

CHAPTER 6.

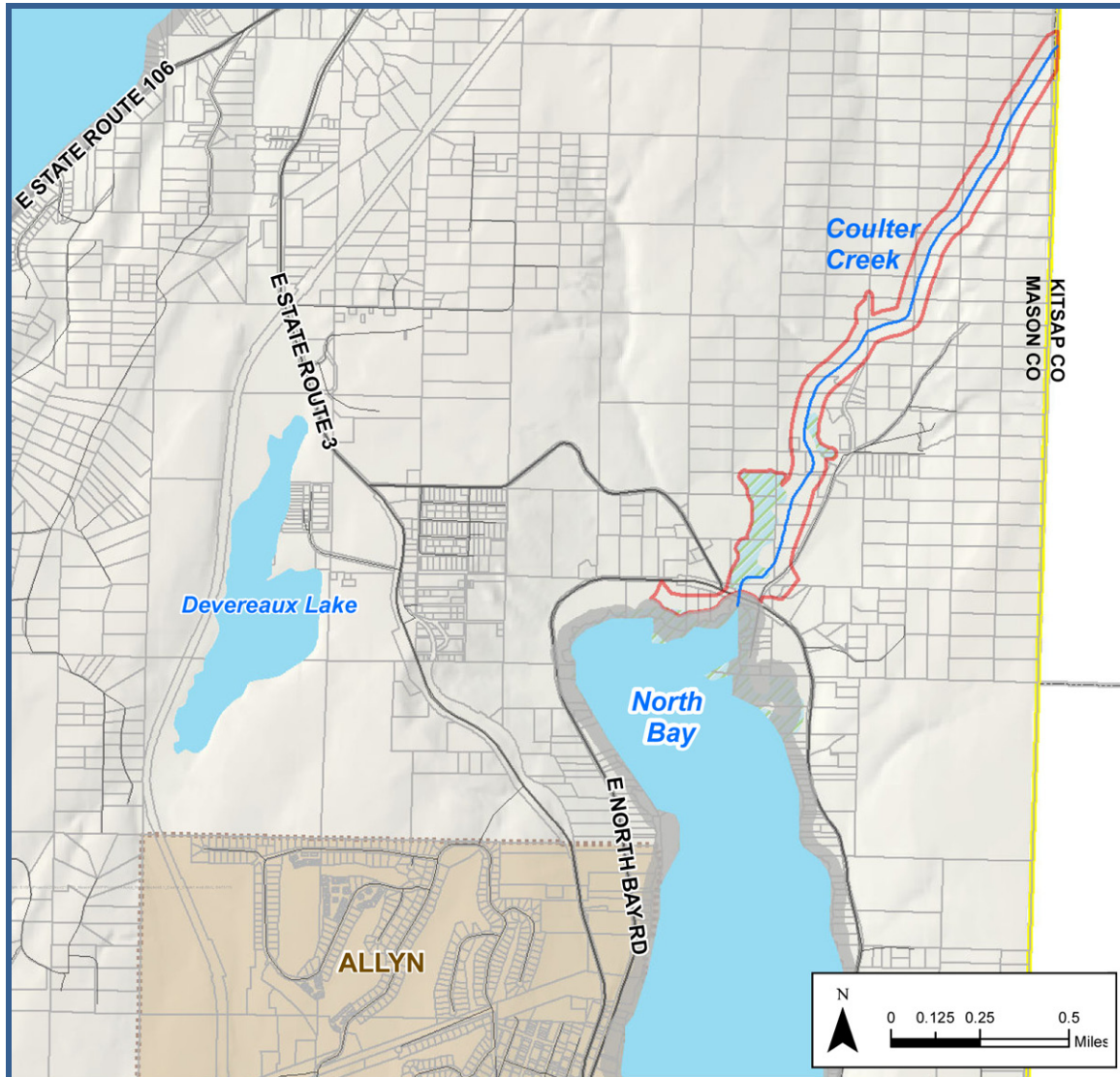
WRIA 14A: KENNEDY-GOLDSBOROUGH

Chapter 6 provides a discussion of the freshwater shoreline waterbodies located within the Mason County portion of Kennedy-Goldsborough Water Resource Inventory Area (WRIA) 14a. See Map 1 (Appendix A) for the location of WRIA 14a. This chapter covers 21 lakes and 14 streams that are considered to be shorelines of the state. There are no freshwater shorelines of statewide significance designated in WRIA 14a. Marine shorelines in the South Puget Sound have been characterized in Chapter 5.

Waterbodies within this chapter are grouped based on drainage patterns and watersheds beginning with rivers and lakes located in the far northeastern corner of WRIA 14a. Within each section, the streams are generally ordered in geographic order moving from the river mouth upstream and the lakes from North to South.

After a summary description of the waterbodies, the reaches have been described in two page reach sheets that provide a summary of data per shoreline reach. Information displayed in the reach sheets is largely GIS data taken from a combination of state and county data sources. Data sources are described in Chapter 2.

6.1 Coulter Creek



6.1.1 Physical Characterization and Modifications

The Coulter Creek drainage basin is one of the largest in East WRIA 15 (Haring, 2003). The mainstem of Coulter Creek is approximately eight miles long; several tributaries contribute an additional 10 to 12 miles of channel length. The headwaters of Coulter Creek and upper seven miles of the mainstem are located in Kitsap County. The lower 1.9 mile of Coulter Creek is located in Mason County. Coulter Creek flows southwardly into North Bay in Case Inlet. There is significant wetland area in this watershed, both on the mainstem and tributaries of Coulter Creek. The natural floodplain of Coulter Creek is generally intact and stable. A fish hatchery operated by Washington State Department of Fish and Wildlife (WDFW) is located at RM 0.25 on Coulter Creek. At the hatchery, Coulter Creek water is pumped into two asphalt rearing ponds which discharge into an adult pond (WDFW, 2003).

The Coulter Creek drainage basin has been modified by past development. Some of the process modifications include:

- Land conversion from pervious to impervious surfaces;
- Logging adjacent to the stream; and
- Diversion of water into the hatchery.

6.1.2 Water Quality

Water quality in Coulter Creek is generally very good. Coulter Creek is not included on Ecology's 303 (d) Category 5 list of impaired waters (Ecology, 2008). Kitsap County Health District has monitored the stream since 1996. According to a 2010 Water Quality Monitoring Report, the statistical analysis for the stream shows a stationary long-term trend, but a worsening water quality since 2008 (Kitsap County Health District, 2010). There has been a recent increase in fecal coliform bacteria levels but the stream still meets state water quality standards.

6.1.3 Critical or Priority Habitat and Species

Coulter Creek is documented as providing migratory and spawning habitat for several priority salmonid species (WDFW, 2010; Table 6-1). Priority species and habitats are defined by WDFW and discussed in Chapter 3 of this report. The Coulter Creek Hatchery is used to supplement natural spawning salmonids in the stream.

Table 6-1. Priority fish species documented for Coulter Creek

Common Name	Scientific Name	Habitat Use	Federal Listing	State Listing
Coastal cutthroat trout	<i>Oncorhynchus clarki clarki</i>	Migration/Spawning	~	~
fall Chinook salmon	<i>Oncorhynchus tshawytscha</i>	Migration/Spawning	Threatened (T)	Candidate
fall Chum salmon	<i>Oncorhynchus keta</i>	Migration/Spawning	~	~
summer Chum salmon	<i>Oncorhynchus keta</i>	Migration/Spawning	T	Candidate
Coho salmon	<i>Oncorhynchus kisutch</i>	Migration/Spawning	Concern	~
winter Steelhead trout	<i>Oncorhynchus mykiss</i>	Migration/Spawning	T	~
Pacific lamprey	<i>Lampetra tridentata</i>	Migration/Spawning	Concern	~

Approximately 20.7 acres of wetlands are mapped along Coulter Creek within Mason County shoreline jurisdiction, which represents 17.6 percent of the Coulter Creek reach (NWI, 1989). Wetlands located in the upstream part of the reach are relatively undisturbed.

The Washington Department of Natural Resources (WDNR) Natural Heritage Program (NHP) has not identified priority plant species or vegetation communities within the Coulter Creek shoreline planning area (WDNR, 2009).

6.1.4 Land Use

See reach sheet for land use issues.

6.1.5 Summary of Key Management Issues

See reach sheet for key management issues.

6.1.6 Reach Analysis

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COULTER CREEK - REACH 01

SHORELINE LENGTH

1.9 mi

REACH AREA

117.6 ac



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 28% (33 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

16.4% erosion, 4.7% landslide

LAND COVER (MAP 15)

4% developed, 44% forested, 5% wetland, 47% floodplain/riparian (GAP 2009).
Riparian vegetation: 74% forest cover, 8% non-forest, 18% other natural vegetation (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Coastal cutthroat trout, fall Chinook salmon, fall chum salmon, summer chum salmon, coho salmon, and winter steelhead trout; Pacific lamprey
Wetlands – 20.7 acres (17.6% of reach); wetland habitat types include estuarine intertidal emergent (near mouth), palustrine emergent, palustrine scrub-shrub, palustrine forested.

WATER QUALITY (MAP 13)

Generally very good water quality. Not listed as a 303 (d) Category 5 water.

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use – Forestry (53%); Residential (28%); Vacant (10%); and Aquaculture (9%). Ownership – Private (90%) and Public (10%).

SHORELINE MODIFICATIONS (MAP 16):

There is one road crossing in the southern portion of the reach at Coulter Creek Rd. A dam is located in the southern portion adjacent to the WDFW fish hatchery.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning districts - Rural Residential 10 Acres (49%), Rural Residential 5 Acres (44%) and Agricultural Resource Lands (7%). Comprehensive Plan Designations – Rural (93%) and Agriculture Resource Lands (7%).

Existing Shoreline Environment Designation (SED) – 100% Conservancy.

PUBLIC ACCESS (MAP 14)

There is no mapped public access to Coulter Creek.

IMPERVIOUS SURFACES (MAP 16)

2.5% of the reach contains mapped impervious surfaces (NOAA CCAP 2006). Aerial photos from 2009 show single-family residences, roads, and the Coulter Creek fish hatchery in lower part of reach.

AREAS OF SPECIAL INTEREST

According to the Ecology facilities/sites database, there are no listed facilities or contaminated sites.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a low to moderate probability of finding unknown artifacts within this reach, with a small portion of the reach in a moderate probability zone.

OPPORTUNITY AREAS (MAP 23)

No opportunities for additional public access within Mason County due to private properties, critical areas, and short length of shoreline within County jurisdiction.

Protect riparian area and associated wetlands to protect overall good water quality in Coulter Creek.

Work with public agencies with ownership in the reach to identify public access opportunities.

KEY MANAGEMENT ISSUES

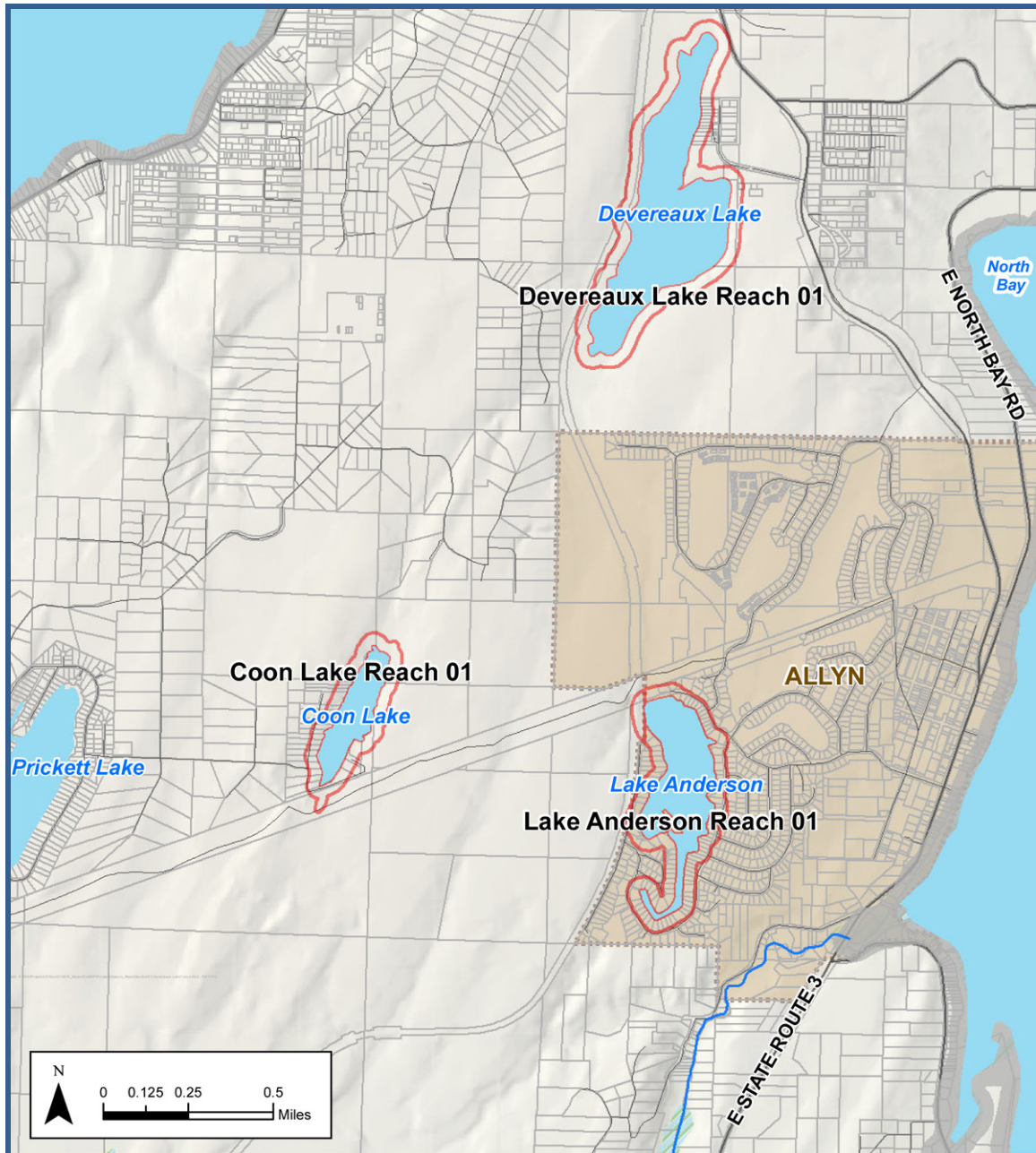
Septic systems may be contributing to an increase in fecal coliform.

Promote best management practices in agricultural uses to protect stream from sedimentation and erosion.

Comply with Washington Forest Practice Rules.

Development of South Kitsap Industrial Area in the headwaters of Coulter Creek.

6.2 Lakes Near Allyn (Devereaux, Anderson, Coon)



6.2.1 Physical Characterization and Modifications

A significant portion of the West Drainage Basin of the Allyn Urban Growth Area drains into Anderson Lake (Otak, 2007). Lake Anderson is a man-made lake that performs regional detention prior to discharge into Anderson Creek, a tributary of Sherwood Creek that ultimately discharges into the North Bay of Case Inlet. Fish passage barriers are located on small creeks flowing out from Anderson Lake (Kuttel, 2002).

The area Lake Anderson has been modified by development throughout the shoreline. Some of the process modifications include:

- Dams that have artificially raised water levels;
- Land conversion from pervious to impervious surfaces:
 - Lake Anderson is primarily surrounded by impervious surfaces associated with residential development.

6.2.2 Water Quality

Lake Anderson is not included on Ecology's 303(d) list of impaired waters (Ecology, 2008). No other water quality assessments or aquatic plant management plans were identified for this lake. Lake Anderson is an important source of cold water for Anderson Creek.

6.2.3 Critical or Priority Habitat and Species

Lake Anderson

Several priority fish species have been identified as occurring in Lake Anderson (WDFW, 2010; Table 6-2).

Table 6-2. Priority fish species documented for Lake Anderson

Common Name	Scientific Name	Habitat Use	Federal Listing	State Listing
Coastal cutthroat trout	<i>Oncorhynchus clarki clarki</i>	Migration/Spawning	~	~
Coho salmon	<i>Oncorhynchus kisutch</i>	Migration/Spawning	Concern	~
winter Steelhead trout	<i>Oncorhynchus mykiss</i>	Migration/Spawning	Threatened	~

No wetlands are mapped around Lake Anderson (NWI, 1989). No priority species occurrences have been mapped in the vicinity of the lake, and the WDNR NHP has not identified priority plant species or vegetation communities within the Lake Anderson shoreline planning area (WDFW, 2010; WDNR, 2009).

6.2.4 Land Use

Lake Anderson, on the other hand, is mostly developed with residential homes and individual docks/piers.

6.2.5 Summary of Key Management Issues

PLACEHOLDER

6.2.6 Reach Analysis

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LAKE ANDERSON

SHORELINE PERIMETER

2.2 MI

WATERBODY AREA

45.3 AC

REACH AREA

95.8 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 42% (21 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

5.7% erosion, 5.7% landslide

LAND COVER (MAP 15)

6% developed, 32% open water, 3% beach; 47% forest, 11% floodplain/riparian (GAP, 2009).

Riparian vegetation: 22% forest cover, 32% non-forest, 1% other natural vegetation, 45% water (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Coastal cutthroat trout, coho salmon, winter steelhead trout.

No wetlands mapped.

Cold water refugia for juvenile salmonids and priority coho rearing habitat.

WATER QUALITY (MAP 13)

Not included on Ecology's 303 (d) list of impaired waters. Important source of cold water for Anderson Creek.

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use - Residential (67%); Vacant (13%); Parks, Open Space, and Recreation Areas (12%); and Transportation (8%). Ownership – 100% Private.

SHORELINE MODIFICATIONS (MAP 16)

A dam is located in the southwestern portion of the reach. According to 2009 aerial imagery, there are numerous individual docks/piers associated with single-family homes.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning districts – County: Rural Residential 5 Acres (6%), Allyn Urban Growth Area (UGA): Residential Platted (92%), and Residential Recreational (2%). Comprehensive Plan Designations – 100% Rural. Existing SED – 100% Urban Residential.

PUBLIC ACCESS (MAP 14)

There are no mapped public access facilities to Lake Anderson.

IMPERVIOUS SURFACES (MAP 16)

13% of the reach contains mapped impervious surfaces (NOAA CCAP, 2006). Aerial photos from 2009 show numerous single-family residences and several roads along the lake shore.

AREAS OF SPECIAL INTEREST

According to the Ecology facilities/sites database, there are no listed facilities or contaminated sites.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a low to moderate probability of finding unknown artifacts within this reach.

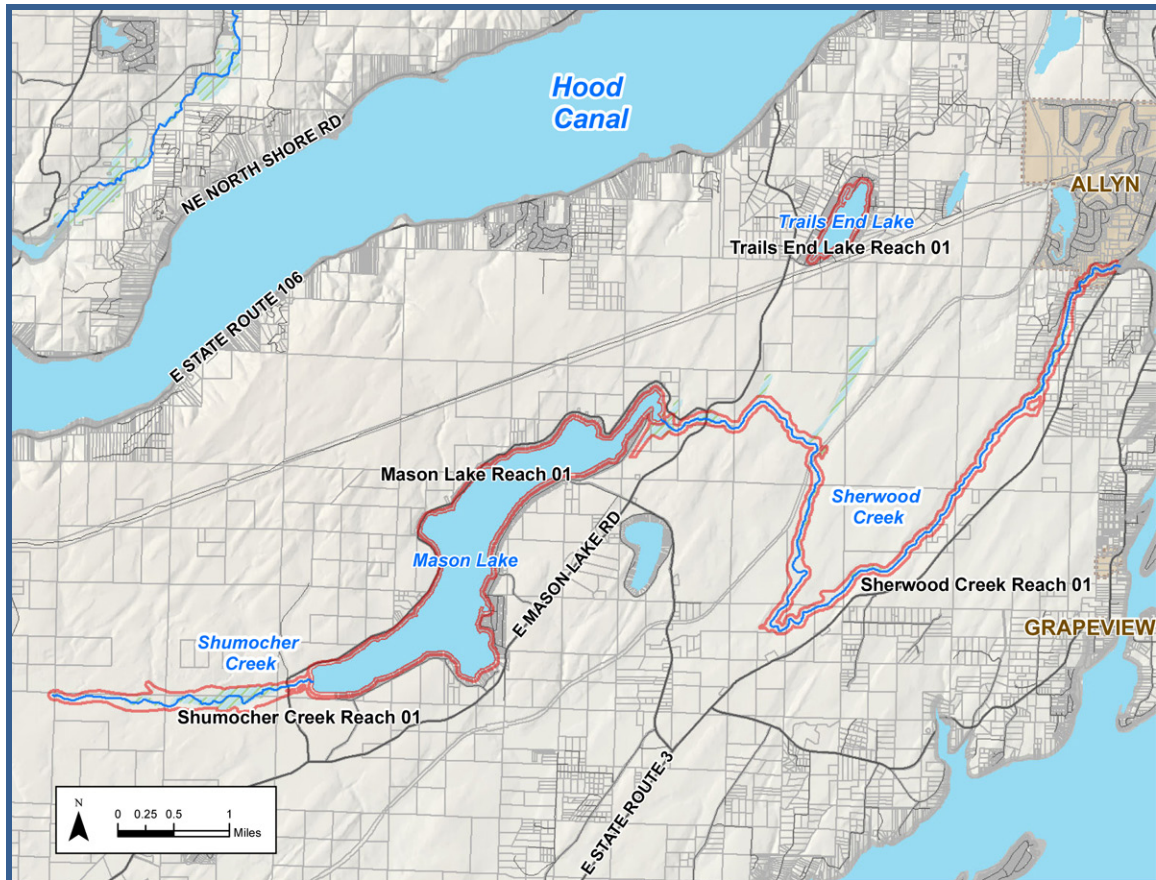
OPPORTUNITY AREAS (MAP 23)

Restore trees to riparian zones where vegetation is lacking.

Reduce number of docks over time by considering joint use docks

KEY MANAGEMENT ISSUES

6.3 Sherwood Creek and Tributaries (Mason Lake, Trails End Lake, Shumocher Creek)



6.3.1 Physical Characterization and Modifications

Schumocher Creek and four tributaries flow into Mason Lake, which flows into Sherwood Creek. Mason Lake and Trails End Lake (also known as Prickett) drain via Sherwood Creek to the North Bay of Case Inlet, near the town of Allyn.

