandy Park is highly developed and has a well-established pattern of land use. The City is bounded by approximately 3.5 miles of Puget Sound shoreline to the west and 1st Avenue South to the east. The city of Burien forms the northern boundary and the city of Des Moines forms the boundary to the south. The City's shoreline jurisdiction is composed of a variety of natural and human modified landscape features that include natural and modified beaches, concrete and rock bulkheads.

Existing Land Use

The City is predominately developed with single-family residential properties within the shoreline environment and has one public park (Marine View Park) and one private park known as The Cove. There are no multi-family or commercial developments within the shoreline environment. The shoreline jurisdiction also contains a few undeveloped parcels of land. Vacant parcels are described in the *Reach-level Shoreline Characterization* section of this report.

Comprehensive Plan/Zoning Designations

Comprehensive Plan

According to the City of Normandy Park 2004 Comprehensive Plan, the City's shoreline jurisdiction is largely comprised of properties designated Low Density Single-Family. The only other designation located within the shoreline jurisdiction is Open Space for the private park and the public park.

General goals and policies established in the City of Normandy Park 2004 Comprehensive Plan relate to a common desire to protect the quality of Normandy Park's natural and built environment. The forested, low-density residential character of Normandy Park is in large part due to the natural landscape that flows through the community. Natural open spaces and sensitive areas are major components of the city's character and it is essential that they be preserved.

The City's existing Shoreline Master Program goals and policies are included as an element of the City's current Comprehensive Plan. These goals and policies encourage minimal adverse effect on the quality of the shoreline environment.

Zoning Designations

Zoning designations in the City generally follow land use designations as discussed above under Comprehensive Plan designation. Within the City's shoreline jurisdiction, Low Density Single-Family Residential zoning (R-15 and R-20) dominates the entire shoreline. The southern 1.5 miles are zoned as R-15 and the northern 2 miles are zoned R-20. The zoning is such that no subdivisions along the shoreline will occur in the future.

Roads and Transportation Facilities

As described above, the majority of the City's shoreline is occupied by low-density, single-family development, a private park, and a public park. There are generally very few roads that are found within the shoreline jurisdiction. The following road segments are located within shoreline jurisdiction:

- *The westernmost 200 feet of SW Shorebrook Drive;*
- *Normandy Terrace SW, which parallels the shoreline, dipping in and out of shoreline jurisdiction;*
- *The western end of SW 187th Street;*
- *Edgecliff Drive SW, which parallels the shoreline for most of its length, with the last 150 feet dipping into shoreline jurisdiction;*
- *The western end of South 216th Street;*
- *The western end of South 218th Street; and*
- *The western end of South 219th Street.*

There are also various private roads or driveways located in shoreline jurisdiction. Within this group are two sizeable private roads. There is 500 feet of private road/driveway located along the steep slopes of Segment 2. There is roughly 600 feet of road in Segment 3 that is located at the ordinary high water mark and encircles a wetland.

There are no public transit routes located within the shoreline environment of Normandy Park. The closest metro route stops at First Avenue South and 211th Street less than a mile away from Marine View Park.

Wastewater and Stormwater Utilities

The Southwest Suburban Sewer District provides for the collection, treatment, and disposal of wastewater for most of the City. The Southwest Suburban Sewer District has a treatment plant located outside shoreline jurisdiction at 801 SW 168th Street. Two outfall pipes from the facility run to the Puget Sound. The Midway Sewer District serves the southernmost end of the City and has one outfall that is located just south of the City limits.

The City has jurisdiction over the storm and surface water management system within the city boundaries, within and outside of roadways. Stormwater utilities consist of over 750 catch basins, 50 manholes, over 12 miles of conveyance lines, and over 8 miles of open ditches.

Other utilities in the shoreline jurisdiction include electric power, water, gas, and cable.

Existing and Potential Public Access Sites

There are only a few existing shoreline areas in the City that are available for public access (Inventory and Characterization Report, Map 3 [King County 2011]). Due to the nature of the single-family development along the shoreline, there are no pedestrian walkways, outside of the asphalt and dirt trails located in Marine View Park, that are open to the public.

The primary access area is Marine View Park, which is located at 20945 Marine View Drive SW (Inventory and Characterization Report, Map 3 [King County 2011]). There is also limited public access to the beach at the south end of the City. The 200 feet of access is available through Des Moines Beach Park, in the City of Des Moines. The City also owns several shoreline properties in the Beaconsfield development. However, these properties do not currently have a legal upland access point. The only legal public access is by boat.

The remainder of the shoreline is residential with one private park. The private park, known as The Cove, has beach access via SW Shorebrook Drive. There is a small private graveled parking area and boat launch. Only Lot A property owners in the community have access to The Cove.

There is the potential for increased shoreline access in the future, especially around the Beaconsfield area (Inventory and Characterization Report, Map 3 [King County 2011]). Areas with potential for public access are noted in the *Reach-level Shoreline Characterization* section of this report.

There are also several road segments that are located either in shoreline jurisdiction or along the shore that provide visual access to the shore. While not as tangible as physical shoreline access, visual access still provides some level of enjoyment of the shoreline areas of the City.

REASONABLY FORESEEABLE FUTURE DEVELOPMENT AND USE

The City has established land use patterns in the shoreline jurisdiction that predate the current regulatory regime. The pattern generally includes single-family residential development and public waterfront parks within the City's shorelines. Since 1991, at the time when the previous SMP regulations were adopted, the City had received an average of 2 building permits per year for residential-related construction within the shoreline (including new residential construction, residential remodel and addition, and residential accessory structures). A total of 23 building permits were issued in the shoreline jurisdiction since 1991. In addition, there are only two residential piers on the marine shoreline and no public marinas within the City.

Currently, the Puget Sound shoreline within the City is nearly fully developed and is zoned single-family residential. Of the total number of parcels along the City's Puget Sound shoreline, only 12 percent remain undeveloped (Table 3). Parcels that could be developed with new residences may be highly encumbered by critical areas and their buffers and cost prohibitive or unsafe to build on. These lots would be difficult to develop except through the shoreline variance process. All developed land along both the Puget Sound and stream shoreline areas contain use patterns that are consistent with both the City's current zoning and vision of future land use as established by the City's Comprehensive Plan land use designations.

Table 3 – Total Parcels, Developable Parcels, and Completely Encumbered Parcels Within the Shoreline Areas of Normandy Park

Segment Number	Shoreline Segments	Number of Parcels	Number of Undeveloped Parcels	Number of Undeveloped Parcels (% of total)	Number of Undeveloped Parcels considered developable	Undeveloped Parcels (%) considered developable
1	South City Limits through Beach Community	24	7	29	0	0
2	Marine View Park and Beaconsfield	52	8[a]	15	8	15
3	Beaconsfield to Edgecliff	10	1	3	0	0
4	Edgecliff	33	1	3	1	3
5	Edgecliff to north end of the Cove	32	0	0	0	0
6	North end of the Cove to North City Limits	6	1	17	0	0
	Total for City	**157**	**18**	**12**	**9**	**6**

[a] The number of vacant lots in Segment 2 is 34; however, 26 of those are in the Beaconsfield area and are in the process of being purchased for conservation.

Source: Inventory and Characterization Report (King County 2011).

Based on the nature of the shoreline within the City limits, the lack of extensive vacant developable land and consistency among land use regulations and long-range plans, reasonable foreseeable development will likely primarily include redevelopment of property. The shoreline is zoned for R-15 and R-20 low density residential and no lots can be subdivided under the current zoning regulations. Only 18 lots are potentially developable, but they may be encumbered by critical areas and their buffers and too costly to develop. The amount of future new development within the Normandy Park shoreline is expected to be a very small amount, if any.

These data show that limited development on vacant residential lots has occurred over the last several years. Further, the permit history shows that the primary pattern of active development along the City's largely developed shorelines is redevelopment and accessory development of residential lots. These redevelopment activities have also occurred at relatively low levels within Normandy Park shoreline areas. For example, 1 to 3 percent of the lots along the Puget Sound shoreline have received shoreline permits on an annual basis since 2006, and there were no shoreline permits issued in 2013.

Redevelopment and development of primarily single-family residential uses will also include many activities that are exempt from Shoreline Substantial Development Permits (SDP) (NPMC 16.24.040 and WAC 173-27-040). These activities include reconstruction of single-family residences and reconstruction of shoreline modification. Although a SDP would not be required, all of these development activities would still be required to meet the provisions of the updated SMP requirements. During permit review for land use and development activities, the City will ensure compliance with the guidelines of the updated SMP (NPMC 16.24.040). The details of specific SMP provisions are summarized and discussed below in order to demonstrate how reasonably foreseeable exempt activities, as well as other activities, will not lead to a net loss of ecological function within the foreseeable future.

CHANGES TO SHORELINE ENVIRONMENT DESIGNATIONS AND REGULATIONS

Changes to Shoreline Environment Designations

The latest version of the City's SMP is from 1991. Shoreline management goals and policies are contained in the land use element of the Normandy Park Comprehensive Plan. Shoreline development regulations and permitting procedures are codified in Title 16 of the *Normandy Park Municipal Code* (NPMC). The City's SMP established a system of "shoreline environment designations" that provide a uniform basis for applying policies and use regulations within distinctly different shoreline areas. Shoreline environment designations function like zoning overlays. That is, they do not replace the underlying zoning regulations for density, setbacks, etc., but they may impose additional development standards or regulations for portions of property within the shoreline jurisdiction. Generally, environment designations are based on existing and planned development patterns, biological and physical capabilities and limitations of the shoreline, and a community's vision or objectives for its future development.

The existing (1991) SMP used two shoreline environment designations: (1) Rural Residential, and (2) Aquatic. The proposed SMP addresses inconsistencies in the 1991 SMP by providing a new system of environment designations, in compliance with State guidelines (WAC 173-26-211). The new system applies designation criteria and management policies consistently across areas with similar current and planned land uses and resource characteristics. Elimination of these inconsistencies will help the City reduce net loss of ecological function in the shoreline over time. The proposed SMP environment designations includes the following:

- *Residential* environment which replaces but is the same as Rural Residential for areas of the City that are characterized by single-family residences or planned as such.
- *Urban Conservancy* environment that includes waterfront park areas and the mouth of Miller and Walker Creek where The Cove is located where natural shorelines are protected and residential structures are not allowed.

- *Bluff Conservancy* environment to protect the ecologically and physically important functions of feeder bluffs along the shoreline that provide sediment to beach and the Puget Sound and limit any type of shoreline modification.
- *Beach Community* environment to protect the unique character of the residences that are on the beach in the southernmost portion of the shoreline; while also trying to encourage returning the parcels to natural shoreline when property has been substantially damaged.
- *Aquatic* environment to protect habitats and ecological functions of the nearshore and intertidal zones in balance with water dependent uses such as boat moorings and floats.

The proposed environment designations are consistent with both the existing land use pattern and the Comprehensive Plan future land use designations.

Changes to Development Standards and Use Regulations

The proposed SMP offers several changes to the development regulations that encourage shoreline conservation and prohibit activities that would cause adverse impact to shoreline functions and processes. These changes include limiting shoreline modifications such as bulkheads and riprap revetments along much of the City's shoreline and encouraging soft or green shoreline structures where possible. These shoreline modifications have significantly altered the natural net-shore drift direction and the availability and local distribution of beach sediment. Further, the conservation of shoreline vegetation has been emphasized in the new shoreline regulations for the City to further stabilize shorelands and increase habitat functions. Other changes related to development of specific uses in the shoreline are also designed to protect shoreline ecological functions and processes, while continuing to allow legal uses, provide public access where feasible, and allow sensitive development.

These proposed changes to development standards and use regulations are, in general, more protective than the existing SMP. Redevelopment would be allowed in all environments, but redevelopment of more intense water-dependent uses would be restricted to the Urban Conservancy environments. As redevelopment occurs in other environments (particularly for shoreline stabilization), policies and development standards establish a preference for alternative "soft-shore" erosion control or stabilization designs. In some cases, project applicants would be required to demonstrate why a "soft-shore" design would not provide adequate protection of existing development. Over time these changes will likely have a net beneficial effect on shoreline ecological processes as properties are redeveloped.

BENEFICIAL EFFECTS OF ANY ESTABLISHED REGULATORY PROGRAMS UNDER OTHER LOCAL, STATE, AND FEDERAL LAWS

The City's SMP is meant to be consistent with and work in conjunction with several city, state, and federal programs and planning documents to protect the functions and values of shoreline resources and protect the health and safety of City residents. These include, but are not limited to, the following programs.

City Programs and Planning Documents

City of Normandy Park Comprehensive Plan

General goals and policies established in the City of Normandy Park Comprehensive Plan relate to the preservation of existing residential neighborhood character, protection of environmental resources, and the promotion of economic development. The Comprehensive Plan seeks to balance these social, environmental, and economic goals through land use and zoning regulations, critical areas regulations using best available science, and development regulations. In relation to shorelines, the Comprehensive Plan seeks to preserve or develop shorelines and adjacent areas in a manner that assures a balance of shoreline uses with minimal adverse effect on the quality of life, water, and environment.

The City's existing Shoreline Master Program goals and policies are included as an element in the land use chapter of the City's current Comprehensive Plan. These goals and policies encourage water-oriented uses and existing residential uses in balance with protection of the Puget Sound shoreline's natural resources.

Normandy Park Municipal Code Title 17: Zoning. This title establishes zoning designations. Zoning implements the Comprehensive Plan's vision for future land use. Zoning designations near the Puget Sound shoreline include Single-Family Residential. Zoning designations near the freshwater stream shorelines include Single-Family Residential. Shoreline zoning is consistent with the designations in the proposed SMP.

Normandy Park Municipal Code Title 16.24, Critical Areas. This code establishes development standards, buffers, and permitted uses in designated critical areas. Critical areas include geologic hazardous areas, streams, regulated wetlands, regulated wellheads and critical aquifer recharge areas, and wellhead protection areas. Standards in this chapter are designed to protect these areas from adverse impacts. The City updated its Critical Areas code in 2010. Designated critical areas are found throughout the City's shoreline jurisdiction, particularly Puget Sound shoreline, streams, flood hazard areas, and geologic hazard areas. Consistent with state guidelines, development standards for critical areas that are physically located in the shoreline jurisdiction have been fully incorporated into the proposed SMP by including these regulations as part of the shoreline regulations. Elements of the critical areas code that were identified by Ecology to not meet best available science were updated within the SMP.

City of Normandy Park Surface Water Management Division. The City's Surface Water Management Division is guided by the Comprehensive Surface Water Management Plan (2011; updated 2013). The Surface Water Management (SWM) Division is responsible for the comprehensive management of the City's surface water systems. This involves protecting developed and undeveloped properties from flooding, runoff, and water quality problems, while continuing to accommodate new development. The SWM Division also promotes the preservation of natural drainage systems, protection of fishery resources and wildlife habitat. The City's Surface Water Capital Improvement Program identifies, funds, and implements site-specific projects intended to provide flood control or alleviation; improve and enhance riparian habitat; replace culverts to improve fish passage; and improve water quality from stormwater runoff. The Surface Water Management restoration program is currently focused on stream resources, with limited emphasis on restoration of marine shorelines.

State and Federal Regulations

A number of state and federal agencies may have jurisdiction over land or natural elements in the City's shoreline jurisdiction. Local development proposals most commonly trigger requirements for state or federal permits when they impact wetlands or streams; potentially affect fish and wildlife listed under the federal Endangered Species Act (ESA); result in over one acre of clearing and grading; or affect the floodplain or floodway. As with local requirements, state and federal regulations may apply throughout the City, but regulated resources are common within the City's shoreline jurisdiction. The state and federal regulations affecting shoreline-related resources include, but are not limited to:

Endangered Species Act

The federal ESA addresses the protection and recovery of federally listed species. The ESA is jointly administered by the National Oceanic and Atmospheric Administration (NOAA) Fisheries (formerly referred to as the National Marine Fisheries Service), and the United States Fish and Wildlife Service (USFWS). The Puget Sound marine shoreline and Miller and Walker Creeks provide crucial migration, spawning, and rearing habitat to several salmonid species. The WDFW SalmonScape database, WDFW Priority Habitat and Species Database, and Pacific States Marine Fisheries Commission StreamNet database identify the known presence of salmonids in local streams.