Mason Lake is the largest (997 acres) and deepest natural lake (48 feet) in Mason County. Mason Lake has a drainage area of approximately 20 square miles (Ecology, 2011). Trails End Lake has no surface water inlets and a drainage area of approximately 0.4 square miles (Ecology, 2011). Sherwood Creek contains 18.3 miles of channel and is the largest stream system in WRIA 14 (Kuttel, 2002). The average flow in Sherwood Creek is 15 to 25 cfs. A small mill pond is located at approximately RM 1.0 on Sherwood Creek. Above RM 3.0 on Sherwood Creek, dense stands of second growth conifers and cultivated Christmas trees are prevalent. Fish passage barriers are located on small creeks flowing out from Mason and Trails End Lakes (Kuttel, 2002).

The drainage basins of Sherwood Creek, Trails End Lake, Mason Lake, and Schumocher Creek have been modified to varying degrees. Some of the process modifications include:

- Logging adjacent to the creeks and lakes;
- Undersized culverts; and
- Residential development.

A mill and mill pond was constructed near the mouth of Sherwood Creek in 1854 (Kuttel, 2002). This resulted in logs being transported down the creek and erosion. In the 19th and 20th centuries culverts were built. These culverts are undersized and result in high water velocities.

6.3.2 Water Quality

Sherwood Creek and Shumocher Creek are not included on Ecology's 303(d) Category 5 list of impaired waters (Ecology, 2008). However, there is some evidence of water quality problems in Sherwood Creek with respect to the temperature and dissolved oxygen parameters, which has resulted in Category 2 listings for Sherwood Creek for both parameters (Ecology, 2008; Otak, 2007).

Trails End Lake is not listed on Ecology's 303(d) list of impaired waters. Mason Lake is currently on the 303(d) list due to high concentrations of PCBs in fish tissue. Total PCB concentrations were 10.1 mg/kg in northern pikeminnow tissue samples collected from Mason Lake in 2006. Methyl mercury concentrations are also high in Mason Lake. Concentrations as high as 450 ug/kg were detected in pikeminnow

tissue samples, exceeding National Toxics Rule criterion (Washington Department of Ecology, 2008a, b). Mason Lake is also listed by Ecology as having impairments associated with the presence of Eurasian water-milfoil (*Myriophyllum spicatum*); and an Integrated Aquatic Vegetation Management Plan (IAVMP) has been developed for the lake to guide plant management. In addition, residents of Mason Lake have formed a Lake Management District to coordinate actions to address water quality and management of aquatic weeds.

6.3.3 Critical or Priority Habitat and Species

Sherwood Creek

Sherwood Creek is mapped as providing habitat for multiple fish species (WDFW, 2010; Table 6-3). The Squaxin Island Tribe operates smolt traps to monitor natural salmon production in Sherwood and Schumocher Creeks (Squaxin Island Natural Resource Division, 2010).

Table 6-3. Priority fish species documented for Sherwood Creek, Mason Lake, and Shumocher Creek

Common Name	Scientific Name	Habitat Use	Federal Listing	State Listing
Coastal cutthroat trout	<i>Oncorhynchus clarki clarki</i>	Migration/Spawning	~	~
fall Chinook salmon (Sherwood Creek only)	<i>Oncorhynchus tshawytscha</i>	Migration/Spawning	T	Candidate
fall Chum salmon	<i>Oncorhynchus keta</i>	Spawning (Sherwood Creek only) and Migration	~	~
summer Chum salmon	<i>Oncorhynchus keta</i>	Spawning (Sherwood Creek only) and Migration	T	Candidate
Coho salmon	<i>Oncorhynchus kisutch</i>	Migration/Spawning	Concern	~
Rainbow trout	<i>Oncorhynchus mykiss</i>	Migration/Spawning	~	~
kokanee salmon (Mason Lake /Shumocher only)	<i>Oncorhynchus nerka</i>	Migration/Spawning	~	~
winter Steelhead	<i>Oncorhynchus mykiss</i>	Spawning (Sherwood Creek only) and Migration	T	~

Approximately 86.4 acres of wetland have been mapped along the shoreline of Sherwood Creek, representing 17.2 percent of the reach (NWI, 1989). No priority species occurrences have been mapped in the vicinity of the lake, and the WDNR NHP has not identified priority plant species or vegetation communities within the Sherwood Creek shoreline planning area (WDFW, 2010; WDNR, 2009).

Trails End Lake

Trails End Lake supports coastal cutthroat trout (WDFW, 2010). No wetlands are mapped in the shoreline planning area of the lake (NWI, 1989). The shores of the lake are heavily developed. No priority species occurrences have been mapped in the vicinity of the lake (WDFW, 2010). The WDNR NHP has identified approximately 48.1 acres of water lobelia within the Trails End Lake shoreline planning area (WDNR, 2009).

Mason Lake

Mason Lake, due to its association with Sherwood Creek and Shumocher Creek, supports many priority salmon and trout species (WDFW, 2010; Table 6-3). There are reports of coho and chum escapements above Mason Lake (Kuttel, 2002). Approximately 10.0 acres of wetland have been mapped around the lake, representing 3.7 percent of the reach (NWI, 1989). Residential development along the shoreline has impacted wetland habitat. No priority species occurrences have been mapped in the vicinity of the lake (WDFW, 2010). The WDNR NHP has identified approximately 215.5 acres of water lobelia habitat within the Mason Lake shoreline planning area (WDNR, 2009).

Shumocher Creek

Shumocher Creek is mapped as supporting several species of priority fish (WDFW, 2010; Table 6-3). Coho production is monitored through smolt traps placed by the Squaxin Island Tribe and the stream is a major anadromous fish production stream (Kuttel, 2002). Approximately 81.1 acres (36.2 percent of the reach) is mapped as wetland (NWI, 1989). A priority species occurrence for osprey is documented in the vicinity of the lake (WDFW, 2010). The WDNR NHP has identified approximately 0.7 acre of water lobelia habitat and 20.1 acres of Douglas fir/Western Hemlock/Evergreen Huckleberry vegetation community within the Shumocher Creek shoreline planning area (WDNR, 2009).

6.3.4 Land Use

Sherwood Creek is primarily mapped as forestry with some residential uses in the lower portion of the reach near the stream mouth. Schumocher Creek is similar, with almost the entire reach designated as forestry use.

Mason Lake is extensively developed with residential homes and individual docks/piers. Mason Lake Park is a County-owned community park located at the north end of the lake (Mason County Department of Parks and Trails, 2006). The park has a boat launch, barbeques, picnic tables and a parking area. Mason Lake Picnic Park is a small, undeveloped park located at the south end of the lake.

Trails End Lake is similar to Mason Lake in that the predominant use is residential but it is not as extensively developed. Trails End Lake has a WDFW public boat launch (Mason County Parks and Recreation Department, 2008).

6.3.5 Summary of Key Management Issues

PLACEHOLDER

6.3.6 Reach Analysis

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SHERWOOD CREEK - REACH 01

SHORELINE LENGTH

9.0 MI

REACH AREA

502.7 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 33% (168 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

32.5% erosion, 33.7% landslide

LAND COVER (MAP 15)

61% forest, 1% wetland, 37% floodplain/riparian (GAP, 2009).

Riparian vegetation: 57% forest cover, 4% non-forest, 37% other natural vegetation, 2% water (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Coastal cutthroat trout, fall Chinook salmon, fall chum salmon, summer chum salmon, coho salmon, rainbow trout, winter steelhead trout.

Wetlands – 86.4 acres (17.2% of reach); wetland habitat types include estuarine intertidal emergent (near stream mouth) and palustrine scrub-shrub.

WATER QUALITY (MAP 13)

Not listed as a 303 (d) Category 5 water; Category 2 for temperature and dissolved oxygen.

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use - Forestry (82%); Vacant (9%); Residential (7%); and remaining 2% is a mix of Parks, Open Space, and Recreation Areas and Transportation. Ownership - Private (56%) and Public (44%).

SHORELINE MODIFICATIONS (MAP 16)

There are 3 crossings in the northeast, central and northwest portions of the reach: Sherwood Rd, a railway, and Trails End Rd. The railway is a bridge crossing.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning districts – County: Long Term Commercial Forest (78%), Rural Residential 5 Acres (10%), Rural Residential 20 Acres (5%); Inholding Lands (2%); and Allyn UGA: Single Family Residential (4%). Comprehensive Plan Designations: Long Term Commercial Forest (81%), Rural (17%) and Inholding Lands (2%).

Existing SED: Conservancy (84%) and Rural (16%).

PUBLIC ACCESS (MAP 14)

There is no mapped public access to Sherwood Creek

IMPERVIOUS SURFACES (MAP 16)

Less than 1% of the reach contains mapped impervious surfaces (NOAA CCAP, 2006). Aerial photos from 2009 show most of this is single-family residential development in the lower part of the reach.

AREAS OF SPECIAL INTEREST

The Ecology-listed facilities and sites within the reach include a Voluntary Cleanup Site.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a very low probability of finding unknown artifacts within this reach, with small portions of the reach in low to high probability zones.

OPPORTUNITY AREAS (MAP 23)

Riparian forest of 100 feet in width remains following timber harvest that extends several miles over nonconsecutive parcels. Restore trees in the riparian buffer within shoreline jurisdiction.

Restore associated wetlands impacted by logging.

Work with public agencies with ownership in the reach to identify public access opportunities.

KEY MANAGEMENT ISSUES

Important cold water refugia for juvenile salmon.

Development and removal of riparian habitat increasing stream temperatures.

Lack of large woody debris.

TRAILS END LAKE

SHORELINE PERIMETER

2.2 MI

WATERBODY AREA

73.04 AC

REACH AREA

125.9 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 39% (21 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

0.2% erosion, 0.2% landslide

LAND COVER (MAP 15)

3% developed, 47% open water, 2% beach, 2% playa, 46% forest (GAP, 2009).
Riparian vegetation: 17% forest cover, 23% non-forest, 2% other natural vegetation, 59% water (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Coastal cutthroat trout; water lobelia.
No wetlands mapped.

WATER QUALITY (MAP 13):

Not included on Ecology's 303 (d) list of impaired waters.

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use - Residential (74%); Vacant (21%); with the remaining 4% a mix of Parks, Open Space, and Recreation Areas and Transportation. Ownership – 100% Private.

SHORELINE MODIFICATIONS (MAP 16)

There is a public boat launch at the south end of the lake. Most residential homes have an individual dock/pier.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 19)

Zoning Districts - County: 100% Rural Residential 5 Acres. Comprehensive Plan Designations – 100% Rural.

Existing SED – 100% Urban Residential.

PUBLIC ACCESS (MAP 14)

There is a WDFW gravel boat launch that provides access to Trails End Lake (Washington Department of Fish and Wildlife WDFW Lands, 2011).

IMPERVIOUS SURFACES (MAP 16)

Approximately 11% of the reach contains mapped impervious surfaces (NOAA CCAP, 2006). Aerial photos from 2009 show single-family residences along most of the lake shore.

AREAS OF SPECIAL INTEREST (MAP 13)

According to the Ecology facilities/sites database, there are no listed facilities or contaminated sites.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a very high probability of finding unknown artifacts within this reach, with smaller portions of the reach in moderate-low to high probability zones.

OPPORTUNITY AREAS (MAP 22):

Restore trees in riparian zone where only lawn exists.

Reduce number of docks over time by considering joint use docks

KEY MANAGEMENT ISSUES:

MASON LAKE

SHORELINE PERIMETER

11.1 MI

WATERBODY AREA

997 AC

REACH AREA

1,245 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 48% (128 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

2% erosion, 21% landslide

LAND COVER (MAP 15)

4% developed, 76% open water, 2% beach, 16% forest, 2% wetland (GAP, 2009).

Riparian vegetation: 7% forest cover, 12% non-forest, 1% other natural vegetation, 80% water (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Coastal cutthroat trout, fall chum salmon, summer chum salmon, coho salmon, rainbow trout, kokanee salmon, winter steelhead trout. Water lobelia.

Wetlands – 10.0 acres (3.7% of reach); wetland habitat types include lacustrine aquatic bed and palustrine scrub-shrub.

WATER QUALITY (MAP 13):

Listed on Ecology's 303 (d) list of impaired waters for PCB in fish tissue and methyl mercury. Eurasian water milfoil is also a problem; an integrated aquatic vegetation management plan has been developed.

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use - Residential (82%); Parks, Open Space, and Recreation Areas (9%); Vacant (7%) and Forestry (2%). Ownership – 100% Private.

SHORELINE MODIFICATIONS (MAP 16)

There are 503 docks/piers mapped throughout the reach, one buoy/float mapped in the southwest portion of the reach and a boat launch in the north part of the lake (Mason County Department of Parks and Trails, 2006). Bulkheads exist on many lots.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning districts – County: Rural Residential: 5 Acres (97%) and Rural Residential 20 Acres (3%). Comprehensive Plan Designations – 100% Rural. Existing SED – Urban Residential (94%) and Conservancy (6%).

PUBLIC ACCESS (MAP 14)

Mason Lake Park is a County-owned community park located at the north end of the lake. The park has a boat launch, barbecues, picnic tables, and a parking area. The park is 17 acres in total size with only 2 acres developed. The remaining area is undeveloped, forested lands (Mason County Department of Parks and Trails, 2006).

Mason Lake Picnic Park is a 1 acre undeveloped, forested park located on the south side of the lake. Lakefront residences and Green Diamond Timberland border the park (Mason County Department of Parks and Trails, 2006).

IMPERVIOUS SURFACES (MAP 16)

Approximately 7% of the reach contains mapped impervious surfaces. Aerial photos from 2009 show single-family residences along most of the lake shore.

AREAS OF SPECIAL INTEREST

According to the Ecology facilities/sites database, there are no listed facilities or contaminated sites.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a low to moderate probability of finding unknown artifacts within this reach.

OPPORTUNITY AREAS (MAP 23)

Remove bulkheads and use soft-shore bank stabilization where feasible.

Reduce number of docks over time by considering joint use docks.

Restore trees in the riparian zone.

Remove non-native predator species (e.g. bass).

KEY MANAGEMENT ISSUES:

Water quality impaired by nutrients, resulting in Eurasian water milfoil and nuisance aquatic plants.

Manage recreational uses and balance with environmental protection.

Maintain constant lake discharge (from the hypolimnion) to Sherwood Creek to maintain adequate base flows and cold water input.

Dock proliferation and overwater structures.

SHUMOCHER CREEK - REACH 01

SHORELINE LENGTH

2.6 MI

REACH AREA

223.9 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain – 77% (173 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

15.6% erosion, 13.6% landslide

LAND COVER (MAP 15)

1% developed, 59% forest, 1% wetland, 40% floodplain/riparian (GAP, 2009).

Riparian vegetation: 73% forest cover, 4% non-forest, 21% other natural vegetation, 1% water (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Coastal cutthroat trout, fall chum salmon, summer chum salmon, coho salmon, rainbow trout, kokanee salmon, winter steelhead trout. Osprey.

Water lobelia and Douglas fir/Western Hemlock/Evergreen Huckleberry.

Wetlands – 81.1 acres (36.2% of reach); wetland habitat types include palustrine forested and palustrine scrub-shrub.

WATER QUALITY (MAP 13)

Not listed as a 303 (d) Category 5 water

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use – Parks, Open Space, and Recreation Areas (92%) and Forestry (8%). Ownership – 100% Private.

SHORELINE MODIFICATIONS (MAP 16)

There are two road crossings: Mason Lake Drive W and an unnamed road.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning districts – County: Rural Residential 20 Acres (91%) and Rural Residential 5 Acres (9%). Comprehensive Plan Designations – 100% Rural. Existing SED – 100% Conservancy.

PUBLIC ACCESS (MAP 14)

There are no mapped parks or public access facilities in Shumocher Creek Reach 01.

IMPERVIOUS SURFACES (MAP 16)

1.4% of the reach contains mapped impervious surfaces (NOAA CCAP, 2006). Aerial photos from 2009 show one road crossing near the confluence with Mason Lake.

AREAS OF SPECIAL INTEREST

According to the Ecology facilities/sites database, there are no listed facilities or contaminated sites.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a low to moderate probability of finding unknown artifacts within this reach

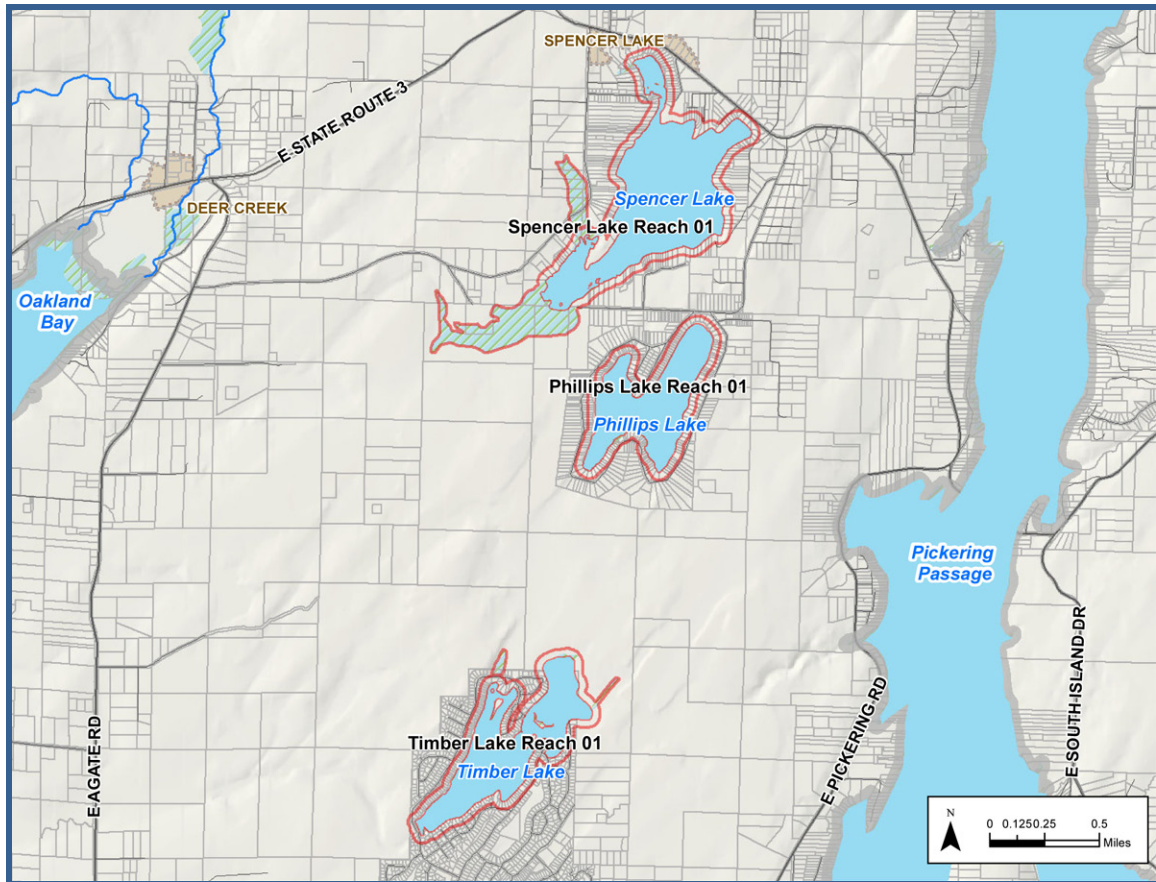
OPPORTUNITY AREAS (MAP 23)

Protect and conserve wetlands associated with Schumocher Creek.
Restore forested riparian zones where impacted by forestry and timber cutting.

KEY MANAGEMENT ISSUES

Protect water temperatures
Comply with Washington Forest Practices Rules

6.4 Lakes Near Spencer Lake (Spencer, Phillips, Timber)



6.4.1 Physical Characterization and Modifications

Spencer, Phillips, and Timber Lakes (listed from north to south) are located approximately seven miles east of Shelton and one to two miles east of Oakland Bay. Spencer Lake is located about seven miles northeast of Shelton. Spencer Lake has a drainage basin area of approximately 1.7 square miles, no surface inlets, and drains via Malaney Creek, which flows to Oakland Bay (Ecology, 2011). Phillips Lake has a drainage basin area of approximately 0.5 square miles, no surface inlets, and drains via wetlands to Timber Lake, which drains to Campbell Creek through a marshy area to Oakland Bay (Ecology, 2011).

The drainage basins of Spencer, Phillips, and Timber Lakes have been modified to varying degrees. Some of the process modifications include:

- Conversion of pervious to impervious areas;
- Logging adjacent to the lakes; and
- Residential development.

6.4.2 Water Quality

Spencer Lake is included on Ecology's 303 (d) list of impaired waters for possible impairments related to the presence of swollen bladderwort (*Utricularia inflata*) identified in 2002. Phillips and Timber lakes are not included on the list. No recent data on any of these lakes were identified.

6.4.3 Critical or Priority Habitat and Species

Spencer Lake

Multiple priority salmon and trout species are supported by Spencer Lake (WDFW, 2010; Table 6-4).

Table 6-4. Priority fish species documented for Spencer Lake

Common Name	Scientific Name	Habitat Use	Federal Listing	State Listing
Coastal cutthroat trout	<i>Oncorhynchus clarki clarki</i>	Migration/Spawning	~	~
fall Chum salmon	<i>Oncorhynchus keta</i>	Migration/Spawning	~	~
Coho salmon	<i>Oncorhynchus kisutch</i>	Migration/Spawning	Concern	~
Rainbow trout	<i>Oncorhynchus mykiss</i>	Migration/Spawning	~	~
winter Steelhead trout	<i>Oncorhynchus mykiss</i>	Migration/Spawning	T	~

Spencer Lake has approximately 93.4 acres of wetland mapped, which represents 52.3 percent of the reach (NWI, 1989). A large wetland area extends from the southwest portion of the lake. No priority species occurrences have been mapped in the vicinity of the lake (WDFW, 2010). The WDNR NHP has identified approximately 28.5 acres of water lobelia within the Spencer Lake shoreline planning area (WDNR, 2009).

Philips Lake

Coastal cutthroat trout have been documented in Phillips Lake (WDFW, 2010). No wetlands are mapped within the shoreline planning area (NWI, 1989). No priority species occurrences have been mapped in the vicinity of the lake, and the WDNR NHP has not identified priority plant species or vegetation communities within the Philips Lake shoreline planning area (WDFW, 2010; WDNR, 2009).

Timber Lake

Timber Lake supports two priority species of fish: coastal cutthroat trout and winter steelhead (WDFW, 2010). Winter steelhead are listed as threatened under the Endangered Species Act. Approximately 9.7 acres of wetland, primarily located in the northeast portion of the lake, have been mapped, representing 10.3 percent of the reach. No priority species occurrences have been mapped in the vicinity of the lake, and the WDNR NHP has not identified priority plant species or vegetation communities within the Philips Lake shoreline planning area (WDFW, 2010; WDNR, 2009).