Nearshore habitat is an important environment for juvenile salmonids, where the shallow water depth obstructs the presence of larger predator species (Kerwin and Nelson 2000). All shoreline segments within the City's shoreline jurisdiction are known or expected to contain juvenile salmonids including Chinook, bull trout, and steelhead trout, which are listed by the ESA as threatened in Puget Sound, as well as cutthroat trout, chum, coho, pink, and sockeye salmon, based on the knowledge of species life histories (KCDNRP 2007). Salmonid species that are not listed under the ESA are protected under the Magnuson-Stevens Fishery Conservation and Management Act that establishes catch limits for these species and requires that conservation measures be taken to protect these species from development activities.

Clean Water Act (CWA)

The federal CWA requires states to set standards for the protection of water quality for various parameters, and it regulates excavation and dredging in waters of the United States, including wetlands. Certain activities affecting wetlands in the City's shoreline jurisdiction or work in the connected streams may require a permit from the US Army Corps of Engineers and/or Washington State Department of Ecology (Ecology) under Section 404 and Section 401 of the CWA, respectively.

Hydraulic Project Approval (HPA)

The Washington Department of Fish and Wildlife (WDFW) regulates activities that use, divert, obstruct, or change the natural flow of the beds or banks of waters of the state and may affect fish habitat. Projects in the shoreline jurisdiction requiring construction below the ordinary high water mark of Puget Sound or streams in the city could require an HPA from WDFW. Projects creating new impervious surface that could substantially increase stormwater runoff to waters of the state may also require approval. HPA requirements include incorporation of best management practices (BMPs) to avoid and minimize impacts to waters of the state. BMPs include measures to be incorporated during project construction, such as consideration of fish windows, management of erosion and site runoff, and monitoring, as well measures to be incorporated into the design and ongoing use of a proposed development, such as consideration of in-water materials and stormwater treatment and detention.

National Pollutant Discharge Elimination System (NPDES)

Ecology regulates activities that result in wastewater discharges to surface water from industrial facilities or municipal wastewater treatment plants. NPDES Phase II permits are also required for stormwater discharges from industrial facilities, construction sites of one or more acres, and municipal stormwater systems that serve census-defined Urbanized Areas, which include any urbanized areas with more than 50,000 people and densities greater than 1,000 people per square mile. Normandy Park is covered under this permit.

SUMMARY OF CURRENT AND FUTURE PERFORMANCE OF SHORELINE ECOLOGICAL FUNCTIONS

Table 4 presents the existing performance of shoreline ecological functions along the Puget Sound shoreline and Miller and Walker Creeks as described in the Shoreline Inventory and Characterization Report (King County 2011). Regulations from the proposed SMP that protect ecological functions are identified along with policies for enhancement from the Restoration Plan (Hart Crowser 2014). The future performance is then assessed based on the type and amount of expected development in the shoreline, the level of protection the proposed SMP regulations provide, and restoration policies and opportunities. Specific opportunities for restoration are outlined in the Restoration Plan.

Current performance of shoreline ecological functions are ranked “low,” “moderate,” and “high,” depending on the level of alteration within Normandy Park city limits. The Shoreline Characterization does not evaluate the current performance of ecological functions using this ranking system. As such, the evaluation system in the table is intended to summarize the information provided in the Shoreline Characterization; the full report should be evaluated for additional detail regarding existing conditions. Future performance is ranked “reduction,” “maintain,” and “improvement,” depending on the expected changes from existing conditions over the next seven years (i.e., up to the next SMP update cycle). Based on this assessment, the cumulative actions taken over time in accordance with the proposed SMP are not likely to result in a net loss of shoreline ecological functions from existing baseline conditions.

SUMMARY OF CUMULATIVE IMPACTS AND NO NET LOSS

The Normandy Park shoreline, particularly the Puget Sound coast, is fully developed in residential uses. There are few opportunities for new development within the coastal shoreline jurisdiction. Therefore, change within the Puget Sound coastal shoreline will primarily be the result of redevelopment activities. The system of shoreline environment designations and use regulations in the proposed SMP is consistent with the established land use pattern, as well as the land use vision planned for in the City’s comprehensive plan, zoning, and other long-range planning documents. Based on this consistency it is unlikely that substantial changes in the type of shoreline land uses will occur in the future

The proposed SMP provides a new system of shoreline environment designations that establishes more uniform management of the City’s shoreline. The updated development standards and regulation of shoreline modifications provides more protection for shoreline processes. SMP regulations (NPMC Chapter 16), detailed and referenced in Table 4, identify key regulations that will ensure no net loss and/or potential improvement of the City’s most at risk shoreline ecological functions. The SMP provides standards that will require use of softer shoreline stabilization approaches wherever feasible, and prohibit new overwater structures, although rebuilt structures may be allowed. The code provides more stringent restrictions on clearing, cutting, or pruning vegetation and encourages native revegetation of the shoreline. Aquaculture is limited to activities that will not further degrade the ecological functions of the shoreline and is prohibited within 0.5 miles of wastewater treatment outfalls. The SMP encourages incorporation of water pollution control measures and best management practices (BMPs) for stormwater management for all development activities, which will limit water quality impacts on marine waters, streams, and wetlands from adjacent shoreland uses. The updated standards and regulations are more restrictive of activities that would result in adverse impacts to the shoreline environment while encouraging the restoration of shoreline where possible, if structures have been damaged to the point of replacement. The restoration planning effort outlined in the proposed SMP provides the City with opportunities to improve or restore ecological functions that have been impaired as a result of past development activities. In addition, the proposed SMP is meant to compliment several City, state, and federal efforts to protect shoreline functions and values.

Based on assessment of these factors, the cumulative actions taken over time in accordance with the proposed SMP are not likely to result in a net loss of shoreline ecological functions from existing baseline conditions.

REFERENCES

Anchor 2004. Marine Shoreline Inventory Report – WRIA 9. Prepared for Seattle Public Utilities and WRIA 9 by Anchor Environmental, LLC, Seattle, WA.

Anchor 2006. Final report: Prioritization of Marine Shorelines of Water Resource Inventory Area 9 for Juvenile Salmonid Habitat Protection and Restoration. Prepared for Water Resource Inventory Area 9 Technical Committee by Anchor Environmental, LLC.

Berry, H.D., J.R. Harper, T.F. Mumford Jr., B.E. Bookheim, A.T. Sewell, and L.J. Tamayo 2000. The Washington State ShoreZone Inventory User's Manual.

BHC Consultants 2007. Memorandum: Normandy Park Critical Areas Development Regulations Update (Best Available Science). 31 pp.

Booth, D.B. and H.H. Waldron 2004. Geologic map of the Des Moines 7.5-minute quadrangle, Washington, US Geological Survey, Open-File Report, scale 1:24,000.

Collins, B.D. and A.J. Sheikh 2005. Historical Reconstruction, Classification, and Change Analysis of Puget Sound Tidal Marshes. Puget Sound River History Project, Department of Earth and Space Sciences, University of Washington, Seattle. Report to the Washington Department of Natural Resources Aquatic Resources Division, Olympia, Washington.

Hart Crowser 2014. Restoration Plan, City of Normandy Park Master Program Update. June 25, 2014.

Johannessen, J.W., A. MacLennan, and A. McBride 2005. Inventory and Assessment of Current and Historic Beach Feeding Sources/Erosion and Accretion Areas for the Marine Shorelines of Water Resource Inventory Areas 8 & 9, Prepared by Coastal Geologic Services, Prepared for King County Department of Natural Resources and Parks, Seattle, WA.