6.4.4 Land Use

Spencer Lake and Timber Lake have a mix of residential and forestry uses. There are individual docks/piers associated with most residences. There is a WDFW public boat launch at the north end of Spencer Lake (Mason County Parks and Recreation Department, 2008). Phillips Lake is mostly in residential use and has numerous docks/piers. There is a WDFW public boat launch at the north end of the lake and Phillips Lake County Park at the south end (Mason County Parks and Recreation Department, 2008; Mason County Department of Parks and Trails, 2006). Phillips Lake Park is a County-owned community park located next to the WDFW boat launch. It also has a boat launch and parking facilities (Mason County Department of Parks and Trails, 2006).

See reach sheet for a summary land use information by reach.

6.4.5 Summary of Key Management Issues

PLACEHOLDER

6.4.6 Reach Analysis

SPENCER LAKE

SHORELINE PERIMETER

5.0 MI

WATERBODY AREA

212.8 AC

REACH AREA

391.2 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 55% (98 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

No listed erosion or landslide areas

LAND COVER (MAP 15)

3% developed, 49% open water, 3% beach, 17% forest, 6% wetland, 21% floodplain/riparian (GAP, 2009).

Riparian vegetation: 25% forest cover, 12% non-forest, 2% other natural vegetation, 61% water (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Coastal cutthroat trout, fall chum salmon, coho salmon, rainbow trout, winter steelhead trout. Water lobelia.

Wetlands – 93.4 acres (52.3% of reach); wetland habitat types include palustrine emergent and palustrine scrub-shrub.

WATER QUALITY (MAP 13)

Listed on Ecology's 303 (d) list for swollen bladderwort.

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use - Residential (54%); Forestry (29%); Vacant/Rural (16%); and Parks, Open Space, and Recreation Areas (1%). Ownership – 100% Private.

SHORELINE MODIFICATIONS (MAP 16)

There is a road crossing in the western portion of the reach at Spencer Lake Rd. A dam is located in the southwestern portion of the reach. There are 115 docks/piers mapped throughout the reach. There is a public boat launch at the north end of the lake.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning districts – Rural Residential: 5 Acres (77%), 10 Acres (22%) and Rural Tourist (1%). Comprehensive Plan Designations - Inholding Lands (75%) and Long Term Commercial Forest (25%). Existing SED – 100% Urban Residential.

PUBLIC ACCESS (MAP 14)

There is a WDFW boat launch that provides access to the north end of Spencer Lake. The boat launch is a 12-foot wide concrete launch. The total park size is 2 acres and includes parking facilities (Washington Department of Fish and Wildlife WDFW Lands, 2011; Mason County Department of Parks and Trails, 2006).

IMPERVIOUS SURFACES (MAP 16)

5.4% of the reach contains mapped impervious surfaces (NOAA CCAP, 2006). Aerial photos from 2009 show single-family residences around most of the lake shore, except for the SW portion which contains a large wetland.

AREAS OF SPECIAL INTEREST

According to the Ecology facilities/sites database, there are no listed facilities or contaminated sites.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a very low probability of finding unknown artifacts within this reach.

OPPORTUNITY AREAS (MAP 23)

Reduce number of docks over time by considering joint use docks

KEY MANAGEMENT ISSUES

Over water structures and dock proliferation.

PHILLIPS LAKE

SHORELINE PERIMETER

2.6 MI

WATERBODY AREA

106.5 AC

REACH AREA

172.6 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 40% (26 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

6.2% erosion, 6.2% landslide

LAND COVER (MAP 15)

3% developed, 56% open water, 5% beach, 34% forest, 1% wetland, 2% floodplain/riparian (GAP, 2009).

Riparian vegetation: 16% forest cover, 19% non-forest, 65% water (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Coastal cutthroat trout.

No wetlands mapped.

WATER QUALITY (MAP 13)

Not included on Ecology's 303 (d) list for impaired waters

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use - Residential (87%); and Vacant/Rural (12%); and Aquaculture (1%). Ownership – 100% Private.

SHORELINE MODIFICATIONS (MAP 16)

According to 2009 aerial imagery, there are individual docks/piers associated with most residences. There are two public boat launches.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning districts – 100% Rural Residential 5 Acres. Comprehensive Plan Designations – 100% Rural. Existing SED – 100% Urban Residential.

PUBLIC ACCESS (MAP 14)

There is a WDFW boat launch with associated parking that provides access to the north end of Phillips Lake. The boat launch is a 10-foot wide concrete launch. The park is 1 acre in size and is co-managed with Mason County (Washington Department of Fish and Wildlife WDFW Lands, 2011; Mason County Department of Parks and Trails, 2006).

Phillips Lake Park is a County-owned community park located next to the WDFW boat launch. It also has a boat launch and parking facilities (Mason County Department of Parks and Trails, 2006).

IMPERVIOUS SURFACES (MAP 16)

6.6% of the reach contains mapped impervious surfaces (NOAA CCAP, 2006). Aerial photos from 2009 show single-family residences and roads surrounding most of the lake.

AREAS OF SPECIAL INTEREST

No listed facilities or contaminated sites.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a very low probability of finding unknown artifacts within this reach.

OPPORTUNITY AREAS (MAP 23)

Reduce number of docks over time by considering joint use docks

KEY MANAGEMENT ISSUES

Overwater structures and dock proliferation.

TIMBER LAKE

SHORELINE PERIMETER

4.4 MI

WATERBODY AREA

123.06 AC

REACH AREA

217.8 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 45% (43 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

No listed erosion or landslide areas

LAND COVER (MAP 15)

4% developed, 28% open water, 3% beach, 46% forest, 14% wetland, 5% floodplain/riparian (GAP, 2009).

Riparian vegetation: 30% forest cover, 23% non-forest, 7% other natural vegetation, 40% water (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

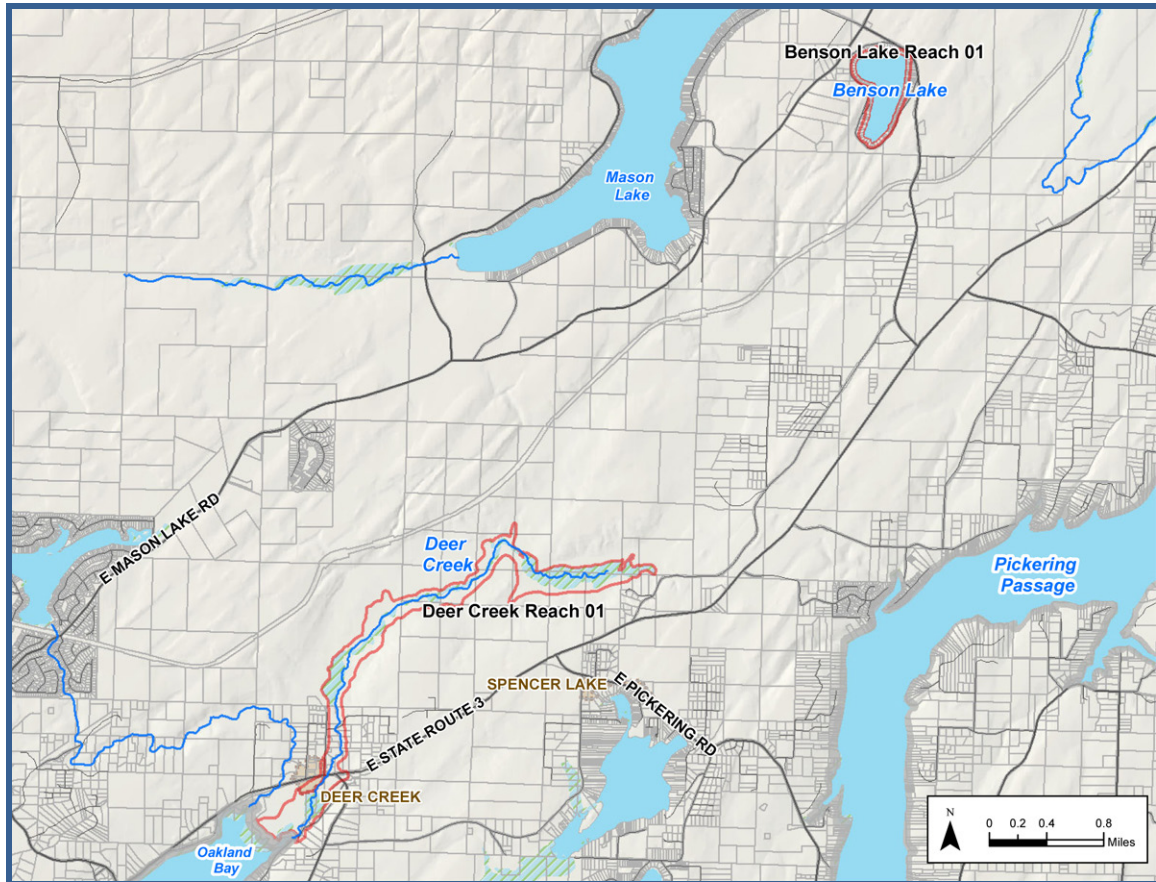
Coastal cutthroat and winter steelhead trout.
Wetlands – 9.7 acres (10.3% of reach); wetland habitat types include palustrine aquatic bed, palustrine emergent, palustrine scrub-shrub, and palustrine forested.

WATER QUALITY (MAP 13)

Not included on Ecology's 303 (d) list for impaired waters

BUILT ENVIRONMENT AND LAND USE	
EXISTING LAND USES AND OWNERSHIP (MAP 18) Land Use - Residential (33%); Parks, Open Space, and Recreation Areas (32%); Forestry (18%); and Vacant (17%). Ownership – 100% Private.	SHORELINE MODIFICATIONS (MAP 16) A dam is located in the southwestern portion of the reach. According to 2009 aerial imagery, there are numerous individual docks/piers.
ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21) Zoning districts - Rural Residential: 5 Acres (80%) and Rural Residential 20 Acres (20%). Comprehensive Plan Designations – 100% Rural. Existing SED – 100% Urban Residential.	PUBLIC ACCESS (MAP 14) There is no mapped public access to Timber Lake.
IMPERVIOUS SURFACES (MAP 16) 15.1% of the reach contains mapped impervious surfaces (NOAA CCAP, 2006). Aerial photos from 2009 show single-family residences and roads along most of the shoreline except for a large wetland on the NE part of the lake.	AREAS OF SPECIAL INTEREST According to the Ecology facilities/sites database, there are no listed facilities or contaminated sites.
CULTURAL AND ARCHAEOLOGICAL RESOURCES There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a moderate to moderate to high probability of finding unknown artifacts within this reach, with small portions of the reach in high to very high probability zones.	
OPPORTUNITY AREAS (MAP 23)	
Reduce number of docks over time by considering joint use docks	
KEY MANAGEMENT ISSUES	
Maintain cold temperature in lake discharge. Overwater structures and dock proliferation. Protect headwaters of Campbell Creek.	

6.5 Deer Creek and Benson Lake



6.5.1 Physical Characterization and Modifications

The headwaters of Deer Creek include springs and the outflow from Benson Lake. Benson Lake covers an area of approximately 80 acres and length of 0.8 mile. The stream flows through Christmas tree farms and wetlands prior to entering Oakland Bay, about ¼ mile east of Cranberry Creek. The section of creek that is considered a shoreline of the state is approximately RM 0 to RM 3. Five small tributaries enter Deer Creek between RM 3 and RM 6 (Kuttel, 2002). Culverts are located along many of the tributaries to Deer Creek. Homes and associated bank armoring are located adjacent to the stream in the lower 1.5 miles of Deer Creek. Extensive ponded and emergent wetlands are located upstream of RM 1.5.

The Deer Creek drainage basin has been modified by logging and development. Some of the process modifications include:

- Land conversion from pervious to impervious surfaces;
- Logging adjacent to the creek;
- Culverts and other structures that change the flow patterns;
- Lack of large woody debris key piece abundance; and
- Severe erosion and bank armoring due to development.

6.5.2 Water Quality

Two monitoring stations on Deer Creek have recorded high water temperatures that exceed Washington State water quality standards. The stream is listed on the 303(d) list of impaired waters (Category 5 water) for the temperature parameter (Ecology, 2008). No other water quality impairments have been identified at this time.

No water quality data were identified for Benson Lake. Benson Lake is not included on Ecology's 303 (d) list of impaired waters.

6.5.3 Critical or Priority Habitat and Species

Deer Creek

Deer Creek drains to Oakland Bay and has been mapped as supporting multiple species of fish (WDFW, 2010; Table 6-5). Coho production is documented as significant, while summer chum and fall Chinook utilization are lower (Kuttel, 2002).

Table 6-5. Priority fish species documented for Deer Creek

Common Name	Scientific Name	Habitat Use	Federal Listing	State Listing
Coastal cutthroat trout	<i>Oncorhynchus clarki clarki</i>	Migration/Spawning	~	~
fall Chinook salmon	<i>Oncorhynchus tshawytscha</i>	Migration	T	Candidate
fall Chum salmon	<i>Oncorhynchus keta</i>	Migration/Spawning	~	~
summer Chum salmon	<i>Oncorhynchus keta</i>	Migration/Spawning	T	Candidate
Coho salmon	<i>Oncorhynchus kisutch</i>	Migration/Spawning	Concern	~
winter Steelhead trout	<i>Oncorhynchus mykiss</i>	Migration/Spawning	T	~

Deer Creek has 142.8 acres of wetland mapped along its shoreline, representing 37.1 percent of the reach (NWI, 1989). No priority species occurrences have been mapped in the vicinity of the lake, and the WDNR NHP has not identified priority plant species or vegetation communities within the Deer Creek shoreline planning area (WDFW, 2010; WDNR, 2009).

Benson Lake

Benson Lake supports coastal cutthroat trout (WDFW, 2010). No wetlands have been mapped around the shoreline of the lake (NWI, 1989). No priority species occurrences have been mapped in the vicinity of the lake (WDFW, 2010). The WDNR NHP maps approximately 43.7 acres of water lily in the lake (WDNR, 2009).

6.5.4 Land Use

Benson Lake is almost entirely developed with residential uses and individual docks/piers. There is a WDFW public boat launch at the north end of the lake (Mason County Parks and Recreation Department, 2008). Deer Creek is mainly in forestry use with some residential uses upstream of Agate Road.

6.5.5 Summary of Key Management Issues

PLACEHOLDER

6.5.6 Reach Analysis

DRAFT

DEER CREEK - REACH 01

SHORELINE LENGTH

3.9 MI

REACH AREA

385.3 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 67% (259 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

2.4% erosion, 3% landslide

LAND COVER (MAP 15)

3% developed, 4 percent agriculture, 34% forest, 3% wetland, 56% floodplain/riparian (GAP, 2009).
Riparian vegetation: 63% forest cover, 11% non-forest, 26% other natural vegetation (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Coastal cutthroat trout, fall Chinook salmon, fall chum salmon, summer chum salmon, coho salmon, winter steelhead trout.
Wetlands -- 142.8 acres (37.1 % of reach); wetland habitat types include estuarine intertidal aquatic bed, estuarine intertidal emergent, palustrine aquatic bed, palustrine forested, and palustrine scrub-shrub

WATER QUALITY (MAP 13)

Listed on Ecology 303(d) as Category 5 for high water temperatures.

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use – Forestry (70%); Residential (22%); and remaining 9% of land uses a mix of Transportation, Vacant, and Agriculture. Ownership – 100% Private.

SHORELINE MODIFICATIONS (MAP 16)

There is one road crossing in the southwest portion of the reach at Agate Rd.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning district – Rural Residential 20 Acres (58%), Rural Residential 5 Acres (18%), Rural Residential 10 Acres (11%), Agriculture Resource Lands (11%), and Rural Commercial 2 (2%). Comprehensive Plan Designations – Rural (87%), Agriculture Resource Lands (11%) and Hamlet (2%).

Existing SED - Conservancy (67%) and Rural (33%).

PUBLIC ACCESS (MAP 14)

There are no mapped parks or public access facilities in the Deer Creek planning area.

IMPERVIOUS SURFACES (MAP 16)

6.7% of the reach contains mapped impervious surfaces. Aerial photos from 2009 show single-family residences and roads, mainly in lower part of reach.

AREAS OF SPECIAL INTEREST

According to the Ecology facilities/sites database, there are no listed facilities or contaminated sites.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a very low to moderate-low probability of finding unknown artifacts within this reach, with a small portion of the reach in a moderate probability zone.

OPPORTUNITY AREAS (MAP 23)

Protect intact riparian areas and associated wetlands.

Restore riparian areas that have been altered by agricultural uses or logging.

KEY MANAGEMENT ISSUES

Protect all reaches.

BENSON LAKE

SHORELINE PERIMETER

1.7 MI

WATERBODY AREA

79.8 AC

REACH AREA

124.1 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 37% (16 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

3.5% erosion, 3.5% landslide

LAND COVER (MAP 15)

58% open water, 1% beach, 40% forest, 1% floodplain/riparian (GAP, 2009).

Riparian vegetation: 16% forest cover, 19% non-forest, 65% water (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Coastal cutthroat trout; water lobelia.

No mapped wetlands.

WATER QUALITY (MAP 13)

Not included on Ecology's 303 (d) list of impaired waters

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use - Residential (91%); remaining 9% is a mix of Parks, Open Space, and Recreation Areas and Vacant. Ownership – 100% Private.

SHORELINE MODIFICATIONS (MAP 16)

According to 2009 aerial imagery, there are individual docks/piers associated with most single-family residences. No other shoreline modifications are mapped.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning districts – County: 100% Rural Residential 5 Acres. Comprehensive Plan Designations – 100% Rural.

Existing SED – 100% Urban Residential.

PUBLIC ACCESS (MAP 14)

There is a WDFW concrete boat launch with associated parking that provides access to Benson Lake. The total park size is about 79 acres (Washington Department of Fish and Wildlife WDFW Lands, 2011; Mason County Department of Parks and Trails, 2006).

IMPERVIOUS SURFACES (MAP 16)

3.4% of the reach contains mapped impervious surfaces (NOAA CCAP, 2006). Aerial photos from 2009 show single-family residences along most of the lake shore.

AREAS OF SPECIAL INTEREST

According to the Ecology facilities/sites database, there are no listed facilities or contaminated sites.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a very low probability of finding unknown artifacts within this reach.

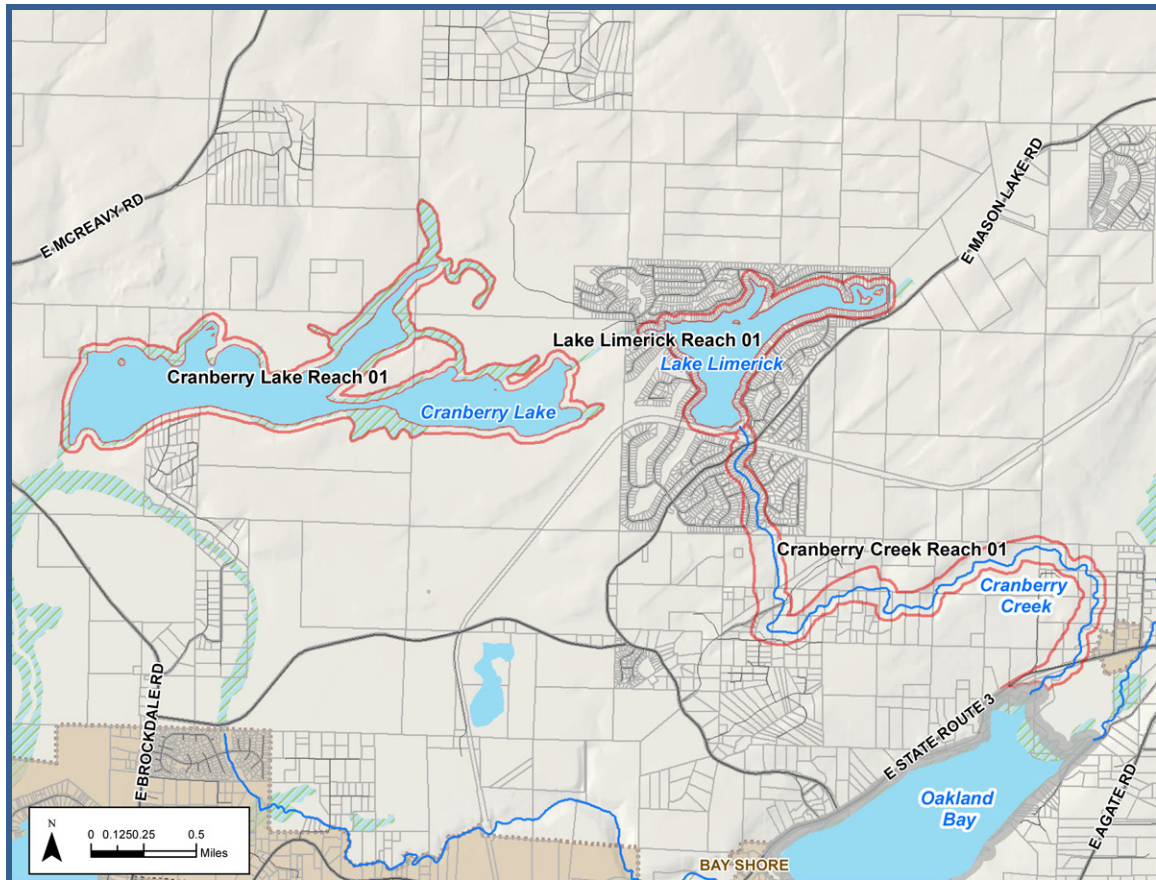
OPPORTUNITY AREAS (MAP 23)

Reduce number of docks over time by considering joint use docks

KEY MANAGEMENT ISSUES

Overwater structures and dock proliferation.

6.6 Cranberry Creek and Tributaries (Cranberry Lake, Lake Limerick)



6.6.1 Physical Characterization and Modifications

The Cranberry Creek drainage basin has been extensively logged and converted to Christmas tree farms. Cranberry Creek flows approximately 9.7 miles, including areas upstream and downstream of Cranberry and Limerick Lakes, before draining into the northern portion of Oakland Bay. Cranberry Lake is surrounded by about 96 acres of springs and marshes. Intermittent streams flow into the lake from bog lakes located up to a mile northward. Lake Limerick is located about five miles northeast of Shelton, at RM 3.5 of Cranberry Creek, and drains an area of about 13 square miles (Ecology, 2011). Lake Limerick was formed in 1966 by building a 15-foot-high dam on Cranberry Creek and adjacent wetlands (Kuttel, 2002). A fish ladder facilitates passage to the lake.

The Cranberry Creek drainage basin has been extensively modified. Some of the process modifications include:

- Creation of the lake by damming the creek;
- Adjacent logging;
- Culverts; and
- Conversion of pervious to impervious surfaces.