KCDNRP 2007. Technical Appendix: Shoreline Inventory and Characterization Methodology and Results. King County Department of Natural Resources and Parks.

KCDNRP 2009. Land cover GIS data for King County in 2007. Accessed May 2010. King County Department of Natural Resources and Parks.

KCDNRP 2010. King County Historical Sites GIS data. Accessed May 2010. King County Department of Natural Resources and Parks.

Kerwin, J. and T.S. Nelson 2000. Habitat Limiting Factors and Reconnaissance Assessment Report, Green/Duwamish and Central Puget Sound's Watersheds (Watershed Inventory Area 9 and Vashon Island). December 2000.

King County 2011. King County Water and Land Resources Division. The City of Normandy Park Shoreline Inventory and Characterization Report. June 2011.

King County Conservation District 2006. Miller and Walker Creeks Basin Plan. February 2006.

PSNERP 2009. Puget Sound Nearshore Ecosystem Restoration Project change analysis database, downloaded June 2009.

Thom, R.M. and L. Hallum 1990. Long-term changes in the areal extent on tidal marshes, eelgrass meadows, and kelp forests of Puget Sound. FRI-UW-9008. Fisheries Research Institute, School of Fisheries, University of Washington, Seattle, Washington

Washington Trout 2004. Water Type Survey Results South King County 2004.

WDFW 2010. Shellfish and fish use of Normandy Park shorelinesg cited in King County (2011) The City of Normandy Park Shoreline Inventory and Characterization Report. Washington Department of Fish and Wildlife.

Williams, R.W., R.M. Laramie, and J.J. Ames 1975. A catalog of Washington streams and salmon utilization, WRIA-09. Washington State Dept. of Fisheries. 34 pp.

W:\CLIENTS.WP\00751\18\Cumulative Impacts\20150806\NP Cumulative Impacts 20150806.docx

TABLE

Table 4 – Assessment of Current and Future Shoreline Ecological Functions

Ecological Functions	Current Performance or Function	Beneficial SMP Provisions **P** = SMP general description (section or regulation) **R** = Restoration Plan Policy / Site-specific Restoration Actions **C** = Critical Areas Code	Future Performance or Function
Hydrology – from WAC173-26-201(3)(d)(i)(C)			
Puget Sound Marine Shoreline • Attenuation of wave energy • Removal of excessive nutrients and toxics • Delivery and transport of woody debris and organic matter	**Puget Sound Marine Shoreline: Moderate** The Normandy Park marine shoreline is a mix of intact beaches and properly functioning feeder bluffs. However, the geomorphic processes in the Beach Community environment reach have been substantially altered by shoreline modifications, mostly associated with residential development and bulkheads that extend below the ordinary high water mark (OHWM). The entire shore is exposed to high levels of fetch and/or wave energy, except the shoreline is more protected at the north end of the City.	**Puget Sound Marine Shoreline** **P:** Mining, forest practices, agriculture commercial and industrial development is prohibited throughout the shoreline jurisdiction (16.20.015). **P:** New overwater residential development is prohibited (16.20.200(1) & (2), 16.20.015) **P:** New overwater commercial and residential docks, piers, and jetties are prohibited in shoreline zone (16.20.170 & 16.20.120). **P:** New or replacement groins require a CUP and are entirely prohibited in the Urban and Bluff Conservancy environments (16.20.200(4)). **P:** New bulkheads require a CUP and are prohibited in the Urban and Bluff Conservancy and Aquatic environments (16.20.190). **P:** The use of hard shoreline stabilization armoring is limited; soft-shore bank stabilization techniques are required as a first alternative (16.20.190). **P:** Fill activity for non-water-dependent uses is prohibited when waterward of the OHWM; otherwise, a CUP is required when waterward of the OHWM (16.20.200(5)(b)). **P:** Dredging below the OHWM requires a CUP and is prohibited in Aquatic and Bluff Conservancy environments, except for restoration/research purposes (16.20.200(5)(a)). **P:** Land clearing and grading is prohibited in the Urban Conservancy and Bluff Conservancy environments and requires a permit and is subject to native vegetation conservation (16.20.195) in other environments (16.20.220). **P:** Native vegetation conservation is required and removal and trimming are limited to that necessary under an approved landscape plan (16.20.195)**.** **P:** Large woody debris below the OHWM is to remain unless it is a safety hazard (16.20.185 (4) (i)). **P:** Residential development is prohibited within the 100-year floodplain, except when it can be demonstrated that the reduced storage capacity of the floodplain will not significantly increase the flood hazard to other properties nor otherwise endanger public safety (16.20.210(m)) and prohibited in floodways (16.20.210(n)). **R:** Site-specific opportunities include restoration of the Beaconsfield properties (several properties) with the goal of removal of bulkheads (Restoration Plan, Figure 2). **R:** Conservation/restoration of intact feeder bluffs within the Bluff Conservancy and (where feasible) Beach Community environments (Restoration Plan). **R:** Work with Burien, Des Moines, King, and Pierce Counties and other entities or private landowners to develop direct linkages to the waterfront to restore shoreline processes and functions. **R:** Remove regulatory impediments to restoration and enhancement projects, and introduce incentive programs to encourage private restoration actions (Restoration Plan, Table 2). **R:** Derelict debris removal along beaches (Restoration Plan – Programmatic Conservation/Restoration Opportunities). **C:** Reduction of impervious surface can be used as an alternative measure for reducing a buffer; low impact measures are encouraged (18.36.640 (4)(e)). **C:** Fish and wildlife habitat buffers of 115 feet from those areas that qualify as Shorelines of the State including Puget Sound shoreline would protect hydrologic functions along shoreline (18.36.640 (4)). **C:** Wetland buffers provide hydrologic functions and protect the hydrologic functions of wetlands (18.36.330 (3)). **C:** Required wetland mitigation for impacts to wetlands and buffers protect and result in no net loss of hydrologic functions of wetlands (18.36.340). **C:** Development is to be set back from geologically hazardous areas including feeder bluffs by 50 feet to prevent landslides, erosion, and potential sedimentation of receiving waters (18.36.530 (2)). **C:** Geotechnical reports of development that will be near steep slopes may require monitoring of surface waters, if deemed necessary by the geotechnical engineer and the City (18.36.520 (2) (g)). **C:** Vegetation must be retained wherever possible on geologically hazardous areas where disturbance is proposed and revegetation is required (18.36.520 (2) (f)).	**Puget Sound Marine Shoreline: Potential Improvement** Redevelopment of residential shorelines will increase the use of soft bulkhead alternatives and result in a net improvement in geomorphic processes and functions. Reduced use of hard shoreline stabilization will hydrologically reconnect shoreland areas with the shoreline. Critical areas regulations (CAO) of geologic-hazard standards requiring buffers and building setbacks from the top of coastal bluffs will benefit hydrologic functions in high bluff areas. Shoreline buffers of 115 feet will reduce development below OHWM. Increased native vegetation at the top and slopes of bluffs will stabilize soils and improve existing and potential steep slope erosion and failure issues. The restoration projects prioritized by the Restoration Plan will improve the beach and feeder bluff processes and functions. As these restoration projects are implemented, coastal processes and functions will improve.