6.6.2 Water Quality

Ten monitoring stations on Cranberry Creek have recorded high water temperatures that exceed Washington State water quality standards. The stream is listed on the 303(d) list of impaired waters (Category 5) for the temperature parameter (Ecology, 2008). No other water quality impairments have been identified at this time.

Ecology has prepared a quality assurance project plan (QAPP) with respect to the Total Maximum Daily Load (TMDL) for Oakland Bay-Hammersley Inlet and associated tributaries with respect to temperature. Cranberry Creek is included in this report (Ecology, 2005).

Cranberry Lake and Lake Limerick are not included on Ecology's 303 (d) list of impaired waters except for possible impairments in Lake Limerick associated with Brazilian elodea (*Egeria densa*) and swollen bladderwort. Lake Limerick is a nutrient rich, meso-eutrophic lake with an extensive aquatic plant community (Washington State Department of Ecology, 1997) that is currently managed under an IAVMP. No other data were identified for Cranberry Lake and Lake Limerick.

6.6.3 Critical or Priority Habitat and Species

Cranberry Creek

Cranberry Creek drains to Oakland Bay and is documented to support many species of priority fish (WDFW, 2010; Table 6-6).

Table 6-6. Priority fish species documented for Cranberry Creek, Cranberry Lake, Lake Limerick

Common Name	Scientific Name	Habitat Use	Federal Listing	State Listing
Coastal cutthroat trout	<i>Oncorhynchus clarki clarki</i>	Migration/Spawning	~	~
fall Chinook salmon (Cranberry Creek only)	<i>Oncorhynchus tshawytscha</i>	Migration	T	Candidate
fall Chum salmon	<i>Oncorhynchus keta</i>	Spawning (Cranberry Creek and only) and Migration	~	~
summer Chum salmon	<i>Oncorhynchus keta</i>	Spawning (Cranberry Creek and only) and Migration (Cranberry Lake and Lake Limerick only)	T	Candidate
Coho salmon	<i>Oncorhynchus kisutch</i>	Spawning (Cranberry Creek and only) and Migration (Cranberry Lake and Lake Limerick only)	Concern	~
Rainbow trout	<i>Oncorhynchus mykiss</i>	Migration/Spawning	~	~
winter Steelhead trout	<i>Oncorhynchus mykiss</i>	Migration/Spawning	T	~

No wetlands have been mapped in the vicinity of Cranberry Creek (NWI, 1989). No priority species occurrences have been mapped in the vicinity of the stream, and the WDNR NHP has not identified priority plant species or vegetation communities within the Cranberry Creek shoreline planning area (WDFW, 2010; WDNR, 2009).

Cranberry Lake

Several priority fish species have been mapped to occur in Cranberry Lake (WDFW, 2010; Table 6-6). Approximately 167.1 acres of wetland (62.3 percent of the reach) is mapped in the vicinity of Cranberry Lake (NWI, 1989). Wetland habitat has not been impacted by direct development, but is surrounded by logged areas and some residential development. Priority species occurrences that have been mapped in the area of the lake include bald eagle and osprey (WDFW, 2010).

Wetland habitat associated with Cranberry Lake is considered high quality. The WDNR NHP has identified the following priority wetland vegetation communities within the Cranberry Lake shoreline planning area (WDNR, 2009):

- 37 acres of Bog Labrador-Tea-Bog-Laurel/Sphagnum Spp.;
- 98.6 acres of Low Elevation Freshwater Wetland;
- 37.1 acres of Low Elevation Sphagnum Bog;
- 98.6 acres of Mountain, Sitka Alder / Skunk Cabbage - Water-parsley; and
- 37.1 acres of Shore Pine / Bog Labrador-Tea / Sphagnum Spp.

Lake Limerick

Many priority fish species have been documented in Lake Limerick since it drains to Cranberry Creek, which empties to Oakland Bay (WDFW, 2010; Table 6-6).. Lake Limerick has approximately 3.8 acres of wetland mapped in the adjacent area, representing 3.9 percent of the reach (NWI, 1989). Much of the area surrounding the lake contains residential development. No priority species occurrences have been mapped in the vicinity of the lake, and the WDNR NHP has not identified priority plant species or vegetation communities within the Lake Limerick shoreline planning area (WDFW, 2010; WDNR, 2009).

6.6.4 Land Use

Cranberry Creek is a mix of forestry, residential and open space uses. Cranberry Lake is almost entirely in forestry use with limited development. Lake Limerick is mostly developed with residences and has numerous docks/piers. There is a WDFW boat launch near East Mason Lake Road on the south side of the lake (Mason County Parks and Recreation Department, 2008). See reach sheet for a summary of land use information.

6.6.5 Summary of Key Management Issues

PLACEHOLDER

6.6.6 Reach Analysis

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CRANBERRY CREEK - REACH 01

SHORELINE LENGTH

3.9 MI

REACH AREA

258.6 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 64% (165 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

7.4% erosion, 30.2% landslide

LAND COVER (MAP 15)

1% developed, 83% forest, 1% wetland, 15% floodplain/riparian (GAP, 2009).

Riparian vegetation: 73% forest cover, 12% non-forest, 15% other natural vegetation (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Coastal cutthroat trout, fall Chinook salmon, fall chum salmon, summer chum salmon, coho salmon, rainbow trout, winter steelhead trout.

No wetlands mapped.

WATER QUALITY (MAP 13)

TMDL quality assurance project plan for temperature

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use – Residential (33%); Vacant (33%). Forestry (29%); and remaining 5% is a mix of Agriculture; Parks, Open Space, and Recreation Areas; and Transportation. Ownership – 100% Private.

SHORELINE MODIFICATIONS (MAP 16)

There are 3 crossings in the northwest and southeast portions of the reach: Mason Lake Dr, Navy Railway, and SR 3.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning districts – Rural Residential 5 Acres (95%) and remaining 5% is a mix of Agriculture Resource Lands and Rural Residential 20 Acres. Comprehensive Plan Designations – Rural (96%) and Agricultural Resource Lands (4%). Existing SED – 100% Conservancy.

PUBLIC ACCESS (MAP 14)

There are no mapped parks or public access facilities in Cranberry Creek Reach 01.

IMPERVIOUS SURFACES (MAP 16)

4.9% of the reach contains mapped impervious surfaces. Aerial photos from 2009 show single-family residences and roads, particularly in the upper part of the reach.

AREAS OF SPECIAL INTEREST

According to the Ecology facilities/sites database, there are no listed facilities or contaminated sites.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a very low probability of finding unknown artifacts within this reach.

OPPORTUNITY AREAS (MAP 23)

Restore forested riparian zones where impacted by logging.

Restore associated wetlands, especially those near the Tacoma Power right of way.

KEY MANAGEMENT ISSUES

Increase LWD in lower reach.

LAKE LIMERICK

SHORELINE PERIMETER

4.4 MI

WATERBODY AREA

132.0 AC

REACH AREA

227.3 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 32% (31 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

No listed erosion or landslide areas

LAND COVER (MAP 15)

6% developed, 48% open water, 2% beach, 36% forest, 1% wetland, 6% floodplain/riparian (GAP, 2009).

Riparian vegetation: 19% forest cover, 20% non-forest, 1% other natural vegetation, 59% water (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Coastal cutthroat trout, fall chum salmon, summer chum salmon, coho salmon, rainbow trout, winter steelhead trout.

Wetlands – 3.8 acres (3.9% of reach); wetland habitat types include lacustrine littoral unconsolidated shore, palustrine aquatic bed, palustrine forested, and palustrine scrub-shrub.

WATER QUALITY (MAP 13)

Not included on Ecology's 303 (d) list of impaired waters; Brazilian elodea and swollen bladderwort infestations managed under an integrated aquatic vegetation management plan

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use - Residential (80%); Parks, Open Space, and Recreation Areas (10%); Vacant (8%); and Forestry (2%). Ownership – 100% Private.

SHORELINE MODIFICATIONS (MAP 16)

There are 2 road crossings in the western portion of the reach; Access Area Rd and E St Andrews Dr. A dam is located in the southern portion of the reach. There are numerous docks and piers visible via 2009 aerial imagery and one public boat launch.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning districts – Rural Residential: 5 Acres (92%) and remaining 8% is a mix of Rural Residential 20 Acres and Rural Tourist. Comprehensive Plan Designations – 100% Rural. SED – 100% Urban Residential.

PUBLIC ACCESS (MAP 14)

There is a WDFW concrete boat launch with associated parking that provides access to Lake Limerick. The total park size is about 0.5 acres (Washington Department of Fish and Wildlife WDFW Lands, 2011; Mason County Department of Parks and Trails, 2006).

IMPERVIOUS SURFACES (MAP 16)

20.8% of the reach contains mapped impervious surfaces (NOAA CCAP, 2006). Aerial photos from 2009 show single-family residences and roads along most of the lake shore.

AREAS OF SPECIAL INTEREST

According to the Ecology facilities/sites database, there are no listed facilities or contaminated sites.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a moderate to low probability of finding unknown artifacts within this reach.

OPPORTUNITY AREAS (MAP 23)

Reduce number of docks over time by considering joint use docks

KEY MANAGEMENT ISSUES

Maintain cold temperatures in lake discharge.

CRANBERRY LAKE

SHORELINE PERIMETER

8.6 MI

WATERBODY AREA

397.5 AC

REACH AREA

665.7 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 21% (56 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

1.1% erosion, 1.8% landslide

LAND COVER (MAP 15)

14% open water, 16% forest, 61% wetland, 9% floodplain/riparian (GAP, 2009).
Riparian vegetation: 55% forest cover, 17% other natural vegetation, 27% water (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Coastal cutthroat trout, fall chum salmon, summer chum salmon, coho salmon, rainbow trout, winter steelhead trout.

Bald eagle and osprey; several rare plant communities (see text.).

High quality wetlands –167.1 acres (62.3% of reach); wetland habitat types include lacustrine littoral aquatic bed, palustrine emergent, palustrine forested, and palustrine scrub-shrub.

WATER QUALITY (MAP 13)

Not included on Ecology's 303 (d) list of impaired waters

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use - Forestry (96%) and remaining 4% are a mix of Parks, Open Space, and Recreation Areas and Residential. Ownership – 100% Private.

SHORELINE MODIFICATIONS (MAP 16)

No shoreline modifications are mapped in the reach.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning districts – Rural Residential 20 Acres (96%) and Rural Residential 5 Acres (4%). Comprehensive Plan Designations – 100% Rural.
Existing SED - Natural (50%) and Rural (50%).

PUBLIC ACCESS (MAP 14)

There are no mapped parks or public access points to Cranberry Lake.

IMPERVIOUS SURFACES (MAP 16)

No impervious surfaces are mapped in this reach (NOAA CCAP 2006). Aerial photos from 2009 show minor roads and no other development in the area.

AREAS OF SPECIAL INTEREST

According to the Ecology facilities/sites database, there are no listed facilities or contaminated sites.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a low to moderate probability of finding unknown artifacts within this reach.

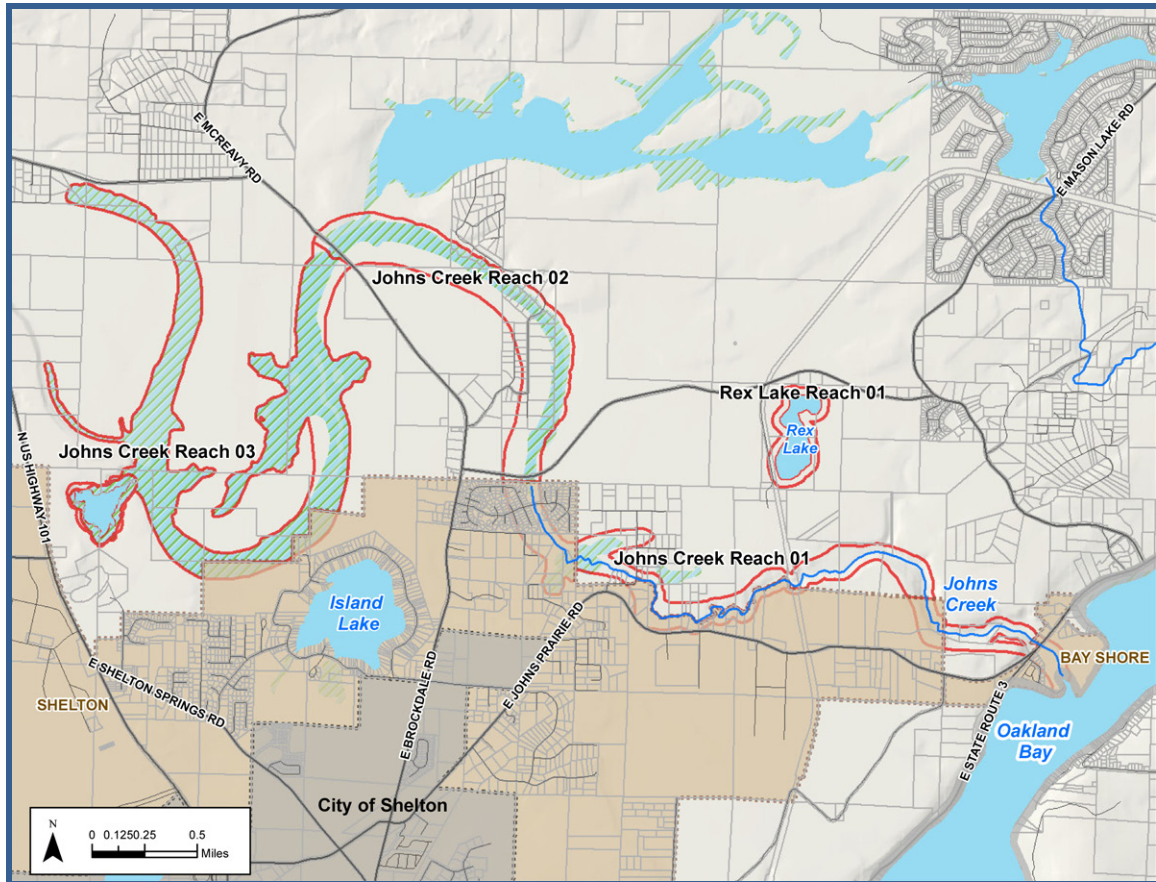
OPPORTUNITY AREAS (MAP 23)

Restore forested riparian zone where impacted by timber harvest.
Restore forested riparian area surrounding associated wetlands.
Protect high value wetlands.

KEY MANAGEMENT ISSUES

Control aquatic invasive species.

6.7 Johns Creek, Johns Lake, and Rex Lake



6.7.1 Physical Characterization and Modifications

The headwaters of Johns Creek include a large wetland complex that extends upstream to just east of SR 101. Johns Creek flows 8.3 miles to Oakland Bay at Bayshore. The upper Johns Creek watershed includes wetlands bordered by Christmas tree farms. The lower watershed includes deciduous and coniferous trees. Some channelization and bank armoring occur in a residential area near RM 3.5.

The Wiley Mill was built at the mouth of Johns Creek in 1871. The Hama Hama Logging Company started operating adjacent to Johns Creek in 1922. Six culverts were built on Johns Creek. Rex Lake has no outlet and is located 0.4 miles north of the lower reach of Johns Creek (i.e. JOHN_CR_01).

The Johns Creek drainage basin has been extensively modified by humans. Some of the process modifications include:

- Land conversion from pervious to impervious surfaces;
- Logging adjacent to the creek; and
- Channelization and bank armoring.

6.7.2 Water Quality

One monitoring station on Johns Creek has recorded high fecal coliform bacteria concentrations, and 16 monitoring stations have recorded high water temperatures that exceed Washington State water quality standards. The stream is listed on the 303(d) list of impaired waters (Category 5 water) for the temperature parameter (Ecology, 2008). Category 5 listings require the preparation of a TMDL to address water quality concerns. In addition, Johns Creek is also listed as a Category 4C water for instream flow. Category 4C waters are those waters impaired by a non-pollutant (Ecology, 2008).

Ecology has initiated a temperature TMDL for Oakland Bay-Hammersley Inlet and associated tributaries. Johns Creek is included in this report (Ecology, 2005).

Rex Lake is not included on Ecology's 303(d) list of impaired waters. No other water quality assessment or aquatic plant management plan was identified.

6.7.3 Critical or Priority Habitat and Species

Johns Creek

Johns Creek drains to Oakland Bay and supports many priority fish species (WDFW, 2010; Table 6-7). Summer chum stocks were supplemented with hatchery production from Johns Creek Hatchery, until 1997 when the program was discontinued (Washington Department of Fish and Wildlife and Western Washington Treaty Tribes 1994 as cited in Kuttel, 2002).

Table 6-7. Priority fish species documented for Johns Creek (Reaches 1, 2, 3)

Common Name	Scientific Name	Habitat Use	Federal Listing	State Listing
Coastal cutthroat trout	<i>Oncorhynchus clarki clarki</i>	Migration/Spawning	~	~
fall Chinook salmon	<i>Oncorhynchus tshawytscha</i>	Migration	T	Candidate
fall Chum salmon	<i>Oncorhynchus keta</i>	Migration/Spawning	~	~
summer Chum salmon	<i>Oncorhynchus keta</i>	Migration/Spawning	T	Candidate
Coho salmon	<i>Oncorhynchus kisutch</i>	Spawning (Reach 1 only) and Migration	Concern	~
winter Steelhead trout	<i>Oncorhynchus mykiss</i>	Migration/Spawning	T	~
Olympic mudminnow (Reach 2 only)	<i>Novumbra hubbsi</i>	Migration/Spawning	~	Sensitive

Low in-stream flows have been recorded for Johns Creek by Washington State Department of Ecology and the Squaxin Island Tribe. There is concern over impacts to flow and instream habitat resulting from groundwater drawdown due to the installation of new residential water wells.

Wetland habitat has been impacted to differing extents along the Johns Creek shoreline. Reach 1 has approximately 28.1 acres of wetland mapped, representing 9.6 percent of the reach. This reach flows through industrial and residential areas and a golf course. Reach 2 flows through residential and logged areas and has approximately 84.6 acres (33.6 percent of the reach) mapped as wetland. Reach 3

has approximately 439.8 acres of wetland documented, representing 87.7 percent of the reach, and flows through logged areas (NWI, 1989).

The WDNR NHP has not identified priority plant species or vegetation communities within the Johns Creek shoreline planning area (WDNR, 2009).

Rex Lake

Rex Lake does not support any priority fish species (WDFW, 2010). Approximately 5.4 acres of wetland are mapped in the vicinity of Rex Lake, representing 16.9 percent of the reach (NWI, 1989). No priority species occurrences have been mapped in the vicinity of the lake, and the WDNR NHP has not identified priority plant species or vegetation communities within the Rex Lake shoreline planning area (WDFW, 2010; WDNR, 2009).

6.7.4 Land Use

Land uses along Johns Creek and Johns Lake are mostly forestry. There are some residential uses focused mostly in Shelton's Urban Growth Area (UGA). Rex Lake is entirely in forestry use with no mapped shoreline modifications.

6.7.5 Land Cover

On Johns Creek, development decreases moving upstream from Reach 1 to Reach 3, while floodplain/riparian area increases (GAP, 2009). The downstream reaches are primarily forested (Reach 1, 66 percent; Reach 2, 51 percent), despite residential and industrial development. Rex Lake is largely undeveloped. Approximately 19 percent is mapped as floodplain/riparian (GAP, 2009).

6.7.6 Summary of Key Management Issues

PLACEHOLDER

6.7.7 Reach Analysis

JOHNS CREEK - REACH 01

SHORELINE LENGTH

3.7 MI

REACH AREA

291.5 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 61% (177 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

43.3% landslide

LAND COVER (MAP 15)

13% developed, 66% forest, 5% wetland, 16% floodplain/riparian (GAP, 2009).
Riparian vegetation: 59% forest cover, 26% non-forest, 15% other natural vegetation (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Coastal cutthroat trout, fall Chinook salmon, fall chum salmon, summer chum salmon, coho salmon, winter steelhead trout, Olympic mudminnow.

Wetlands – 28.1 acres (9.6% of reach); wetland habitat types include palustrine forested and palustrine scrub-shrub.

WATER QUALITY (MAP 13)

High fecal coliform concentrations; TMDL quality assurance project plan for temperature.

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use – Forestry (36%); Residential (28%); Agriculture (9%); Industrial (9%); Parks, Open Space, and Recreation Areas (8%); Vacant (7%); and remaining 5% is a mix of Aquaculture, Commercial and Transportation. Ownership – 100% Private.

SHORELINE MODIFICATIONS (MAP 16)

There are 3 road crossings in the northwest and eastern portions of the reach; Oak Way Rd, an unnamed road, and Johns Creek Dr. A dam is located in the southeastern portion of the reach.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning districts - County: Rural Residential 5 Acres (34%), Rural Natural Resource (13%), Agriculture Resource Lands (10%), Rural Tourist (5%); Shelton UGA: Industrial (9%), Mixed Use (6%), Commercial Industrial (3%), and Bay Shore hamlet: Rural Tourist (5%) and Rural Residential 5 Acres (2%). Comprehensive Plan Designations – Rural (74%). Agricultural Resource Lands (15%), and Hamlet (11%). Existing SED - Rural (78%) and Urban Residential (22%).

PUBLIC ACCESS (MAP 14)

There are no mapped parks or public access in Johns Creek Reach 1.

IMPERVIOUS SURFACES (MAP 16)

22.4% of the reach contains mapped impervious surfaces; most of this is low-intensity developed or developed open space (NOAA CCAP, 2006). Aerial photos from 2009 show single-family residences, roads, and industrial areas in the western section of the reach.

AREAS OF SPECIAL INTEREST

According to the Ecology facilities/sites database, there are no listed facilities or contaminated sites.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a moderate-low to moderate-high probability of finding unknown artifacts within this reach, with a small portion of the reach in a high probability zone.

OPPORTUNITY AREAS (MAP 22)

Restore forested riparian zones where altered by timber harvest and clear-cutting.
Protect high value associated wetlands along Johns Creek.
Protect tributary streams which contribute to flow.
Protect intact forested riparian zone surrounding Johns Lake.
Add LWD in canyon area.
Restore hatchery site.

KEY MANAGEMENT ISSUES

Water quality impairments include low instream flow.
Consider retiring Bay Shore water right.
Protect and restore Bay Shore Golf Course.
Protect cold water tributary habitat and flows.

JOHNS CREEK - REACH 02

SHORELINE LENGTH

Not available

REACH AREA

251.9 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 80% (202 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

4.5% erosion, 4.5% landslide

LAND COVER (MAP 15)

1% developed, 51% forest, 4% wetland, 45% floodplain/riparian (GAP, 2009).

Riparian vegetation: 43% forest cover, 18% non-forest, 38% other natural vegetation, 1% water (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Coastal cutthroat trout, coho salmon, winter steelhead trout; Olympic mudminnow.