Ecological Functions	Current Performance or Function	Beneficial SMP Provisions **P** = SMP general description (section or regulation) **R** = Restoration Plan Policy / Site-specific Restoration Actions **C** = Critical Areas Code	Future Performance or Function
Hydrology (cont'd)			
Puget Sound Marine Shoreline (cont'd)	**Puget Sound Marine Shoreline: Moderate** (cont'd)	**Puget Sound Marine Shoreline** (cont'd) **C:** Reduction of impervious surface can be used as an alternative measure for reducing a buffer; low impact measures are encouraged (18.36.640 (4)(e)). **C:** A geotechnical report must document that new and repaired bulkheads are necessary before they are allowed within the shoreline areas (18.36.640 (8)). **C:** The cumulative effect of any proposed development, when combined with all other existing and anticipated development, shall not increase the water surface elevation of the base flood more than one foot at any point in frequently flooded areas including marine shorelines (9.02.200). **C:** No vegetation can be removed from a critical area or its buffer without permission from the City (18.36.100 (5)). **C:** Measures to minimize effects from lights, noise, toxic runoff, change in water regime, pets and human disturbance in wetlands and their buffers may be required if buffers that apply to moderate intensity development apply are used instead of buffers for high intensity use (18.36.330 (3) (a) (iii)).	**Puget Sound Marine Shoreline: Potential Improvement** (cont'd)
Miller and Walker Creeks, Normandy Creek, and Unidentified stream mouths (Shoreline Stream Mouths) • Sediment and nutrient transport • Bank Stability • Groundwater and tributary inputs (hyporheic functions) • Attenuating flow energy • Floodplain connectivity • Instream habitat development • Freshwater input/distributary channel and tidal channel formation and maintenance (estuarine zones only)	**Shoreline Stream Mouths: Moderate to High** The existing, forested riparian corridor along Miller and Walker Creeks is protected within The Cove from significant development. Restoration of wetlands, riparian, and salmonid habitat has occurred. All functions are moderate to high due to the presence of riparian vegetation, low amount of development in the shoreline zone, and previous restoration of the shoreline reaches of the streams. Normandy Creek is partially piped between two houses and discharges into a shoreline protected by a groin and would have **low to moderate** hydrologic functions. The other stream mouths (three) are intermittent drainages, have narrow intact riparian vegetation, but have little instream fish habitat potential. However, these streams provide freshwater and sediment inputs into Puget Sound and have **moderate to high** hydrologic functions.	**Shoreline Stream Mouths** **See above** – many specific provisions listed in the marine shoreline section above are applicable to shoreline stream mouths because they provide protection, stability and riparian vegetation conservation. **P:** Urban Conservancy is designated at the mouth of Miller and Walker Creeks and many uses (see above under Marine Shoreline) are prohibited within this environment (16.12.020). **P:** Restoration projects that involve less than 10 miles of stream and less than 25 cubic yards of gravel/soil disturbance are exempt from SDP (16.24.040 (2) (o) (i)). **R:** The Restoration Plan proposes that the residence on Parcel #0864500010 that is located at the north edge of the mouth of joined Miller and Walker Creeks could be purchased and the natural shoreline could be restored (Restoration Plan, Figure 2 and Table 3). **R:** The Restoration Plan proposes daylighting of Normandy Creek and the addition of riparian vegetation at Parcel #6117502800 (Restoration Plan, Figure 2 and Table 3). **R:** The Restoration Plan proposes the addition of riparian vegetation along of Normandy Creek at Parcel #6117502800 (Restoration Plan, Figure 2 and Table 3). **R:** The Restoration Plan proposes stream mouth restoration at Parcels #0622049073 and #0616000361 (Restoration Plan, Figure 2 and Table 3). **C:** The same critical areas code provisions listed above for marine shorelines would apply to shoreline streams.	**Shoreline Stream Mouths: Maintain Functions/Processes to moderate improvement** Previous restoration of the shoreline reaches of Miller and Walker Creeks included reconnecting the creeks to their floodplains, creating additional sinuosity, improving instream habitat, and revegetating riparian areas. This is likely to be maintained because there is no public access to this area, it is maintained as a private park, and no new development is expected. Purchase and restoration of the shoreline on Parcel #0864500010 at the north edge of the mouth of mouth of Miller and Walker Creeks would improve the functions and processes of the stream mouth and estuary. Daylighting and improvement/expansion of riparian vegetation within the shoreline reach of Normandy Creek would improve the functions and processes of the stream; however, this is unlikely to occur in the near future unless the properties are redeveloped. Improvement/expansion of riparian vegetation and improvement of instream habitat at the stream mouths on Parcels #0622049073 and #0616000361 would improve the hydrologic functions and processes of the streams; however, these projects are unlikely to occur in the near future unless the properties are purchased and redeveloped.

Ecological Functions	Current Performance or Function	Beneficial SMP Provisions **P** = SMP general description (section or regulation) **R** = Restoration Plan Policy / Site-specific Restoration Actions **C** = Critical Areas Code	Future Performance or Function
Water Quality - from WAC173-26-201(3)(d)(i)(C)			
Puget Sound Marine Shoreline • Wetland removal of pollutants through sedimentation and adsorption • Riparian removal of pollutants • Delivery, movement, and loss or removal of nutrients, pathogens, and toxicants; storage of phosphorus and removal of nitrogen and toxins through sedimentation and adsorption	**Puget Sound Marine Shoreline: Moderate** Water quality data are not available for Puget Sound waters along the Normandy Park Shoreline. However, Miller and Walker Creeks have exceeded State water quality standards for fecal coliform and dissolved oxygen. Approximately one third of the shoreline contains residential development that is at the beach, is hard-armored, and lacks vegetation. The remaining shoreline contains feeder bluffs and contains a moderate to high level of vegetation cover.	**Puget Sound Marine Shoreline:** **P:** All activities and development within the shoreline jurisdiction (including clearing and grading activities) shall incorporate temporary and permanent water pollution control measures and best management practices (BMPs) for stormwater management. These measures must be in compliance with the requirements and restrictions of all applicable city and state regulations (16.20.185 (2)). **P:** Mitigation is required for developments that create unavoidable adverse impacts to shoreline vegetation and slopes. Mitigation shall ensure that no net loss in the amount of vegetated area or the ecological functions performed by the disturbed vegetation (16.20.185(1) and Critical Areas regulations, incorporated into Title 16 – Shoreline Master Program Code). **P:** Floats cannot be larger than 120 square feet in size and must be constructed from materials that are based on best available science and least harmful to the environment. Styrofoam floats may not be used. (16.20.200(2)(c)). **P:** Use of creosote-treated lumber for shoreline stabilization is prohibited in marine shorelines (16.20.190(1)(a)(xi). **P:** Transportation and parking facilities are prohibited in the Urban Conservancy, Bluff Conservancy, and Aquatic environments and only allowed if proven necessary in other environments (16.20.270). **R:** Encourage protection, enhancement, or restoration of native riparian vegetation through incentives and non-regulatory programs. (Restoration Plan – Programmatic Conservation/Restoration Opportunities). **R:** Encourage landowners to remove creosote timbers and toxic materials from beaches (Restoration Plan – Programmatic Conservation/Restoration Opportunities) **R:** Work with public and private partners and funding organizations to encourage restoration and enhancement projects, including funding strategies (Restoration Plan – Restoration Programmatic Conservation/Restoration Opportunities). **R:** Coordinate stormwater treatment and low impact development measures of the City's Surface Water Management Plan to maximize pollutant and sediment inputs into the shoreline waters (Restoration Plan - Restoration Programmatic Conservation/Restoration Opportunities). **R:** Wetland restoration opportunities were identified for parcels #0622049131 and #0864500010 (Restoration Plan – Specific Restoration Opportunities, Figure 2) **C:** Reduction of impervious surface can be used as an alternative measure for reducing a buffer; low-impact measures are encouraged (18.36.640 (4)(e)). **C:** Fish and wildlife habitat buffers of 115 feet from those areas that qualify as Shorelines of the State, including Puget Sound shoreline, would protect water-quality functions along shoreline (18.36.640 (4)). **C:** Wetland buffers provide water-quality functions and protect these functions in wetlands (18.36.330 (3)). **C:** Required wetland mitigation for impacts to wetlands and buffers both protect wetlands and result in no net loss of water-quality functions of wetlands (18.36.340). **C:** Development is to be set back from geologically hazardous areas, including feeder bluffs, by 50 feet to prevent landslides, erosion, and potential sedimentation of receiving waters (18.36.530 (2)). **C:** Geotechnical reports of development that will be near steep slopes may require monitoring of surface waters, if deemed necessary by the geotechnical engineer and the City (18.36.520 (2) (g)). **C:** Vegetation must be retained wherever possible on geologically hazardous areas where disturbance is proposed and revegetation is required (18.36.520 (2) (f)). **C:** Reduction of impervious surface can be used as an alternative measure for reducing a buffer; low-impact measures are encouraged (18.36.640 (4)(e)). **C:** A geotechnical report must document that new and repaired bulkheads are necessary before they are allowed within the shoreline areas (18.36.640 (8)). **C:** No vegetation can be removed from a critical area or its buffer without permission from the City (18.36.100 (5)). **C:** Measures to minimize effects from lights, noise, toxic runoff, change in water regime, pets, and human disturbance in wetlands and their buffers may be required if buffers that apply to moderate-intensity development are used instead of buffers for high-intensity use (18.36.330 (3) (a) (iii)).	**Marine Shoreline: Potential Improvement** Vegetation conservation during redevelopment of residential and recreational shorelines will enhance marine riparian function and result in improved water quality. Redevelopment will also correspond with improved stormwater treatment and detention, as well as use of improved materials and techniques for in-water structures. The prioritized projects listed in the Restoration Plan and identified in this table will improve water quality. Restoration goals and policies will assist in identifying additional opportunities and implementing water quality monitoring programs.