Wetlands -- 84.6 acres (33.6% of reach); wetland habitat types include palustrine emergent, palustrine forested, and palustrine scrub-shrub.

WATER QUALITY (MAP 13)

High fecal coliform concentrations; TMDL quality assurance project plan for temperature.

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use - Forestry (66%); Residential (28%); and remaining 7% is a mix of Vacant and Transportation. Ownership – 100% Private.

SHORELINE MODIFICATIONS (MAP 16)

There are 3 road crossings in the northwest, central, and eastern portions of the reach: Brockdale Rd, Jensen Rd, and McEwan Prairie Rd.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning districts - Rural Residential 20 Acres (63%) and Rural Residential 5 Acres (37%). Comprehensive Plan Designations – 100% Rural. Existing SED – 100% Rural.

PUBLIC ACCESS (MAP 14)

There are no mapped park or public access facilities in Johns Creek Reach 2.

IMPERVIOUS SURFACES (MAP 16)

2.5% of the reach contains mapped impervious surfaces (NOAA CCAP 2006). Aerial photos from 2009 show single-family residences and roads, mainly in the lower part of the reach.

AREAS OF SPECIAL INTEREST

According to the Ecology facilities/sites database, there are no listed facilities or contaminated sites.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a moderate to low probability of finding unknown artifacts within this reach.

OPPORTUNITY AREAS (MAP 23)

Restore forested riparian zones where altered by timber harvest and clear-cutting.
Protect high value associated wetlands along Johns Creek.
Protect tributary streams which contribute to flow.

KEY MANAGEMENT ISSUES

JOHNS CREEK - REACH 03

SHORELINE LENGTH

Not available

REACH AREA

518.1 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 54% (273 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

0.2% erosion, 1.4% landslide

LAND COVER (MAP 15)

2% open water, 15% forest, 8% wetland, 75% floodplain/riparian (GAP, 2009).

Riparian vegetation: 54% forest cover, 1% non-forest, 40% other natural vegetation, 5% water (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Coastal cutthroat trout, coho salmon, winter steelhead trout.

Wetlands – 439.8 acres (87.7% of reach); wetland habitat types include palustrine emergent, palustrine forested and palustrine scrub-shrub.

WATER QUALITY (MAP 13)

High fecal coliform concentrations; TMDL quality assurance project plan for temperature.

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use - Forestry (98%) and Residential (2%).
Ownership – 100% Private

SHORELINE MODIFICATIONS (MAP 16)

There is one road crossing in the southeast portion of the reach at Powerline Rd.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning districts - County: Rural Residential: 20 Acres (90%) and remaining 5% are a mix of Rural Residential 10 Acres, Rural Residential 5 Acres and Water and Shelton UGA: Neighborhood Residential (5%). Comprehensive Plan Designations – 100% Rural.

PUBLIC ACCESS (MAP 14)

There are no mapped parks or public access facilities in Johns Creek Reach 3.

Existing SED – Not designated.

IMPERVIOUS SURFACES (MAP 16)

Less than 1% of the reach contains mapped impervious surfaces. Aerial photos from 2009 show a few roads but no other development in this reach.

AREAS OF SPECIAL INTEREST

According to the Ecology facilities/sites database, there are no listed facilities or contaminated sites.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a moderate to high probability of finding unknown artifacts within this reach, with a small portion of the reach in a very high probability zone.

OPPORTUNITY AREAS (MAP 23)

Protect high quality wetlands associated with Johns Creek.
Restore riparian areas altered by timber harvest.
Protect tributary streams which contribute to flow.
Protect intact forested riparian zone surrounding Johns Lake.

KEY MANAGEMENT ISSUES

Protect Johns Lake.

REX LAKE

SHORELINE PERIMETER

1.2 MI

WATERBODY AREA

29.7 AC

REACH AREA

61.7 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 29% (9 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

No listed erosion or landslide areas

LAND COVER (MAP 15)

1% developed, 16% forest, 65% wetland, 19% floodplain/riparian (GAP, 2009).

Riparian vegetation: 35% forest cover, 2% non-forest, 63% other natural vegetation (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

5.4 acres of palustrine scrub-shrub wetland (16.9% of reach).

WATER QUALITY (MAP 13)

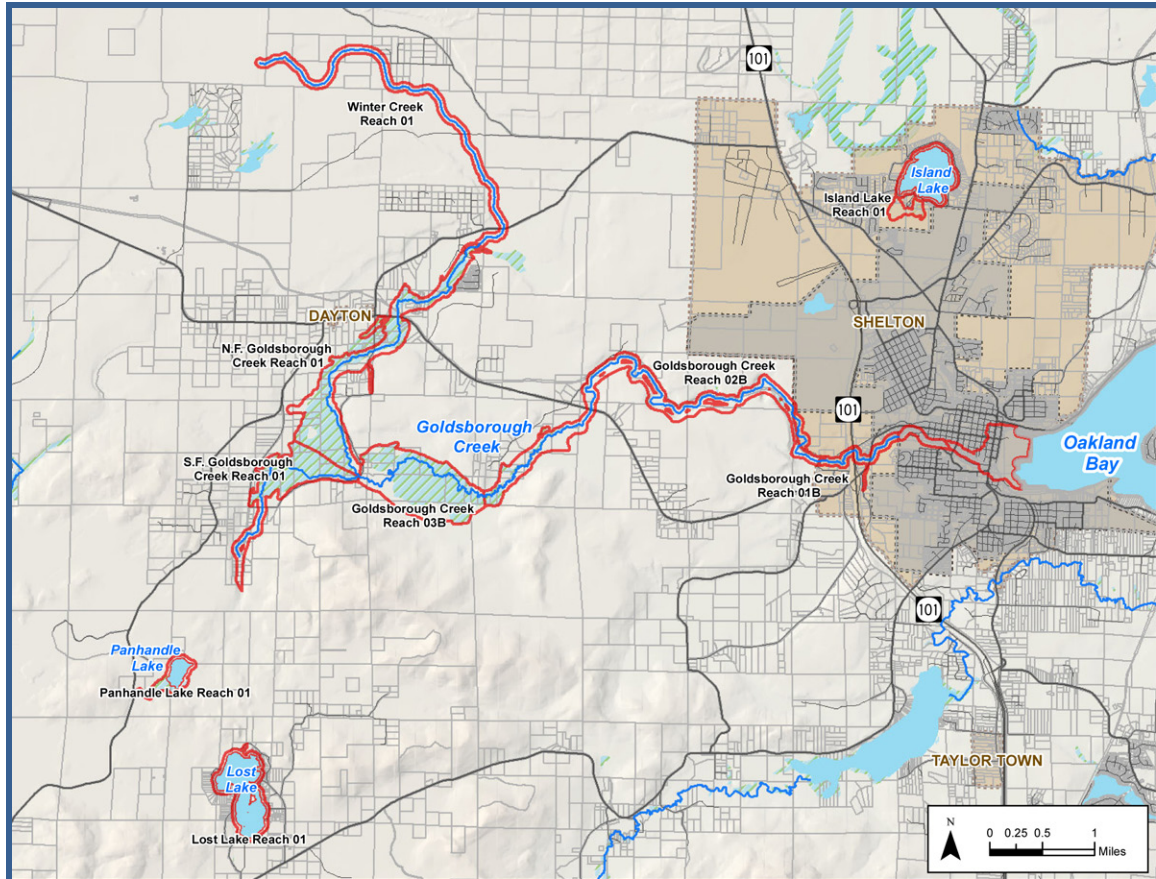
Not included on Ecology's 303 (d) list of impaired waters

BUILT ENVIRONMENT AND LAND USE	
EXISTING LAND USES AND OWNERSHIP (MAP 18) Land Use – 100% Forestry. Ownership – 100% Private.	SHORELINE MODIFICATIONS (MAP 16) No shoreline modifications exist in the reach.
ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21) Zoning districts - County: 100% Rural Residential 20 Acres. Comprehensive Plan Designations – 100% Rural. Existing SED – Not designated.	PUBLIC ACCESS (MAP 14) There are no mapped parks or public access facilities in the Rex Lake shoreline.
IMPERVIOUS SURFACES (MAP 16) 1.4% of the reach contains mapped impervious surfaces (NOAA CCAP, 2006). Aerial photos from 2009 show a railroad crossing at the SW part of the reach.	AREAS OF SPECIAL INTEREST According to the Ecology facilities/sites database, there are no listed facilities or contaminated sites.
CULTURAL AND ARCHAEOLOGICAL RESOURCES There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a moderate to low probability of finding unknown artifacts within this reach.	

OPPORTUNITY AREAS (MAP 23)

KEY MANAGEMENT ISSUES

6.8 Goldsborough Creek and Tributaries (Island Lake, North Fork, South Fork, Winter Creek, Panhandle Lake, Lost Lake)



6.8.1 Physical Characterization and Modifications

The Goldsborough Creek drainage basin contains about 14.0 miles of stream. The headwaters of Goldsborough Creek include springs, surface drainage, small lakes, and tributaries. The stream drains to Oakland Bay within the City of Shelton.

Island Lake is located 2.5 miles north of Shelton, 0.2 miles southeast of the upper reach of Johns Creek (JOHN_CR_03) and drains via a wetland system to Goldsborough Creek (Ecology, 2011).

The South Fork of Goldsborough Creek begins about three miles south of Dayton. Panhandle Lake is located at the headwaters of the South Fork. The South Fork drainage consists primarily of marshlands with mixed deciduous and coniferous forest on nearby hills. Lost Lake is about 120 acres in area, located about 8 miles southwest of Shelton, and drains to the South Fork of Goldsborough Creek. The lake has a drainage basin area of 1 square mile (Ecology, 2011).

The North Fork of Goldsborough Creek begins about two miles northeast of Dayton. Winter Creek joins the North Fork, about one mile north of Dayton. The North Fork drainage consists primarily of shallow gradient plateaus with second growth conifers (Kuttel, 2002). The Winter Creek drainage consists of rolling plateaus with second growth conifers.

The Goldsborough Creek drainage basin has been modified by humans. Some of the process modifications include:

- Land conversion from pervious to impervious surfaces;
- Logging adjacent to the creek;
- Railroad lines limiting channel migration; and
- Use of dams, culverts and weirs to change flow patterns.

Flood control projects to support development have disconnected the Goldsborough Creek floodplain in much of the area from RM 0 to RM 2. The railroad line limits channel migration from about RM 2 to RM 4.5.

Historically, dams have changed flow patterns in Goldsborough Creek. In the past 35 years, two of the major dams on the creek were removed. The dam located at RM 5.2 was removed by 1975. The Goldsborough Dam, which was located at Goldsborough Creek RM 2.3, was removed in the fall of 2001 (Kuttel, 2002). A series of weirs were installed to convert the gradient of the streambed to more natural conditions.

6.8.2 Water Quality

One monitoring station on Goldsborough Creek, Reach 1B, has recorded high water temperatures that exceed Washington State water quality standards. The stream is listed on the 303(d) list of impaired waters (Category 5) for the temperature and fecal coliform bacteria parameter (Ecology, 2008). However, the 303(d) listed reach for fecal coliform bacteria lies within the City of Shelton and is associated with the inner Shelton Harbor. Reaches 1B and 2B are also identified as a Category 4C water for instream flow. Category 4C waters indicate impairment by a non-pollutant (Ecology, 2008). Reaches 1B and 2B are also listed as Category 2 waters for temperature. Category 2 waters show evidence of water quality problems.

Ecology has prepared a QAPP for fecal coliform bacteria with respect to the TMDL for Oakland Bay-Hammersley Inlet and associated tributaries to address fecal coliform bacteria. Goldsborough Creek is included in this report (Ecology, 2004).

North Fork Goldsborough Creek, South Fork Goldsborough Creek, and Winter Creek are not listed on Ecology's 303 (d) of impaired waters (Ecology, 2008).

Panhandle Lake and Lost Lake are not included on Ecology's 303 (d) list of impaired waters. No water quality data or assessments were identified for Panhandle Lake and Lost Lake.

Island Lake is not included on Ecology's 303 (d) list of impaired waters, but may have impairments due to the presence of Eurasian watermilfoil. No water quality data were identified for more recent years.

6.8.3 Critical or Priority Habitat and Species

Goldsborough Creek

Priority fish species documented in the Goldsborough Creek reaches discussed in this document include the following (WDFW, 2010; Table 6-8).

Table 6-8. Priority fish species documented for Goldsborough Creek (Reaches 1B, 2B, 3B), North Fork Goldsborough Creek, and South Fork Goldsborough Creek

Common Name	Scientific Name	Habitat Use	Federal Listing	State Listing
Coastal cutthroat trout	<i>Oncorhynchus clarki clarki</i>	Migration/Spawning	~	~
fall Chinook salmon (Goldsborough Creek reaches 1B and 2B only)	<i>Oncorhynchus tshawytscha</i>	Presence/Migration	T	Candidate
fall Chum salmon	<i>Oncorhynchus keta</i>	Spawning (Reach 1B only) and Migration	~	~
Coho salmon	<i>Oncorhynchus kisutch</i>	Spawning (Reaches 1B, 2B, 3B, North Fork Goldsborough Creek only) and Migration	Concern	~
winter Steelhead trout	<i>Oncorhynchus mykiss</i>	Spawning (Reaches 1B and 2B only) and Migration	T	~

The removal of Goldsborough Dam in 2001 may increase fall chum, coho, and winter steelhead escapement by providing access to additional instream habitat. Significant coho escapements have been documented in the stream, while fall Chinook escapements are significantly less (Kuttel, 2002).

In total, the three stream reaches contain 305.4 acres of mapped wetland (37.8 percent of the total reach area) (NWI, 1989).

Reach 3B is a wide, open stretch of stream with little associated development. The stream is more incised and development occurs in close proximity along the downstream reaches, closer to the City of Shelton.

Island Lake

No priority fish species are mapped in Island Lake (WDFW, 2010). Island Lake has approximately 29.5 acres of wetland (38.4% of the reach). No priority species occurrences have been mapped in the vicinity of the lake, and the WDNR NHP has not identified priority plant species or vegetation communities within the Island Lake shoreline planning area (WDFW, 2010; WDNR, 2009).

North Fork Goldsborough Creek

North Fork Goldsborough Creek is mapped as supporting several species of priority fish (WDFW, 2010; Table 6-8). Approximately 312.0 acres of wetland (representing 79.1 percent of the reach) has been mapped adjacent to the stream; this area has limited impacts from development. No other priority species occurrences have been mapped in the vicinity of the creek, and the WDNR NHP has not identified priority plant species or vegetation communities within the North Fork Goldsborough Creek shoreline planning area (WDFW, 2010; WDNR, 2009).

South Fork Goldsborough Creek

Several priority fish species have been documented in South Fork Goldsborough Creek (WDFW, 2010; Table 6-8). Approximately 155.5 acres of wetland, representing 70.3 percent of the reach, has been mapped in the reach (NWI, 1989). Wetland habitat is narrow and forested at the upstream portion of the reach and broad and open downstream. Great blue heron, a priority species, is known to occur in the vicinity of the stream (WDFW, 2010). The WDNR NHP has not identified priority plant species or vegetation communities within the South Fork Goldsborough Creek shoreline planning area (WDNR, 2009).

Winter Creek

Winter Creek is mapped as supporting coastal cutthroat trout and coho salmon (WDFW, 2010). Coho salmon are listed as a federal species of concern. Approximately 6.7 acres of wetland have been mapped along the shoreline of Winter Creek, representing 3.3 percent of the reach (NWI, 1989). Logging has taken place along the entire stream reach, impacting wetland habitat. No other priority species occurrences have been mapped in the vicinity of the stream, and the WDNR NHP has not identified priority plant species or vegetation communities within the Winter Creek shoreline planning area (WDFW, 2010; WDNR, 2009).

Panhandle Lake

Costal cutthroat trout have a documented presence in Panhandle Lake (WDFW, 2010). Approximately 22.6 acres of wetland (57.0 percent of the reach) is mapped in the shoreline (NWI, 1989), much of which is located southwest of the lake. No priority species occurrences have been mapped in the vicinity of the lake, and the WDNR NHP has not identified priority plant species or vegetation communities within the Panhandle Lake shoreline planning area (WDFW, 2010; WDNR, 2009).

Lost Lake

No priority fish species are documented in Lost Lake (WDFW, 2010). The Lost Lake shoreline has approximately 4.4 acres of wetland, representing 6.3 percent of the reach. Residential development surrounds much of the lake. An osprey priority species occurrence is mapped in the vicinity of Lost Lake (WDFW, 2010). The WDNR NHP has not identified priority plant species or vegetation communities within the Lost Lake shoreline planning area (WDNR, 2009).

6.8.4 Land Use

Goldsborough Creek has a mix of forestry, open space and residential uses. Residential homes are concentrated in Shelton's UGA. The North Fork Goldsborough Creek reach is a mix of forestry and residential land uses, while South Fork is a mix of residential and vacant land uses. Residential structures are generally located outside of the shoreline planning area along both forks of the creek. Winter Creek is mostly in forestry use.

Island Lake is mostly developed with residential homes and individual docks/piers. There is a WDFW public boat launch ramp at the south end of the lake (Mason County Parks and Recreation Department, 2008). Panhandle Lake is mainly in open space use, with one area developed for residential uses and docks/piers. There are 20 acres of undeveloped park owned by WDFW near Panhandle Lake (Mason County Department of Parks and Trails, 2006). Lost Lake is a mix of residential and forestry uses. Many residential homes have individual docks/piers. There is a WDFW public boat launch that provides access to the lake (Mason County Parks and Recreation Department, 2008).

6.8.5 Summary of Key Management Issues

PLACEHOLDER

6.8.6 Reach Analysis

This section describes freshwater shoreline reaches within County jurisdiction. The mouth of Goldsborough Creek (Marine Reach 31, Oakland Bay) is discussed in Chapter 5 (South Puget Sound). Goldsborough Creek Reach 1A lies within the city limits of Shelton and will be discussed within the Shelton Shoreline Inventory (ESA, 2011, in progress).

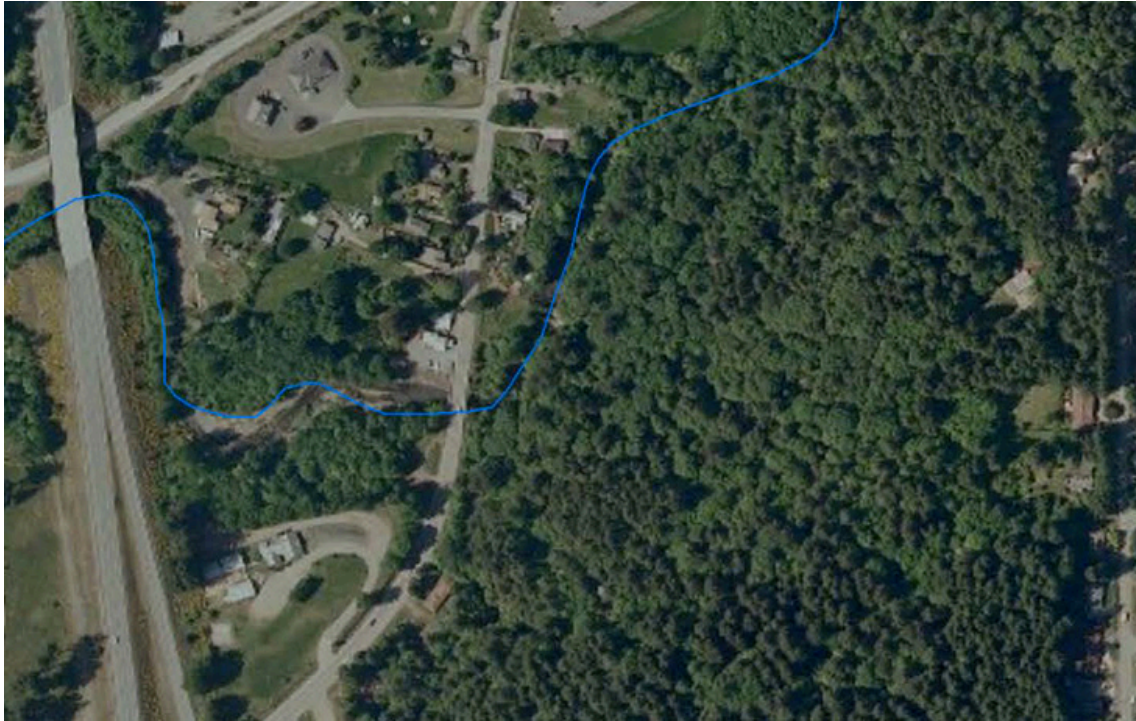
GOLDSBOROUGH CREEK - REACH 01B

SHORELINE LENGTH

1.4 MI

REACH AREA

69.7 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 35% (24 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

19.5% landslide

LAND COVER (MAP 15)

23% developed, 2% agriculture, 35% forest, 2% wetland, 38% floodplain/riparian (GAP, 2009).
Riparian vegetation: 47% forest cover, 28% non-forest, 21% other natural vegetation, 3% water (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Coastal cutthroat trout, fall Chinook salmon, fall chum salmon, coho salmon, winter steelhead trout.
Wetlands -- 2.3 acres (3.3% of reach); wetland habitat types include palustrine emergent and palustrine forested.

WATER QUALITY (MAP 13)

One 303 (d) Category 5 listing for temperature; TMDL for fecal coliform bacteria; Category 4C listing for instream flow.

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use – Forestry (54%); Commercial (19%); Vacant (12%); Residential (10%); and Mining/Transportation (5%). Ownership – 100% Private.

SHORELINE MODIFICATIONS (MAP 16)

There are 2 road crossings in the central and southern portions of the reach at E Deegan Road and U.S. Highway 101. Highway 101 is a bridge crossing.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning Districts - Shelton UGA: Industrial (29%), Neighborhood Residential (27%), Commercial Industrial (23%), General Commercial (10%), and Mixed Use (11%). Comprehensive Plan Designations – 100% City.

Existing SED – 100% Urban Residential.

PUBLIC ACCESS (MAP 14)

There are no mapped parks or public access facilities in Goldsborough Creek Reach 1B.

IMPERVIOUS SURFACES (MAP 16)

37.6% of the reach contains low to moderate levels of impervious surfaces (NOAA CCAP, 2006). Aerial photos from 2009 show most of the development focused in the lower part of the reach.

AREAS OF SPECIAL INTEREST

No listed facilities or contaminated sites.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

The DAHP architectural and archaeological records show three inventoried early historic sites in this reach. Resource mapping suggests there is a very low probability of finding unknown artifacts within this reach, with a small portion of the reach in a low probability zone.