Ecological Functions	Current Performance or Function	Beneficial SMP Provisions **P** = SMP general description (section or regulation) **R** = Restoration Plan Policy / Site-specific Restoration Actions **C** = Critical Areas Code	Future Performance or Function
Water Quality (cont'd)			
Miller and Walker Creeks, Normandy Creek, Unidentified stream mouths (Shoreline Stream Mouths) • Wetland removal of pollutants through sedimentation and adsorption • Riparian removal of pollutants • Delivery, movement, and loss or removal of nutrients, pathogens, and toxicants; storage of phosphorus and removal of nitrogen and toxins through sedimentation and adsorption	**Shoreline Stream Mouths: Moderate** The existing, forested riparian corridor along Miller and Walker Creeks is protected within The Cove from significant development. Restoration of wetlands, riparian, and salmonid habitat has occurred and riparian vegetation is relatively intact, except for a lawn area. However, Miller and Walker Creeks have exceeded State water quality standards for fecal coliform and dissolved oxygen. Elevated levels of copper, zinc and pesticides were also found in Miller Creek (Miller and Walker Creek Basin Plan [King County Conservation District 2006]). Normandy Creek is piped at the shoreline but has a narrow riparian vegetation band in the reach above the pipe. Other streams also have narrow riparian vegetated corridors and no information is known about water.	**Shoreline Stream Mouths** **See above** – Many specific provisions listed in the marine shoreline section above are applicable to shoreline stream mouths. **P:** Urban Conservancy is designated at the mouth of Miller and Walker Creeks and many uses (see above under Marine Shoreline) are prohibited within this environment (16.12.020). **P:** Restoration projects that involve less than 10 miles of stream and less than 25 cubic yards of gravel/soil disturbance are exempt from SDP (16.24.040 (2) (o) (i)). **R:** The Restoration Plan proposes that the residence on Parcel #0864500010 that is located at the north edge of the mouth of joined Miller and Walker Creeks could be purchased and the natural shoreline could be restored (Restoration Plan, Figure 2 and Table 3). **R:** The Restoration Plan proposes daylighting of Normandy Creek and the addition of riparian vegetation at Parcel #6117502800 (Restoration Plan, Figure 2 and Table 3). **R:** The Restoration Plan proposes the addition of riparian vegetation along of Normandy Creek at Parcel #6117502800 (Restoration Plan, Figure 2 and Table 3). **R:** The Restoration Plan proposes stream mouth restoration at Parcels #0622049073 and #0616000361 (Restoration Plan, Figure 2 and Table 3). **C:** The same critical areas code provisions listed above for marine shorelines would apply to shoreline streams.	**Shoreline Stream Mouths: Maintain or Potential for Improvement** Miller and Walker Creeks shoreline reaches have potential for improvement for the following reasons: improved stormwater regulations, protection of the streams, wetlands, and riparian areas in a private park, and potential buyout and restoration of Parcel #0864500010 adjacent to the stream. Conditions in other shoreline streams are likely to be maintained or slightly improve due to improved stormwater regulations. Greater improvements in water quality functions would be accomplished by daylighting and improvement/expansion of riparian and wetland vegetation of Normandy Creek and riparian improvements of the other stream mouths. These projects would likely require buyout and redevelopment, which may take a long period of time.

Ecological Functions	Current Performance or Function	Beneficial SMP Provisions **P** = SMP general description (section or regulation) **R** = Restoration Plan Policy / Site-specific Restoration Actions **C** = Critical Areas Code	Future Performance or Function
Sediment Generation and Transport - from WAC173-26-201(3)(d)(i)(C)			
Puget Sound Marine Shoreline • Sediment delivery from coastal bluffs and streams • Sediment transport	**Puget Sound Marine Shoreline: Moderate** The Normandy Park marine shoreline is a mix of intact beaches and moderately functioning feeder bluffs. However, the geomorphic processes in the Beach Community reach and the residential area north of Edgecliff have been substantially altered by shoreline modifications, most associated with residential development and bulkheads that extend below the Ordinary High Water Mark. The entire shore is exposed to high levels of fetch and/or wave energy, except it is slightly more protected at the north end of the City. The entire City is approximately 60 percent developed with 22 percent impervious surfaces. Approximately only 35 percent of the City is vegetated, which limits dampening of stormwater flow and associated sedimentation of waterbodies and shorelines.	**Puget Sound Marine Shoreline** **P:** Bluff Conservancy environment was established to protect and where possible restore bluff sediment delivery and transport processes and functions (16.12.025). **P:** All activities and development within the shoreline jurisdiction (including clearing and grading activities) shall incorporate temporary and permanent water pollution control measures and best management practices (BMPs) for stormwater management that limit sedimentation. These measures must be in compliance with the requirements and restrictions of all applicable city and state regulations (16.20.185 (2)). **P:** Mitigation is required for developments that create unavoidable adverse impacts to shoreline vegetation and slopes. Mitigation shall ensure that no net loss in the amount of vegetated area or the ecological functions performed by the disturbed vegetation (16.20.185(1) and Critical Areas regulations, incorporated into Title 16 – Shoreline Master Program Code). **P:** Mining, forest practices, agriculture commercial and industrial development is prohibited throughout shoreline jurisdiction (16.20.015). **P:** Transportation and parking facilities are prohibited in the Urban Conservancy, Bluff Conservancy, and Aquatic environments and permitted if proven necessary in other environments (16.20.270). **P:** Native vegetation conservation is required and removal and trimming are limited to that necessary under an approved landscape plan (16.20.195)**.** **P:** Large woody debris below the OHWM is to remain unless it is a safety hazard (16.20.185 (4) (i)). **R:** Encourage protection, enhancement, or restoration of native riparian vegetation through incentives and non-regulatory programs. (Restoration Plan, Table 3). **R:** Coordinate stormwater treatment and low impact development measures of the City's Surface Water Management Plan to maximize pollutant and sediment inputs into the shoreline waters (Restoration Plan – Programmatic Conservation/Restoration Opportunities). **R:** Remove regulatory impediments to restoration and enhancement projects, and introduce incentive programs to encourage private restoration actions (Restoration Plan, Tables 2 and 3). **R:** The Restoration Plan proposes bluff and/or beach restoration at the following locations: Beaconsfield properties and Parcels 0864500010, 6117500545, 0622049144, 0722049029, 664180060. (Restoration Plan, Figure 2 and Table 3). **R:** The Restoration Plan proposes estuary wetland restoration at the mouth of Miller and Walker Creeks and at Parcel 0622049131 (Restoration Plan, Figure 2 and Table 3). **C:** Reduction of impervious surface can be used as an alternative measure for reducing a buffer; low-impact measures are encouraged (18.36.640 (4)(e)). **C:** Fish and wildlife habitat buffers of 115 feet from those areas that qualify as Shorelines of the State, including Puget Sound shoreline, would protect hydrologic functions along shoreline (18.36.640 (4)). **C:** Wetland buffers provide sediment retention functions and protect these functions in wetlands (18.36.330 (3)). **C:** Required wetland mitigation for impacts to wetlands and buffers both protect wetlands and result in no net loss of sediment retention functions of wetlands (18.36.340). **C:** Development is to be set back from geologically hazardous areas, including feeder bluffs, by 50 feet to prevent landslides, erosion, and potential sedimentation of receiving waters (18.36.530 (2)). **C:** Geotechnical reports of development that will be near steep slopes may require monitoring of surface waters, if deemed necessary by the geotechnical engineer and the City (18.36.520 (2) (g)). **C:** Vegetation must be retained wherever possible on geologically hazardous areas where disturbance is proposed and revegetation is required (18.36.520 (2) (f)). **C:** Reduction of impervious surface can be used as an alternative measure for reducing a buffer; low-impact measures are encouraged (18.36.640 (4)(e)). **C:** A geotechnical report must document that new and repaired bulkheads are necessary before they are allowed within the shoreline areas (18.36.640 (8)). **C:** No vegetation can be removed from a critical area or its buffer without permission from the City (18.36.100 (5)). **C:** Measures to minimize effects from lights, noise, toxic runoff, change in water regime, pets, and human disturbance in wetlands and their buffers may be required if buffers that apply to moderate-intensity development are used instead of buffers for high-intensity use (18.36.330 (3) (a) (iii)).	**Puget Sound Marine Shoreline: Potential Improvement** Redevelopment of residential shorelines will increase the use of soft bulkhead alternatives and should result in a net improvement in shoreline sediment delivery and transport processes and functions. Reduced use of hard shoreline stabilization will allow natural bluff erosion and sedimentation processes to occur. Critical areas regulations of geologic-hazard standards requiring buffers and building setbacks from the top of coastal bluffs will benefit sediment generation and transport processes and functions in high bluff areas. Shoreline buffers of 115 feet will reduce development below the ordinary high water mark. Increased native vegetation at the top and slopes of bluffs will stabilize soils and improve existing and potential steep slope erosion and failure issues. The restoration projects prioritized by the Restoration Plan will improve the beach and feeder bluff processes and functions and restore those processes at the Beaconsfield properties and potentially at other properties (see Beneficial SMP Provisions for this category). As these restoration projects are implemented, sediment processes and functions should improve.

Ecological Functions	Current Performance or Function	Beneficial SMP Provisions **P** = SMP general description (section or regulation) **R** = Restoration Plan Policy / Site-specific Restoration Actions **C** = Critical Areas Code	Future Performance or Function
Sediment Generation and Transport (cont'd)			
Miller and Walker Creeks • Sediment input • Sediment transport	**Shoreline Stream Mouths: Moderate** The existing forested riparian corridor along Miller and Walker Creeks is protected within The Cove from significant development. Restoration of wetlands, riparian, and salmonid habitat has occurred and riparian vegetation is relatively intact, except for a lawn area within a portion of the riparian area. Narrow riparian corridors and development along Normandy Creek and the other stream shoreline mouths provide **low to moderate** sedimentation minimization functions.	**Shoreline Stream Mouths** **See above** – Many specific provisions listed in the marine shoreline section above are applicable to shoreline stream mouths. Also the provisions listed for Shoreline Stream Mouths under the Water Quality category apply to sediment generation and input. The following additional provisions from the Restoration Plan would potentially improve the sediment transport and in input processes. **R:** Work with public and private partners and funding organizations to encourage restoration and enhancement projects of stream, including funding strategies (Restoration Plan – Programmatic Conservation/Restoration Opportunities). **R:** Continue participation in existing programs, such as WRIA 9 Forum, and obtain funding sources for streambank stabilization and riparian revegetation (Restoration Plan – Existing Plans and Programs). **C:** The same critical areas code provisions listed above for marine shorelines would apply to shoreline streams.	**Shoreline Stream Mouths: Maintain and Potential Improvement** Miller and Walker Creeks shoreline reaches have potential for improvement in sediment processes for the following reasons: improved stormwater regulations, protection of the streams, wetlands, and riparian areas in a private park, and potential buyout and restoration of Parcel #0864500010 adjacent to the stream. Conditions are likely to be maintained or slightly improve due to improved stormwater regulations. Greater improvements in sedimentation functions would be accomplished by daylighting, reconnecting the stream to the floodplains, and improvement/ expansion of riparian and wetland vegetation of Normandy Creek and riparian improvements of the other stream mouths. However, these projects would likely require buyout and redevelopment, which may take a long period of time.
Fish and Wildlife Habitat – from WAC173-26-201(3)(d)(i)(C)			
Puget Sound Marine Shoreline • Estuarine habitat; subtidal and intertidal mudflats and salt marshes provide transition habitat between fresh and salt water environments • Shoreline habitat for wildlife; vegetation provides structure for invertebrates, birds, amphibians, reptiles, and mammals • Source and delivery of LWD	**Puget Sound Marine Shoreline: Moderate to High** The nearshore areas along the shoreline have narrow intertidal and shallow subtidal margins along the deep waters of the Sound. Only four boat ramps, 4 docks, and one groin extend into the intertidal zone. These margins are important migratory routes for salmon, waterfowl, and shorebirds, and serve as rearing areas for juvenile to adult salmonids and their prey, as spawning areas for forage fish, and for intertidal and subtidal shellfish, algae, and eelgrass production. Eelgrass is present along nearly all of the Normandy Park shoreline. Eight species of native salmonids are documented as (or are likely to) using the nearshore environment (all environments) including chinook, chum, coho, sockeye, and pink salmon, and cutthroat, steelhead, and bull trout. Approximately one half of the intertidal areas are adversely affected by residential development and bulkheads with the most intensive development at the southern end of the coastline.	**Puget Sound Marine Shoreline** **P:** Commercial aquaculture is only permitted in the Aquatic environment, requires a CUP, and must not cause ecological degradation of the Aquatic environment, critical saltwater habitats, or adjacent shoreline. It is prohibited within 0.5 miles of wastewater outfalls (16.20.040; Figure 2). **P:** Subsistence aquaculture, unless for the purposes of research or restoration, is prohibited in Urban and Bluff Conservancy environments and requires a CUP in other environments (16.20.040; Figure 2). **P:** New overwater residential development is prohibited (16.20.200(1) & (2); 16.20.015) **P:** New overwater commercial and residential docks, piers, and jetties are prohibited in shoreline zone (16.20.170 & 16.20.120). **P:** Mooring buoys are limited to one per residence and must comply with Washington Department of Natural Resources regulations (16.20.175). **P:** New or replacement groins require a CUP and are entirely prohibited in the Urban and Bluff Conservancy environments (16.20.200(4)). **P:** Fill activity for non-water dependent uses is prohibited when waterward of the OHWM; otherwise, CUP is required when waterward of the OHWM (16.20.200(5)(b)). **P:** Dredging below the OHWM requires a CUP and is prohibited in Aquatic and Bluff Conservancy environments, except for restoration/research purposes (16.20.200(5)(a)). **P:** Land clearing and grading is prohibited in the Urban Conservancy and Bluff Conservancy environments and requires a permit and is subject to native vegetation conservation (16.20.195) in other environments (16.20.220). **P:** Native vegetation conservation is required and removal and trimming are limited to that necessary under an approved landscape plan (16.20.195)**.** **P:** Large woody debris below the OHWM is to remain unless it is a safety hazard (16.20.185 (4) (i)). **P:** Additional CAO protection for impacts to wetlands, streams, and other habitat areas within the shoreline environment: impacts must be avoided, minimized, and mitigated consistent with the requirements of the CAO (CAO incorporated into Title 16 – Shoreline Master Program Code). **P:** Mitigation is required for developments that create unavoidable impacts adverse to shoreline vegetation and slopes. Mitigation shall ensure that no net loss in the amount of vegetated area or the ecological functions performed by the disturbed vegetation (16.20.185(1) and Critical Areas regulations, incorporated into Title 16 – Shoreline Master Program Code).	**All reaches: Potential Improvement** As redevelopment occurs, implementation of the beneficial provisions of the SMP and greater restrictions on in-water structures are expected to potentially improve and protect shoreline habitat. Critical areas regulations (CAO) of geologic-hazard standards requiring buffers and building setbacks from the top of coastal bluffs will benefit habitat functions in high bluff areas. Shoreline buffers of 115 feet will reduce development below the ordinary high water mark. Increased native vegetation at the top and slopes of bluffs will improve marine riparian habitat. Habitat improvements will occur in the longer term due to the establishment of the Beach Community environment, and where structures that are highly damaged are restored to natural shoreline. In the near and long term, implementation of the proposed conservation and restoration actions proposed in the Restoration Plan will potentially improve habitat within the shoreline, nearshore, and intertidal habitats.