OPPORTUNITY AREAS (MAP 23)

Restoration opportunities have been identified in Combs 2010:

- Remove artificial fill causing channel constriction in the Goldsborough Creek (500 ft upstream of Hwy.101.). Add LWD and riparian vegetation, which are both lacking.
- Stabilize eroding left bank of Goldsborough Creek upstream of Hwy 101 and reduce sediment loss through installation of a crib wall and LWD. (Project #2)
- Restore riparian vegetation along Goldsborough Creek in cooperation with Mason Conservation District.
- Stabilize eroding bank on the Simpson railroad grade and add LWD to create pool habitat.

KEY MANAGEMENT ISSUES

Bank erosion and stability in developed areas.

Water quality issues related to forestry and agricultural uses.

Protect and restore associated wetlands and off channel habitat.

GOLDSBOROUGH CREEK - REACH 02

SHORELINE LENGTH

5.6 MI

REACH AREA

371.7 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 45% (169 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

15.3% landslide

LAND COVER (MAP 15)

2% agriculture, 71% forest, 4% wetland, 22% floodplain/riparian (GAP, 2009).

Riparian vegetation: 63% forest cover, 12% non-forest, 23% other natural vegetation, 1% water (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Coastal cutthroat trout, fall Chinook salmon, fall chum salmon, coho salmon, winter steelhead trout.

Wetlands - 44.6 acres (12.0% of reach); wetland habitat types include palustrine emergent, palustrine forested, and palustrine scrub-shrub.

WATER QUALITY (MAP 13)

TMDL for fecal coliform; Category 4 listing for instream flow.

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use – Forestry (85%); and remaining 15% include a mix of Agriculture, Parks, Open Space and Recreation Areas, Residential, and Vacant; and Transportation. Ownership – 100% Private.

SHORELINE MODIFICATIONS (MAP 16)

W. Shelton-Matlock Road crosses in this reach. There are two additional crossings in the north central portions of the reach at Carman Rd and Simpson Railroad..

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning districts - County: Rural Residential 20 Acres (50%), Long Term Commercial Forest (29%), Agricultural Resource Lands (12%), and Rural Residential 10 Acres and 5 Acres (9%). Comprehensive Plan Designations - Rural (59%), Long Term Commercial Forest (29%) and Agriculture (12%).

Existing SED – Conservancy (94%) and Urban Residential (6%).

PUBLIC ACCESS (MAP 14)

There are no mapped public access facilities to Goldsborough Reach 2B.

IMPERVIOUS SURFACES (MAP 16)

Less than 1% of the reach contains mapped impervious surfaces (NOAA CCAP, 2006). Aerial photos from 2009 show limited development with a few roads in the reach.

AREAS OF SPECIAL INTEREST

According to the Ecology facilities/sites database, there are no listed facilities or contaminated sites.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a low to moderate probability of finding unknown artifacts within this reach.

OPPORTUNITY AREAS (MAP 2)

Restoration opportunities have been identified in Combs 2010:

- Reconnect Goldsborough Creek with off-channel wetlands by installing culverts beneath railroad grade (Project #5).
- Replace perched culverts (define) on tributaries to remove barriers to anadromous fish.
- Restore riparian vegetation near location of former dam.

KEY MANAGEMENT ISSUES

Culverts block fish passage on tributaries and limit spawning habitat.

Bank erosion and stability in developed areas.

Water quality issues related to forestry, agricultural, and rural residential uses.

Protect and restore associated wetlands and off-channel habitat.

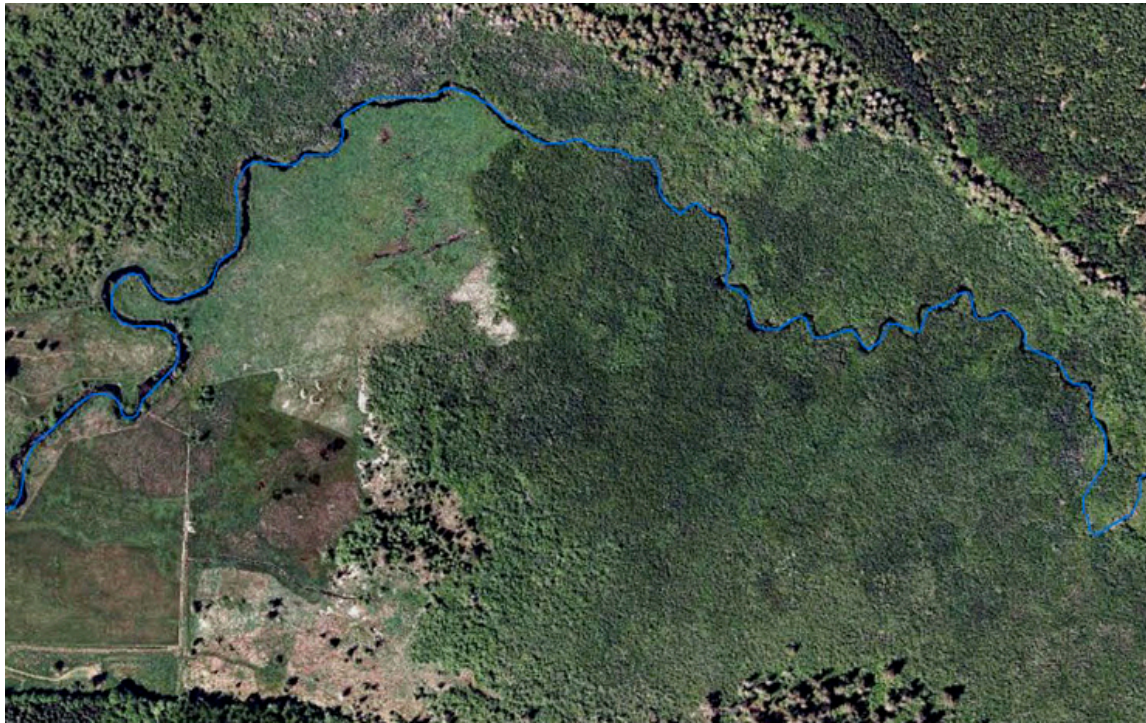
GOLDSBOROUGH CREEK - REACH 03

SHORELINE LENGTH

2.0 MI

REACH AREA

366.7 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 88% (322 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

6.2% landslide

LAND COVER (MAP 15)

8% agriculture, 10% forest, 10% wetland, 72% floodplain/riparian (GAP, 2009).

Riparian vegetation: 72% forest cover, 9% non-forest, 18% other natural vegetation, 1% water (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Coastal cutthroat trout, coho salmon, winter steelhead trout.

Wetlands -- 258.6 acres (70.5% of reach); wetland habitat types include palustrine emergent, palustrine forested, and palustrine scrub-shrub.

WATER QUALITY (MAP 13):

TMDL quality assurance project plan for fecal coliform

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use – Forestry (40%); Parks, Open Space and Recreation Areas (28%); Vacant (19%); and remaining 13% are a mix of agriculture and Residential. Ownership - Private (100%).

SHORELINE MODIFICATIONS (MAP 16)

No shoreline modifications are mapped in the reach.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning districts: County - Rural Residential 20 Acres (40%), Long Term Commercial Forest (31%), Agricultural Resource Lands (23%), and Rural Residential 5 Acres (6%). Comprehensive Plan Designations - Rural (45%), Long Term Commercial Forest (31%) and Agricultural Resource Lands (23%).

Existing SED – 100% Conservancy.

PUBLIC ACCESS (MAP 14)

There are no mapped parks or public access facilities in Goldsborough Creek Reach 3.

IMPERVIOUS SURFACES (MAP 16)

Less than 1% of the reach contains mapped impervious surfaces (NOAA CCAP, 2006). Aerial photos from 2009 show limited development with a few roads in the reach.

AREAS OF SPECIAL INTEREST

According to the Ecology facilities/sites database, there are no listed facilities or contaminated sites.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a low to moderate probability of finding unknown artifacts within this reach.

OPPORTUNITY AREAS (MAP 23)

Restore wetland habitat, riparian vegetation, add LWD and restore habitat complexity on “Rose” property, 40 acre site in upper watershed (Combs, 2010).

KEY MANAGEMENT ISSUES

Protect and restore associated wetlands and off-channel habitat.

ISLAND LAKE

SHORELINE PERIMETER

2.0 MI

WATERBODY AREA

104.9 AC

REACH AREA

181.5 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 39% (30 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

No listed erosion or landslide areas

LAND COVER (MAP 15)

16% developed, 52% open water, 1% beach, 13% forest, 16% wetland, 3% floodplain/riparian (GAP, 2009).

Riparian vegetation: 10% forest cover, 22% non-forest, 12% other natural vegetation, 57% water (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Wetlands – 29.5 acres (38.4% of reach); wetland habitat types include palustrine emergent, palustrine forested and palustrine scrub-shrub.

WATER QUALITY (MAP 13)

Not included on Ecology's 303 (d) list of impaired waters; Eurasian water milfoil infestation

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use – Residential (73%); Forestry (11%); and remaining 15% are a mix of Vacant, Parks, Open Space, and Recreational Areas, and Transportation. Ownership – 100% Private.

SHORELINE MODIFICATIONS (MAP 16)

There are 31 mapped docks and piers within the reach. There is a public boat launch on the north end of the lake.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning districts – Shelton UGA: 100% Neighborhood Residential. Comprehensive Plan Designations – 100% City.
Existing SED – 100% Urban Residential.

PUBLIC ACCESS (MAP 14)

There is a WDFW boat launch that provides access to the north end of Island Lake. The boat launch is a 12-foot wide concrete launch. The total park size is 1 acre (Washington Department of Fish and Wildlife WDFW Lands, 2011; Mason County Department of Parks and Trails, 2006).

IMPERVIOUS SURFACES (MAP 16)

16.2% of the reach contains mapped impervious surfaces, mostly low density development and developed open space (NOAA CCAP, 2006). Aerial photos from 2009 show most of the lake shore developed with single-family residences and roads.

AREAS OF SPECIAL INTEREST

According to the Ecology facilities/sites database, there are no listed facilities or contaminated sites.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a moderate to low probability of finding unknown artifacts within this reach.

OPPORTUNITY AREAS (MAP 23)

Reduce number of docks over time by considering joint use docks

KEY MANAGEMENT ISSUES

Overwater structures.

N.F. GOLDSBOROUGH CREEK - REACH 01

SHORELINE LENGTH

3.5 MI

REACH AREA

394.6 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 55% (216 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

3.3% landslide

LAND COVER (MAP 15)

3% agriculture, 1% open water, 11% forest, 7% wetland, 78% floodplain/riparian (GAP, 2009).

Riparian vegetation: 71% forest cover, 7% non-forest, 18% other natural vegetation, 3% water (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Coastal cutthroat trout, coho salmon, winter steelhead trout.

Wetlands – 312.0 acres (79.1% of reach); wetland habitat types includes palustrine emergent, palustrine forested, and palustrine scrub-shrub.

WATER QUALITY (MAP 13)

Not listed as a 303(d) Category 5 water

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use – Forestry (49%); Residential (22%); Parks, Open Space and Recreation Areas (15%); and remaining 14% are a mix of Vacant and Transportation. Ownership - Private (100%).

SHORELINE MODIFICATIONS (MAP 16)

There are two road crossings located in the northwest portion of the reach at Shelton Matlock Rd and Koku Rd.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning districts: Rural Residential 5 Acres (40%), Long Term Commercial Forest (34%), Rural Residential 10 and 20 Acres (16%), and Rural Tourist (10%). Comprehensive Plan Designations - Rural (66%) and Long Term Commercial Forest (34%). Existing SED - Rural (73%) and Conservancy (27%).

PUBLIC ACCESS (MAP 14)

There are no mapped public access facilities to North Fork Goldsborough Creek.

IMPERVIOUS SURFACES (MAP 16)

Less than 1% of the reach contains mapped impervious surfaces (NOAA CCAP, 2006). Aerial photos from 2009 show limited rural residential development and roads in this reach.

AREAS OF SPECIAL INTEREST

According to the Ecology facilities/sites database, there are no listed facilities or contaminated sites.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a moderate to low probability of finding unknown artifacts within this reach.

OPPORTUNITY AREAS (MAP 23)

KEY MANAGEMENT ISSUES

Major contributor of cold water to mainstem Goldsborough Creek.
Cold water refugia for salmonid species below

S.F. GOLDSBOROUGH CREEK - REACH 01

SHORELINE LENGTH

2.0 MI

REACH AREA

221.1 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 51% (113 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

3.1% landslide

LAND COVER (MAP 15)

18% agriculture, 9% forest, 13% wetland, 59% floodplain/riparian (GAP, 2009).

Riparian vegetation: 56% forest cover, 6% non-forest, 38% other natural vegetation (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Coastal cutthroat trout, coho salmon, winter steelhead trout.

Great blue heron.

Wetlands - 155.5 acres (70.3% of reach); wetland habitat types include palustrine emergent, palustrine forested, and palustrine scrub-shrub.

WATER QUALITY (MAP 13)

Not listed as a 303 (d) Category 5 water

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use – Vacant (40%); Residential (28%); Agriculture (18%); Forestry and Transportation (13%). Ownership – 100% Private.

SHORELINE MODIFICATIONS (MAP 16)

There is one road crossing in the central part of the reach located at Little Egypt Rd.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning districts: Rural Residential 20 Acres (48%), Rural Residential 5 Acres (32%), and remaining 21% are a mix of Agriculture Resource Lands and Long Term Commercial Forest. Comprehensive Plan Designations – Rural (79%) and remaining 21% are a mix of Agriculture Resource Lands and Long Term Commercial Forest.

Existing SED – 100% Conservancy.

PUBLIC ACCESS (MAP 14)

There are no mapped parks or public access facilities in this reach.

IMPERVIOUS SURFACES (MAP 16)

Less than 1% of the reach contains mapped impervious surfaces (NOAA CCAP, 2006). Aerial photos from 2009 show very limited development (roads) in this reach.

AREAS OF SPECIAL INTEREST

According to the Ecology facilities/sites database, there are no listed facilities or contaminated sites.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a low to moderate probability of finding unknown artifacts within this reach.

OPPORTUNITY AREAS (MAP 23)

KEY MANAGEMENT ISSUES

WINTER CREEK - REACH 01

SHORELINE LENGTH

4.1 MI

REACH AREA

203.2 AC

PLACEHOLDER

PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - There is no mapped FEMA 1% annual chance floodplain for the reach

HAZARD AREAS (MAP 12)

0.8% landslide

LAND COVER (MAP 15)

65% forest, 3% wetland, 32% floodplain/riparian (GAP, 2009).

Riparian vegetation: 47% forest cover, 6% non-forest, 47% other natural vegetation (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Coastal cutthroat trout, coho salmon.

6.7 acres of palustrine scrub-shrub wetland (3.3% of reach).

WATER QUALITY (MAP 13)

Not listed as a 303 (d) Category 5 water

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use – Forestry (88%); and remaining 12% is a mix of Residential, Vacant, Parks, Open Space, and Recreation Areas. Ownership - Private (95%) and Public (5%).

SHORELINE MODIFICATIONS (MAP 16)

There is one road crossing located in the southeastern portion of the reach at Dayton Airport Rd.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning districts: Long Term Commercial Forest (61%), Rural Residential 20 Acres (23%), and remaining 16% is a mix of Rural Residential 5 Acres and Rural Tourist. Comprehensive Plan Designations - Long Term Commercial Forest (61%) and Rural (39%).

Existing SED – none designated.

PUBLIC ACCESS (MAP 14)

There are no mapped public access facilities to Winter Creek.

IMPERVIOUS SURFACES (MAP 16)

No impervious surfaces are mapped in this reach (NOAA CCAP, 2006). Aerial photos from 2009 show very limited development within this reach (roads).

AREAS OF SPECIAL INTEREST

According to the Ecology facilities/sites database, there are no listed facilities or contaminated sites.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a moderate to low probability of finding unknown artifacts within this reach.

OPPORTUNITY AREAS (MAP 23)

KEY MANAGEMENT ISSUES

Important cold ground water source for North Fork Goldsborough.
Protect ground water.

PANHANDLE LAKE

SHORELINE PERIMETER

0.8 MI

WATERBODY AREA

22.0 AC

REACH AREA

61.6 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain -23% (9 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

No listed erosion or landslide areas

LAND COVER (MAP 15)

24% open water, 41% forest, 3% wetland, 32% floodplain/riparian (GAP, 2009).

Riparian vegetation: 61% forest cover, 2% non-forest, 6% other natural vegetation, 31% water (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Coastal cutthroat trout.

Wetlands – 22.6 acres (57.0% of reach); wetland habitat types include palustrine forested and palustrine scrub-shrub.

WATER QUALITY (MAP 13)

Not included on Ecology's 303 (d) list of impaired waters

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use - Parks, Open Space, and Recreation Areas (88%) and Forestry (12%). Ownership - Private (72%) and Public (28%).

SHORELINE MODIFICATIONS (MAP 16)

There are three docks and piers on the western portion of the lake visible via 2009 aerial imagery.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning districts: Rural Tourist (65%), Inholding Lands (26%), and Long Term Commercial Forest (9%). Comprehensive Plan Designations – Rural (65%), Inholding Lands (26%), and Long Term Commercial Forest (9%).

Existing SED – not designated.

PUBLIC ACCESS (MAP 14)

There are 20 acres of undeveloped park owned by WDFW near Panhandle Lake (Mason County Department of Parks and Trails, 2006).

IMPERVIOUS SURFACES (MAP 16)

No impervious surfaces are mapped in this reach (NOAA CCAP, 2006). Aerial photos from 2009 show a small area of rural residential development on the western shore of the lake.

AREAS OF SPECIAL INTEREST

According to the Ecology facilities/sites database, there are no listed facilities or contaminated sites.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a very low probability of finding unknown artifacts within this reach, with small portions of the reach in low to moderate-low probability zones.

OPPORTUNITY AREAS (MAP 23)

KEY MANAGEMENT ISSUES

LOST LAKE

SHORELINE PERIMETER

3.1 AC

WATERBODY AREA

122.6 AC

REACH AREA

192.7 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 46% (32 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

No listed erosion or landslide areas

LAND COVER (MAP 15)

2% developed, 59% open water, 37% forest, 1% floodplain/riparian (GAP, 2009).

Riparian vegetation: 13% forest cover, 20% non-forest, 66% water (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Osprey.

4.4 acres of palustrine scrub-shrub wetland (6.3% of reach).

WATER QUALITY (MAP 13)

Not included on Ecology's 303 (d) list of impaired waters

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use - Residential (47%); Forestry (33%); Vacant (11%); and remaining 10% are a mix of Parks, Open Space, Recreation Areas, and Transportation. Ownership – 100% Private.

SHORELINE MODIFICATIONS (MAP 16)

There are 90 docks and piers mapped within the reach. There is a public boat launch facility.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning districts: Rural Residential 5 Acres (93%) and Rural Tourist (7%). Comprehensive Plan Designations – 100% Rural.
Existing SED – 100% Urban Residential.

PUBLIC ACCESS (MAP 14)

There is a WDFW boat launch with associated parking that provides access to Lost Lake. The boat launch is a 12-foot wide concrete launch. The total park size is about 1 acre (Washington Department of Fish and Wildlife WDFW Lands, 2011; Mason County Department of Parks and Trails, 2006).

IMPERVIOUS SURFACES (MAP 16)

4.6% of the reach contains mapped impervious surfaces (NOAA CCAP, 2006). Aerial photos from 2009 show single-family residences and roads around most of the lake shore.

AREAS OF SPECIAL INTEREST

According to the Ecology facilities/sites database, there are no listed facilities or contaminated sites.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a very low probability of finding unknown artifacts within this reach, with smaller portions of the reach in low to moderate-low probability zones.

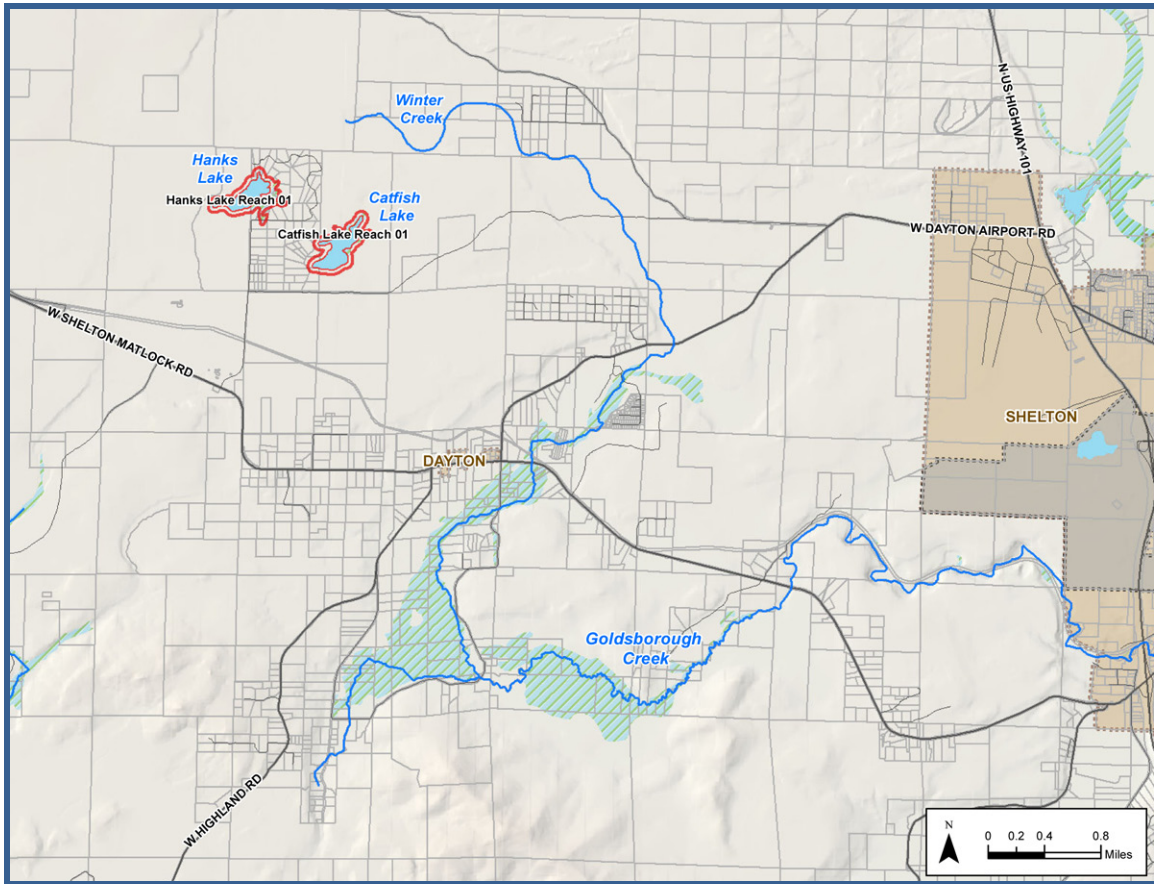
OPPORTUNITY AREAS (MAP 23)

Reduce number of docks over time by considering joint use docks

KEY MANAGEMENT ISSUES

Dock proliferation and overwater structures.