Ecological Functions	Current Performance or Function	Beneficial SMP Provisions **P** = SMP general description (section or regulation) **R** = Restoration Plan Policy / Site-specific Restoration Actions **C** = Critical Areas Code	Future Performance or Function
Fish and Wildlife Habitat (cont'd)			
Puget Sound Marine Shoreline (cont'd)	**Puget Sound Marine Shoreline: Moderate to High** (cont'd)	**Puget Sound Marine Shoreline** (cont'd) **R:** Ten site-specific bluff, beach, wetland, and/or riparian restoration opportunities (Restoration Plan, Figure 2); **R:** Derelict debris removal along beaches (Restoration Plan – Programmatic Conservation/Restoration Opportunities). **R:** Conservation of intact feeder bluffs within the Bluff Conservancy and (where feasible) Beach Community environments (Restoration Plan – Programmatic Conservation/Restoration Opportunities). **R:** Work with Burien, Des Moines, King, and Pierce Counties, and other entities or private landowners to develop direct linkages to the waterfront to restore ecological function or natural ecosystems (Restoration Plan – Programmatic Conservation/Restoration Opportunities). **R:** Remove regulatory impediments to restoration and enhancement projects, and introduce incentive programs to encourage private restoration actions (Restoration Plan Table 2). **R:** Continue work with existing programs such as WRIA 9 Forum, Puget Sound Partnership, and others, and obtain funding to implement shoreline habitat restoration projects (Restoration Plan –Existing Plans and Programs). **R:** Continue to implement existing programmatic conservation/restoration activities and encourage implementation of additional new ones (Restoration Plan –Programmatic Conservation\Restoration) **C:** Fish and wildlife habitat buffers of 115 feet from those areas that qualify as Shorelines of the State, including Puget Sound shoreline, are required and would protect the shoreline functions from new development or as redevelopment occurs (18.36.640 (4)). **C:** Habitat Assessment reports are required to identify species of local importance, priority species, or endangered, threatened, sensitive, or federal or state candidate species that may be affected by development projects within fish and wildlife areas, including shorelines. They are also required to identify measures to avoid, minimize or mitigate for potential impacts to these species and/or their habitats (18.36.630). **C:** Wetland buffers are increased as wetland habitat value increases, and buffers provide habitat functions and protect these functions in wetlands (18.36.330 (3)). **C:** Required wetland mitigation for impacts to wetlands and buffers protect and result in no net loss of habitat functions of wetlands (18.36.340). **C:** Development is to be set back from geologically hazardous areas, including feeder bluffs, by 50 feet to prevent landslides, erosion, and potential sedimentation of receiving waters (18.36.530 (2)). **C:** Vegetation must be retained wherever possible on geologically hazardous areas where disturbance is proposed and revegetation is required (18.36.520 (2) (f)). **C:** A geotechnical report must document that new and repaired bulkheads are necessary before they are allowed within the shoreline areas (18.36.640 (8)). **C:** No vegetation can be removed from a critical area or its buffer without permission from the City (18.36.100 (5)). **C:** Measures to minimize effects from lights, noise, toxic runoff, change in water regime, pets, and human disturbance in wetlands and their buffers may be required if buffers that apply to moderate-intensity development are used instead of buffers for high-intensity use (18.36.330 (3) (a) (iii)). **C:** If the wetland is a Category I or II wetland with a habitat score greater than 20 points and it is located within 300 feet of a priority habitat area as defined by the Washington State Department of Fish and Wildlife, the applicant shall provide a relatively undisturbed vegetated corridor at least 100 feet wide between the wetland and the priority habitat area. The corridor shall be protected for the entire distance between the wetland and the priority habitat through a conservation easement, native growth protection easement, or the equivalent (18.36.330 (3) (a) (iii) (A)).	**All reaches: Potential Improvement** (cont'd)

Ecological Functions	Current Performance or Function	Beneficial SMP Provisions **P** = SMP general description (section or regulation) **R** = Restoration Plan Policy / Site-specific Restoration Actions **C** = Critical Areas Code	Future Performance or Function
Fish and Wildlife Habitat (cont'd)			
Miller and Walker Creeks, Normandy Creek, Unidentified stream mouths (Shoreline Stream Mouths) • Sources and delivery of LWD • Native plant communities, especially within riparian zone (structure for invertebrates, birds, amphibians, reptiles, and mammals) • Organic inputs • Habitat connectivity • Stream / floodplain interaction	**Shoreline Stream Mouths: Moderate** The existing, forested riparian corridor along Miller and Walker Creeks is protected within The Cove from significant development. Restoration of wetlands, riparian, and salmonid habitat has occurred and riparian vegetation is relatively intact, except for a lawn area within a portion of the riparian area. Narrow riparian corridors and development along Normandy Creek and the other stream shoreline mouths provide **low to moderate** habitat functions.	**Shoreline Stream Mouths** **See above** – Many specific provisions listed in the marine shoreline section above are applicable to shoreline stream mouths. **P:** Residential development is prohibited within the 100-year floodplain, except when it can be demonstrated that the reduced storage capacity of the floodplain will not significantly increase the flood hazard to other properties nor otherwise endanger public safety (16.20.210(m)) and prohibited in floodways (16.20.210(n)). **P:** Urban Conservancy is designated at the mouth of Miller and Walker Creeks and many uses (see above under Marine Shoreline) are prohibited within this environment (16.12.020). **P:** Restoration projects that involve less than 10 miles of stream and less than 25 cubic yards of gravel/soil disturbance are exempt from SDP (16.24.040 (2) (o) (i)). **P:** The Bluff Conservancy environment was designated for the purpose of shoreline conservation and restoration of unnamed stream mouths in that environment (16.12.025). **R:** The Restoration Plan proposes that the residence on Parcel #0864500010 that is located at the north edge of the mouth of joined Miller and Walker Creeks could be purchased and the natural shoreline could be restored (Restoration Plan, Figure 2 and Table 3). **R:** The Restoration Plan proposes daylighting of Normandy Creek and the addition of riparian vegetation at Parcel #6117502800 (Restoration Plan, Figure 2 and Table 3). **R:** The Restoration Plan proposes the addition of riparian vegetation along of Normandy Creek at Parcel #6117502800 (Restoration Plan, Figure 2 and Table 3). **R:** The Restoration Plan proposes stream mouth restoration at Parcels #0622049073 and #0616000361 (Restoration Plan, Figure 2 and Table 3). **C:** The same critical areas code provisions listed above for marine shorelines would apply to shoreline streams.	**Shoreline Stream Mouths: Maintain and Potential Improvement** The Miller and Walker Creek shoreline reaches have potential for improvement in habitat functions for the following reasons: improved stormwater and CAO regulations; protection/additional restoration of the streams, wetlands, and riparian areas in a private park; and potential buyout and restoration of Parcel #0864500010 adjacent to the stream. Conditions are likely to be maintained or slightly improve due to improved stormwater and CAO regulations. Greater improvements in habitat functions would be accomplished by daylighting, reconnecting the stream to the floodplains, and improvement/expansion of riparian and wetland vegetation of Normandy Creek and riparian improvements of the other stream mouths. However, these projects would likely require buyout and redevelopment, which may take a long period of time.