6.9 Lakes in Upper Watershed (Hanks, Catfish)



6.9.1 Physical Characterization and Modifications

Two of the lakes in the upper WRIA 14 watershed include Hanks and Catfish Lakes, located south of Winter Creek. Hanks and Catfish Lakes are about 21 and 25 acres in area, respectively. These lakes are located in relatively flat areas and have no surface inlets.

Some of the modifications to the upper watershed lakes include:

- Logging throughout the drainage basin; and
- Land conversion from pervious to impervious surfaces.

6.9.2 Water Quality

No water quality data or assessments were identified for these lakes. Hanks and Catfish Lakes are not included on Ecology's 303(d) list of impaired waters.

6.9.3 Critical or Priority Habitat and Species

Hanks Lake

No priority fish species are documented in Hanks Lake (WDFW, 2010). Approximately 6.5 acres of wetland (15.9 percent of the reach) are mapped around Hanks Lake (NWI, 1989). The western portion of the lake is adjacent to a clearcut area, while the forest on the eastern side of the lake is relatively intact. No priority species occurrences have been mapped in the vicinity of the lake, and the WDNR NHP has not identified priority plant species or vegetation communities within the Hanks Lake shoreline planning area (WDFW, 2010; WDNR, 2009).

Catfish Lake

No priority fish species are documented in Catfish Lake (WDFW, 2010). Catfish Lake has approximately 15.8 acres mapped as wetland, representing 40.2 percent of the reach (NWI, 1989). No priority species occurrences have been mapped in the vicinity of the lake, and the WDNR NHP has not identified priority plant species or vegetation communities within the Catfish Lake shoreline planning area (WDFW, 2010; WDNR, 2009).

6.9.4 Land Use

The Hanks Lake shoreline has a mix of forestry and residential uses, although there are no residential structures within the shoreline planning area per 2009 aerial imagery. Catfish Lake is predominately in forestry use.

6.9.5 Summary of Key Management Issues

PLACEHOLDER

6.9.6 Reach Analysis

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HANKS LAKE

SHORELINE PERIMETER

1.2 MI

WATERBODY AREA

21.5 AC

REACH AREA

62.4 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 34% (14 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

No listed erosion or landslide areas

LAND COVER (MAP 15)

27% open water, 4% beach, 49% forest, 20% wetland (GAP, 2009).

Riparian vegetation: 32% forest cover, 4% non-forest, 28% other natural vegetation, 36% water (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

6.5 acres of palustrine forested wetland (15.9% of reach).

WATER QUALITY (MAP 13)

Not included on Ecology's 303 (d) list of impaired waters

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use - Forestry (47%); Residential (31%); and Vacant (22%). Ownership – 100% Private.

SHORELINE MODIFICATIONS (MAP 16)

No shoreline modifications are mapped in the reach.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning districts: Rural Residential 5 Acres (54%) and Long Term Commercial Forest (46%). Comprehensive Plan Designations - Rural (54%) and Long Term Commercial Forest (46%). Existing SED – 100% Rural.

PUBLIC ACCESS (MAP 14)

There are no mapped public access facilities to Hanks Lake.

IMPERVIOUS SURFACES (MAP 16)

Less than 1% of the reach contains mapped impervious surfaces (NOAA CCAP, 2006). Aerial photos from 2009 show the reach to be undeveloped except for one road crossing.

AREAS OF SPECIAL INTEREST

According to the Ecology facilities/sites database, there are no listed facilities or contaminated sites.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a low to moderate probability of finding unknown artifacts within this reach.

OPPORTUNITY AREAS (MAP 23)

KEY MANAGEMENT ISSUES

CATFISH LAKE

SHORELINE PERIMETER

1.4 MI

WATERBODY AREA

25.1 AC

REACH AREA

64.3 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 35% (14 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

No listed erosion or landslide areas

LAND COVER (MAP 15)

63% forest, 37% wetland (GAP, 2009).
Riparian vegetation: 33% forest cover, 3% non-forest, 64% other natural vegetation (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Wetlands -- 15.8 acres (40.2% of reach); wetland habitat types include palustrine emergent and palustrine forested.

WATER QUALITY (MAP 13)

Not included on Ecology's 303 (d) list of impaired waters

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use - Forestry (89%) and Residential (11%).
Ownership – 100% Private.

SHORELINE MODIFICATIONS (MAP 16)

No shoreline modifications are mapped in the reach.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning districts: County - Rural Residential 20 Acres (89%) and Rural Residential 5 Acres (11%).
Comprehensive Plan Designations - Rural (100%).
Existing SED - None designated.

PUBLIC ACCESS (MAP 14)

There are no mapped public access facilities to Catfish Lake.

IMPERVIOUS SURFACES (MAP 16)

No impervious surfaces are mapped in this reach (NOAA CCAP, 2006). Aerial photos from 2009 show the reach to be undeveloped except for one road that intersects the SW edge of the reach.

AREAS OF SPECIAL INTEREST

According to the Ecology facilities/sites database, there are no listed facilities or contaminated sites.

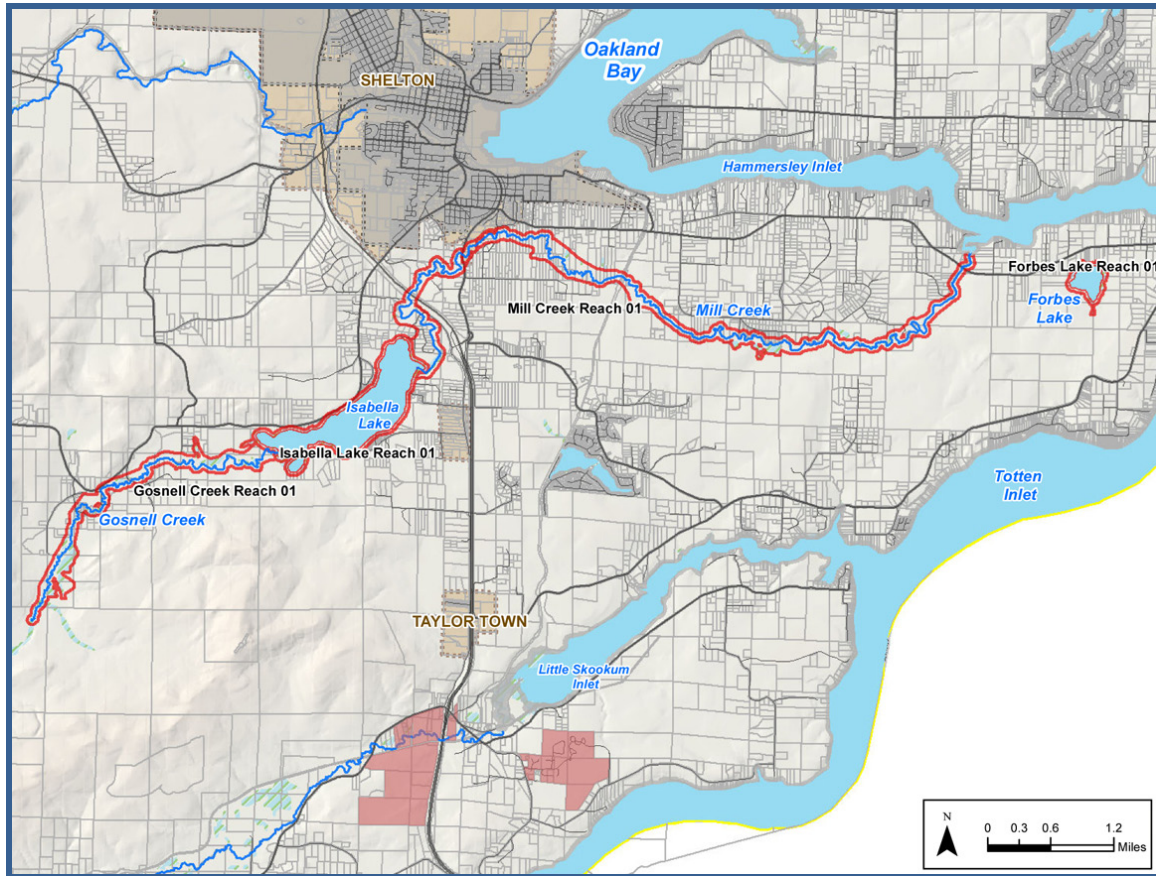
CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a very low probability of finding unknown artifacts within this reach.

OPPORTUNITY AREAS (MAP 23)

KEY MANAGEMENT ISSUES

6.10 Mill Creek and Tributaries (Forbes Lake, Isabella Lake, Gosnell Creek)



6.10.1 Physical Characterization and Modifications

The Mill Creek drainage basin provides about 16 miles of low gradient stream habitat (Kuttel, 2002). The headwaters of Mill Creek primarily include Lake Isabella at RM 10.7 and Gosnell Creek, which is located upstream of the lake. A large wetland is located at the inlet to Lake Isabella. Forbes Lake is located near Hammersley Inlet and provides a small amount of flow. Mill Creek enters the south shore of Hammersley Inlet between Shelton and Arcadia.

The Mill Creek drainage basin has been modified by humans. Some of the process modifications include:

- Culverts and other stream crossing structures;
- Land conversion of forested to agricultural land;
- Land conversion from pervious to impervious areas; and
- Logging operations.

The lower two miles of the Gosnell Creek drainage basin is dominated by agricultural land. The land adjacent to Mill Creek RM 2 through RM 6 is primarily agricultural. Both of these creeks experience bank erosion due to the conversion of forested to agricultural lands. In 1853, the first mill in Mason County was built on Mill Creek (Kuttel, 2002). Extensive logging has occurred throughout this drainage basin. Additionally, there has been some development along Mill Creek, near the southern part of Shelton.

6.10.2 Water Quality

Mill Creek is listed on the 303 (d) list of impaired waters (Category 5 water) for the temperature parameter (Ecology, 2008). Gosnell Creek contains no 303(d) listed reaches for any parameter; no other water quality assessments or aquatic plant management plans were identified for this stream. Mill Creek contains a Category 4C listing for instream flow immediately downstream of Highway 101. Category 4C listings indicate impairment by non-pollutants (Ecology, 2008). Mill Creek also contains one Category 2 listed reach for fecal coliform bacteria, which indicates there is some evidence of water quality issues for that parameter (Ecology, 2008).

Ecology has developed a temperature TMDL for Oakland Bay-Hammersley Inlet and associated tributaries. Mill Creek is included in this report (Ecology, 2005).

No water quality data or assessments were identified for Forbes Lake and Isabella Lake. Neither is included on Ecology's 303 (d) list of impaired waters.

6.10.3 Critical or Priority Habitat and Species

Mill Creek

Mill Creek, which drains to Oakland Bay, supports many priority fish species (WDFW, 2010; Table 6-9). The stream has high fall chum escapement of natural spawning fish (Kuttel, 2002).

Table 6-9. Priority fish species documented for Mill Creek, Isabella Lake, and Gosnell Creek

Common Name	Scientific Name	Habitat Use	Federal Listing	State Listing
Coastal cutthroat trout	<i>Oncorhynchus clarki clarki</i>	Migration/Spawning	~	~
fall Chinook salmon (Mill Creek only)	<i>Oncorhynchus tshawytscha</i>	Presence/Migration	T	Candidate
fall Chum salmon	<i>Oncorhynchus keta</i>	Spawning (Mill Creek and Isabella Lake only) and Migration	~	~
Coho salmon	<i>Oncorhynchus kisutch</i>	Spawning (Mill Creek and Isabella Lake only) and Migration	Concern	~
winter Steelhead trout	<i>Oncorhynchus mykiss</i>	Spawning (Mill Creek and Isabella Lake only) and Migration	T	~

Approximately 42.3 acres of wetland (6.7 percent of the reach) is mapped in the vicinity of Mill Creek (NWI, 1989). The stream flows adjacent to residential development that is concentrated along the upstream portion of the stream. Several priority species occurrences and priority habitats are mapped around and in the stream, including: bald eagle, western pearlshell, mink, and an Estuarine Zone (WDFW, 2010). The WDNR NHP has not identified priority plant species or vegetation communities within the Mill Creek shoreline planning area (WDNR, 2009).

Forbes Lake

Forbes Lake does not support any priority fish species (WDFW, 2010). Approximately 17.7 acres of wetland are mapped adjacent to Forbes Lake, representing 54.5 percent of the reach (NWI, 1989). Wetland habitat along the southern and southeastern portions of the lake has not been impacted by

development, but logging and residential development exists to the north and west. Bald eagle has been mapped in the vicinity of the lake (WDFW, 2010). The WDNR NHP has not identified priority plant species or vegetation communities within the Forbes Lake shoreline planning area (WDNR, 2009).

Gosnell Creek

Several fish species are mapped in Gosnell Creek (WDFW, 2010; Table 6-9). Approximately 74.8 acres, representing 24.4 percent of the reach, are mapped as wetland along the shoreline of the stream (NWI, 1989). No other priority species occurrences have been mapped in the vicinity of the lake, and the WDNR NHP has not identified priority plant species or vegetation communities within the Gosnell Creek shoreline planning area (WDFW, 2010; WDNR, 2009).

Isabella Lake

Due its association with Mill Creek and Gosnell Creek, Isabella Lake is documented as supporting several priority fish species (WDFW, 2010; Table 6-9). The shoreline of Isabella Lake has 43.3 acres (34.7 percent of the reach) of mapped wetland, mainly at the northern and southwestern portions of the lake (NWI, 1989). Osprey and mink priority species and priority habitat are mapped in the area of the lake (WDFW, 2010). The WDNR NHP has identified approximately 9.5 acres of blunt-leaved pondweed within the Mill Creek shoreline planning area (WDNR, 2009).

6.10.4 Land Use

Mill Creek has a mix of residential, forestry and vacant land uses. Residential land uses are concentrated near Isabella Lake. Gosnell Creek is also a mix of forestry and residential land uses but there are some agriculture uses as well.

Isabella Lake is mostly undeveloped with some residential homes and individual docks/piers. There is a WDFW public boat launch at the south part of the lake (Mason County Parks and Recreation Department, 2008). Washington State Parks owns a total of 194 acres of undeveloped land near Isabella Lake (Mason County Department of Parks and Trails, 2006).

Forbes Lake has a mix of forestry and residential land uses.

6.10.5 Summary of Key Management Issues

PLACEHOLDER

6.10.6 Reach Analysis

MILL CREEK - REACH 01

SHORELINE LENGTH

10.7 MI

REACH AREA

627.1 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 60% (375 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

9.1% landslide

LAND COVER (MAP 15)

2% developed, 3% agriculture, 42% forest, 4% wetland, 49% floodplain/riparian (GAP, 2009).
Riparian vegetation: 63% forest cover, 18% non-forest, 17% other natural vegetation, 2% water (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Coastal cutthroat trout, fall Chinook salmon, fall chum salmon, coho salmon, winter steelhead.
Bald eagle, western pearlshell, mink, and Estuarine Zone.
Wetlands – 42.3 acres (6.7% of reach); wetland habitat types include palustrine emergent, palustrine forested, palustrine scrub- shrub, riverine upper perennial flat.

WATER QUALITY (MAP 13)

303(d) impairment for temperature; Category 4C listing for instream flow; TMDL for temperature

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use - Residential (38%); Forestry (28%); Vacant (19%), and remaining 14% are a mix of Agriculture, Parks, Open Space, Recreation Areas and Transportation. Ownership - 100% Private.

SHORELINE MODIFICATIONS (MAP 16)

No shoreline modifications are mapped in the reach.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning districts: County - Rural Residential 5 Acres (81%), remaining 18% are a mix of Rural Residential 10 Acres, Agricultural Resource Lands and Rural Commercial 1, and Shelton UGA - 2% General Commercial. Comprehensive Plan Designations - Rural (100%).

Existing SED - 100% Rural.

PUBLIC ACCESS (MAP 14)

There are no mapped parks or public access facilities in Mill Creek Reach 01.

IMPERVIOUS SURFACES (MAP 16)

4.4% of the reach contains mapped impervious surfaces (NOAA CCAP, 2006). Aerial photos from 2009 show single-family residences and roads, mainly in the upper part of the reach.

AREAS OF SPECIAL INTEREST

No listed facilities or contaminated sites.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a moderate-low to very high probability of finding unknown artifacts within this reach.

OPPORTUNITY AREAS (MAP 23)

KEY MANAGEMENT ISSUES

Inadequate riparian shade.

Deficient in large woody debris.

Land management activities cause bank erosion and fine sediment input.

FORBES LAKE

SHORELINE PERIMETER

1.0 MI

WATERBODY AREA

37.6 AC

REACH AREA

70.1 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 32% (10 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

No listed erosion or landslide areas

LAND COVER (MAP 15)

44% open water, 5% beach, 15% forest, 17% wetland, 19% floodplain/riparian (GAP, 2009).
Riparian vegetation: 27% forest cover, 9% non-forest, 7% other natural vegetation, 57% water (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Bald eagle.
Wetlands – 17.7 acres (54.5% of reach); wetland habitat types include palustrine emergent and palustrine scrub-shrub.

WATER QUALITY (MAP 13)

Not included on Ecology's 303(d) list of impaired waters

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use - Forestry (48%); Residential (37%); and Vacant (15%). Ownership – 100% Private.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning districts: 100% Rural Residential 5 Acres. Comprehensive Plan Designations – 100% Rural. Existing SED – 100% Urban Residential.

IMPERVIOUS SURFACES (MAP 16)

No impervious surfaces are mapped in this reach (NOAA CCAP, 2006). Aerial photos from 2009 show the reach to be largely undeveloped.

SHORELINE MODIFICATIONS (MAP 16)

There are several docks located in the northwestern portion of the reach visible by 2009 aerial imagery.

PUBLIC ACCESS (MAP 14)

There are no mapped public access facilities to Forbes Lake.

AREAS OF SPECIAL INTEREST

According to the Ecology facilities/sites database, there are no listed facilities or contaminated sites.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a moderate-low to high probability of finding unknown artifacts within this reach.

OPPORTUNITY AREAS (MAP 23)

KEY MANAGEMENT ISSUES

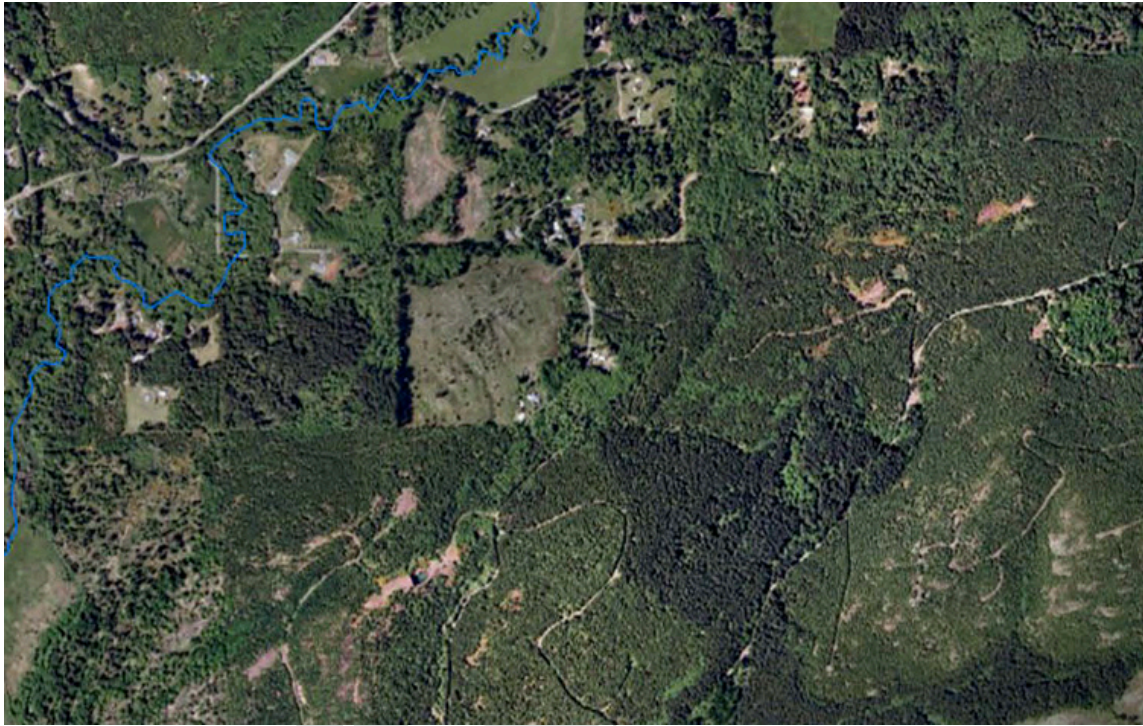
GOSNELL CREEK - REACH 01

SHORELINE LENGTH

4.7 MI

REACH AREA

307.0 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 58% (178 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

2.3% landslide

LAND COVER (MAP 15)

7% agriculture, 44% forest, 13% wetland, 36% floodplain/riparian (GAP, 2009).

Riparian vegetation: 34% forest cover, 41% non-forest, 25% other natural vegetation (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Coastal cutthroat trout, fall chum salmon, coho salmon, winter steelhead trout;

Wetlands – 74.8 acres (24.4% of reach); wetland habitat types include palustrine emergent, palustrine forested, and palustrine scrub-shrub.

WATER QUALITY (MAP 13)

Not included on Ecology's 303 (d) list of impaired waters

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use - Agriculture (33%); Forestry (28%); Residential (15%); Parks, Open Space, and Recreation Areas (12%); and remaining 9% are a mix of Vacant and Transportation. Ownership – 100% Private.

SHORELINE MODIFICATIONS (MAP 16)

There are 3 road crossings located within the southwestern portion of the reach; Bolling Rd, Elson Rd, and privately owned Loertscher Rd.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning districts - Agricultural Resource Lands (55%), Rural Residential 5 Acres (33%), and remaining 12% are a mix of Rural Residential 20 Acres and Long Term Commercial Forest. Comprehensive Plan Designations – Agricultural Resource Lands (55%), Rural and Long Term Commercial Forest (45%). Existing SED – 100% Rural.

PUBLIC ACCESS (MAP 14)

There are no mapped parks or public access facilities in Gosnell Creek Reach 01.

IMPERVIOUS SURFACES (MAP 16)

Less than 1% of the reach is mapped as impervious surfaces (NOAA CCAP, 2006). Aerial photos from 2009 show scattered rural residential development in portions of the reach.

AREAS OF SPECIAL INTEREST

No Ecology listed facilities or contaminated sites.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a moderate to low probability of finding unknown artifacts within this reach.

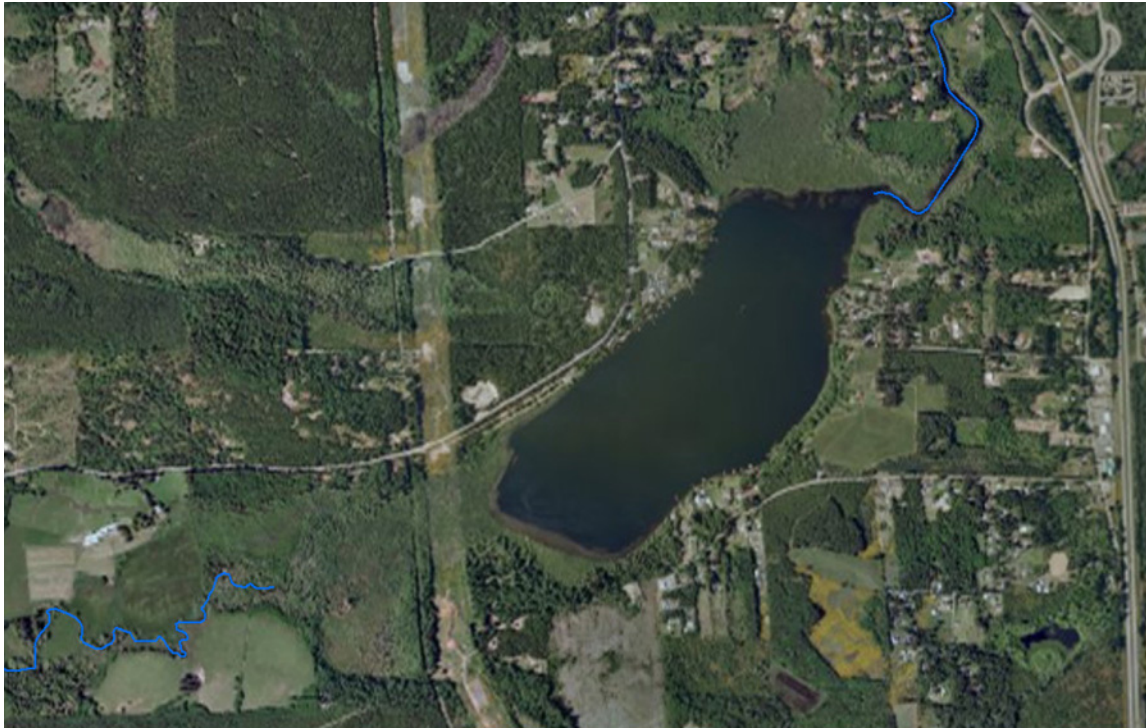
OPPORTUNITY AREAS (MAP 23)

KEY MANAGEMENT ISSUES

Maintain thermal refugia for juvenile salmonids.

ISABELLA LAKE

SHORELINE PERIMETER	WATERBODY AREA	REACH AREA
5.1 MI	338.0 AC	462.6 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 40% (50 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

6.7% landslide

LAND COVER (MAP 15)

1% developed, 41% open water, 9% forest, 3% wetland, 45% floodplain/riparian (GAP, 2009).
Riparian vegetation: 41% forest cover, 6% non-forest, 8% other natural vegetation, 45% water (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Coastal cutthroat trout, fall chum salmon, coho salmon, winter steelhead trout.
Osprey and mink; blunt-leaved pondweed.
Wetlands – 43.3 acres (34.7% of reach); wetland habitat types include palustrine emergent, palustrine forested, palustrine scrub-shrub, and riverine upper perennial flat.

WATER QUALITY (MAP 13)

Not included on Ecology's 303(d) list of impaired waters

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use - Vacant (44%); Residential (20%); Agriculture and Forestry (19%); and Parks, Open Space, and Recreation Areas (17%). Ownership – 100% Private.

SHORELINE MODIFICATIONS (MAP 16)

There are 13 docks and piers and one boat launch mapped within the reach.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning districts: Rural Residential 5 Acres (88%), and remaining 12% are a mix of Long Term Commercial Forest, Agricultural Resource Lands and Rural Residential 20 Acres. Comprehensive Plan Designations – Rural (90%) and remaining 10% are a mix of Long Term Commercial Forest and Agricultural Resource Lands.

Existing SED – Conservancy (78%) and Urban Residential (22%).

PUBLIC ACCESS (MAP 14)

There is a WDFW boat launch that provides access to Isabella Lake. The boat launch is a 12-foot wide concrete launch. The total park size is about 1½ acres (Washington Department of Fish and Wildlife WDFW Lands, 2011; Mason County Department of Parks and Trails, 2006).

Washington State Parks owns a total of 194 acres of undeveloped land near Isabella Lake (Mason County Department of Parks and Trails, 2006).

IMPERVIOUS SURFACES (MAP 16)

2.7% of the reach is mapped as containing impervious surfaces (NOAA CCAP, 2006). Aerial photos from 2009 show single-family residences and roads, mainly along the central part of the lake shore.

AREAS OF SPECIAL INTEREST

No Ecology listed facilities or contaminated sites.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

The DAHP architectural and archaeological records show one inventoried early historic site in this reach. Resource mapping suggests there is a very high probability of finding unknown artifacts within this reach.

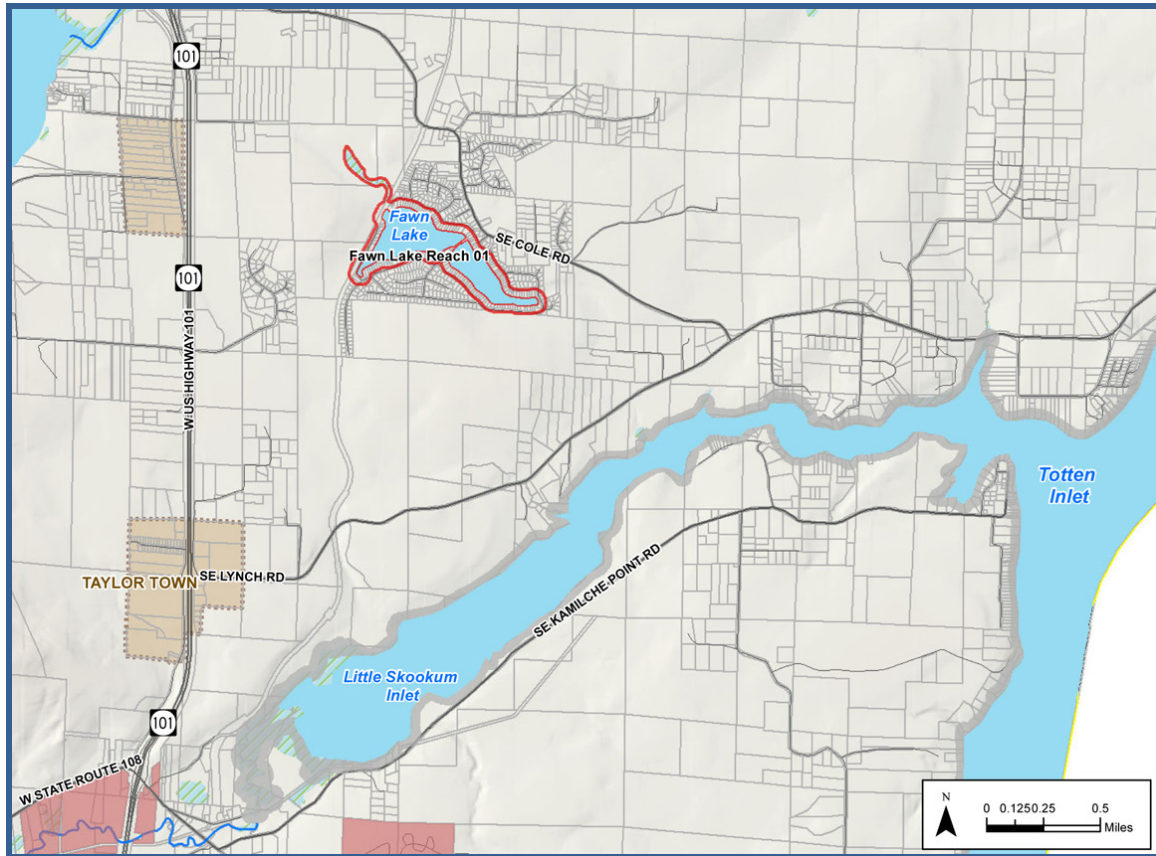
OPPORTUNITY AREAS (MAP 23)

Reduce number of docks over time by considering joint use docks

KEY MANAGEMENT ISSUES

Non-native predator fish in lake.

6.11 Fawn Lake



6.11.1 Physical Characterization and Modifications

The Fawn Lake drainage basin is approximately 0.6 mile and flows into Lynch Creek, which drains into the Little Skookum Inlet. Fawn Lake is part of the Totten/Little Skookum Inlet Subbasin that drains 80 square miles. In the 1960s, Fawn Lake was created by damming open water wetlands. The water levels in the lake are managed to prevent flooding of adjacent homes (Fawn Lake Maintenance Commission, 2010).

The Fawn Lake drainage basin has been modified by humans. The process modifications include:

- Land conversion of pervious to impervious surfaces;
- Management of water flows to prevent flooding; and
- Dam operations.

6.11.2 Water Quality

No water quality data or assessments were identified for Fawn Lake and it is not included on Ecology's 303 (d) list of impaired waters.

6.11.3 Critical or Priority Habitat and Species

Fawn Lake is known to support several fish species (WDFW, 2010; Table 6-10).

Table 6-10. Priority fish species documented in Fawn Lake

Common Name	Scientific Name	Habitat Use	Federal Listing	State Listing
Coastal cutthroat trout	<i>Oncorhynchus clarki clarki</i>	Migration/Spawning	~	~
fall Chum salmon	<i>Oncorhynchus keta</i>	Migration/Spawning	~	~
Coho salmon	<i>Oncorhynchus kisutch</i>	Migration/Spawning	Concern	~
winter Steelhead trout	<i>Oncorhynchus mykiss</i>	Migration/Spawning	T	~

Approximately 6.7 acres of wetland, representing 10.5 percent of the reach, have been mapped in the area adjacent to the lake (NWI, 1989). Residential development

surrounds the lake, but a spur of undeveloped land extends from the northwestern portion of the lake. No priority species occurrences have been mapped in the vicinity of the lake, and the WDNR NHP has not identified priority plant species or vegetation communities within the Fawn Lake shoreline planning area (WDFW, 2010; WDNR, 2009).

6.11.4 Land Use

See reach sheet for land use information.

6.11.5 Summary of Key Management Issues

See reach sheet for key management issues.

6.11.6 Reach Analysis

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FAWN LAKE

SHORELINE PERIMETER

2.3 MI

WATERBODY AREA

56.7 AC

REACH AREA

120.3 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 38% (24 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

1.5% landslide

LAND COVER (MAP 15)

20% developed, 37% open water, 30% forest, 5% wetland (GAP, 2009).

Riparian vegetation: 15% forest cover, 33% non-forest, 4% other natural vegetation, 48% water (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Coastal cutthroat trout, fall chum salmon, coho salmon, winter steelhead trout.

6.7 acres of palustrine scrub-shrub wetland (10.5% of reach).

WATER QUALITY (MAP 13)

Not included on Ecology's 303(d) list of impaired waters

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use - Vacant (57%); Residential (25%); and remaining 18% are a mix of Transportation, Forestry, and Parks, Open Space, and Recreation Areas. Ownership – 100% Private.

SHORELINE MODIFICATIONS (MAP 16)

A dam is located in the southeastern portion of the reach. There are numerous individual docks and piers visible via 2009 aerial imagery.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning districts - County: 100% Rural Residential 5 Acres Comprehensive Plan Designations – 100% Rural.

Existing SED – 100% Urban Residential.

PUBLIC ACCESS (MAP 14)

There are no mapped parks or public access facilities in Fawn Lake Reach 01.

IMPERVIOUS SURFACES (MAP 16)

23.1% of the reach is mapped as containing impervious surfaces, mostly in low-intensity development (NOAA CCAP, 2006). Aerial photos from 2009 show most of the lake shore is developed with single-family residences and roads.

AREAS OF SPECIAL INTEREST

No contaminated sites listed.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a moderate to low probability of finding unknown artifacts within this reach.

OPPORTUNITY AREAS (MAP 23)

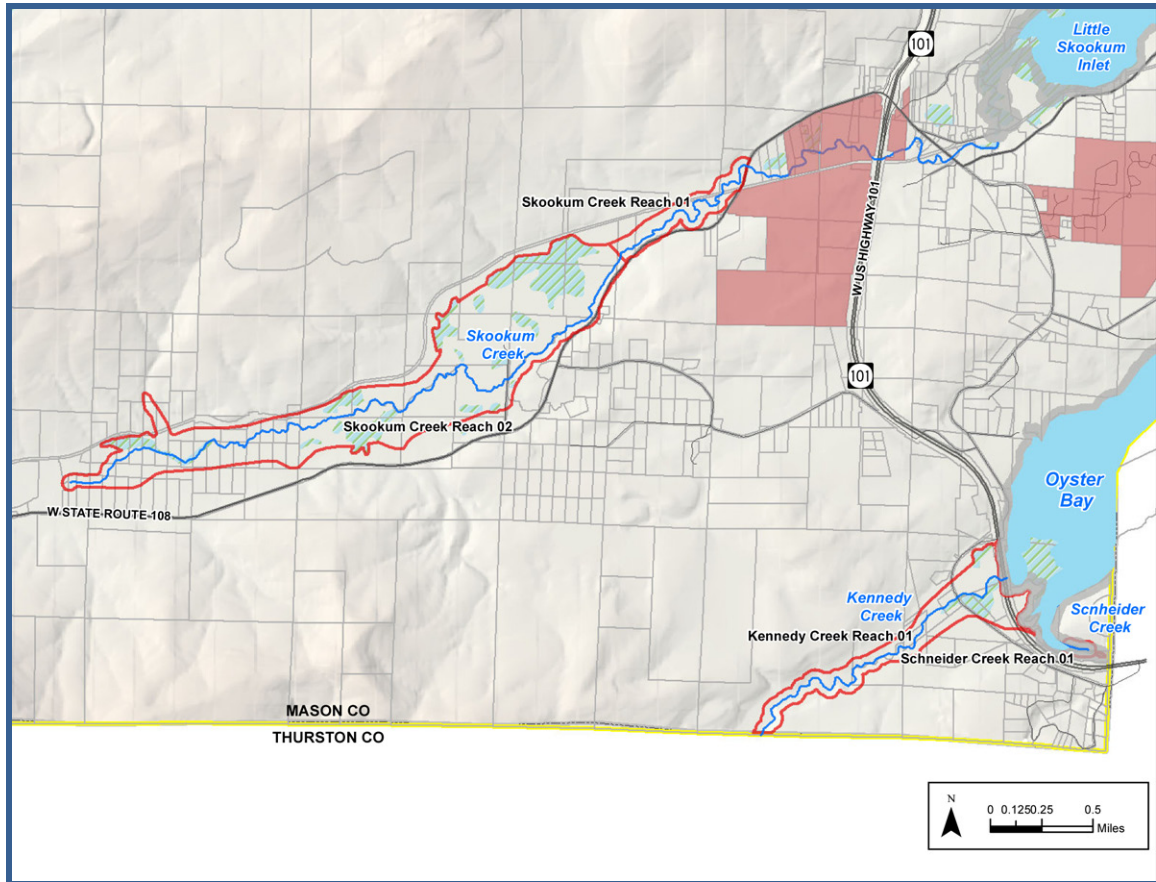
Reduce number of docks over time by considering joint use docks

KEY MANAGEMENT ISSUES

Failing septic systems.

Source of fecal coliform in Little Skookum Inlet.

6.12 Skookum Creek and Kennedy Creek



6.12.1 Physical Characterization and Modifications

The Skookum, Kennedy, and Schneider Creek drainage basins are located in the Totten/Little Skookum Inlet Subbasin. The headwaters of Skookum Creek result from groundwater seepage near Stimson Station on the Northern Pacific Railroad (Kuttel, 2002). The creek flows northwesterly through the Kamilche Valley and drains into Skookum Inlet. The headwaters of Kennedy Creek are Summit Lake and several small tributaries in the northern Black Hills, which flows more than 10 miles to Oyster Bay. The headwaters of Kennedy Creek are forested with conifers, while deciduous trees and pastures dominate the broad valley bottom. Schneider Creek begins on Schneiders Prairie northeast of Summit Lake in Thurston County.

The drainage basins of the Skookum, Kennedy, and Schneider Creeks have been modified. Some of the process modifications include:

- Culverts and other creek crossings;
- Land conversion of forest to agriculture;
- Use of shallow aquifers that are connected with the creeks; and
- Diversion of water for agriculture and other uses.

A culvert is located at the mouth of a tributary entering Skookum Creek at RM 3.3 (Kuttel, 2002). Two culverts are located on tributaries of Kennedy Creek downstream of the falls at RM 2.5. On the mainstem of Skookum and Schneider Creeks there has been extensive removal of riparian vegetation and grazing for agriculture use. Most of the groundwater wells use shallow aquifers that are hydraulically connected with the creeks (Kuttel, 2002).

6.12.2 Water Quality

Skookum Creek is not included on Ecology's 303 (d) Category 5 list of impaired waters (Ecology, 2008). However, Ecology has published a TMDL for fecal coliform bacteria and temperature to address water quality concerns within Skookum Creek (Ecology, 2007). Skookum Creek contains a Category 4C listing for instream flow between Highway 101 and State Route 108. Category 4C listings indicate impairment by non-pollutants (Ecology, 2008). Skookum Creek also contains one Category 2 listed reach for fecal coliform bacteria and dissolved oxygen within Squaxin Island Reservation Trust Lands; however, water quality impairment likely extends downstream. Category 2 listings indicate there is some evidence of water quality problems for that parameter (Ecology, 2008).

Schneider Creek is not recorded on Ecology's 303 (d) Category 5 list of impaired waters (Ecology, 2008). However, Ecology has also published a TMDL for fecal

coliform bacteria to address water quality concerns for Schneider Creek (Ecology, 2007).

One monitoring station on Kennedy Creek has recorded low dissolved oxygen concentrations that do not meet Washington State water quality standards. The stream is listed on the 303(d) list of impaired waters (Category 5 water) for the dissolved oxygen parameter (Ecology, 2008). Ecology has published a TMDL for fecal coliform bacteria to address water quality concerns within Kennedy Creek. A TMDL for temperature is being deferred pending implementation of the Green Diamond Resource Company Habitat Conservation Plan (Ecology, 2007). Kennedy Creek also contains two Category 2 listings for fecal coliform bacteria and pH located upstream and outside of Mason County; however, water quality impairment likely extends downstream.

6.12.3 Critical or Priority Habitat and Species

Skookum Creek

Skookum Creek is divided into two reaches that drain to Totten Inlet. The following priority fish species have been mapped in the stream (WDFW, 2010; Table 6-11).

Table 6-11. Priority fish species documented for Skookum Creek (Reaches 1 and 2), Kennedy Creek, and Schneider Creek

Common Name	Scientific Name	Habitat Use	Federal Listing	State Listing
Coastal cutthroat trout	<i>Oncorhynchus clarki clarki</i>	Migration/Spawning	~	~
fall Chinook salmon (Kennedy Creek only)	<i>Oncorhynchus tshawytscha</i>	Presence/Migration	T	Candidate
fall Chum salmon	<i>Oncorhynchus keta</i>	Spawning (Skookum Reach 1, Kennedy Creek, and Schneider Creek only) and Migration	~	~
Coho salmon	<i>Oncorhynchus kisutch</i>	Spawning (Skookum Reach 1 and Reach 2, Kennedy Creek only) and Migration	Concern	~
winter Steelhead trout	<i>Oncorhynchus mykiss</i>	Spawning (Skookum Reach 1 and Reach 2 only) and Migration	T	~

In total, the two Skookum Creeks contain 122.2 acres of mapped wetland (19.6 percent of the total reach area (NWI, 1989). The downstream portion of the stream has been more impacted by commercial and residential development. Priority habitats and species mapped along Skookum Creek include waterfowl concentrations, Olympic mudminnow, and Roosevelt elk (WDFW, 2010). The WDNR NHP has not identified priority plant species or vegetation communities within the Skookum Creek shoreline planning area (WDNR, 2009).

Kennedy Creek

Kennedy Creek drains to Totten Inlet and supports several species of listed priority fish (WDFW, 2010; Table 6-11). Natural spawning in the stream results in the majority of fall chum production from Totten Inlet (Kuttel, 2002).

Approximately 16.6 acres of wetland are mapped in the vicinity of Kennedy Creek, representing 12.1 percent of the reach (NWI, 1989). No priority species occurrences have been mapped in the vicinity of the stream (WDFW, 2010). The WDNR NHP has identified the following priority plant species and vegetation communities within the Kennedy Creek shoreline planning area (WDNR, 2009):

- Lyngby's Sedge
- Mixed-fine and Mud: Partly Enclosed, Eulittoral, Mesohaline (Marsh)
- Organic: Partly Enclosed, Backshore, Polyhaline (Marsh)
- Tufted Hairgrass - Pacific Silverweed

Schneider Creek

Several species of priority fish are mapped in Schneider Creek, which drains to Totten Inlet (WDFW, 2010; Table 6-11).

Approximately 3.6 acres (46.4 percent of the reach) is mapped as wetland for Schneider Creek (NWI, 1989). A priority habitat, Estuarine Zone, is also mapped for the stream (WDFW, 2010).

No other priority species occurrences have been mapped in the vicinity of the stream. The WDNR NHP has not identified priority plant species or vegetation communities within the Schneider Creek shoreline planning area (WDFW, 2010; WDNR, 2009).

6.12.4 Land Use

Land use along Skookum Creek is predominantly agriculture. Kennedy Creek has an even mix of open space, agriculture, and vacant land uses. Schneider Creek is entirely within marine tideland area.

See reach sheet for detailed land use information.

6.12.5 Summary of Key Management Issues

PLACEHOLDER

6.12.6 Reach Analysis

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SKOOKUM CREEK - REACH 01

SHORELINE LENGTH

2.8 MI

REACH AREA

72.1 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 64% (47 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

0.1% erosion, 4.8% landslide

LAND COVER (MAP 15)

2% agriculture, 10% forest, 5% wetland, 82% floodplain/riparian (GAP, 2009).

Riparian vegetation: 69% forest cover, 12% non-forest, 19% other natural vegetation (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Coastal cutthroat trout, fall chum salmon, coho salmon, winter steelhead trout; waterfowl concentrations.

4.0 acres of palustrine forested wetland (5.5% of reach).

WATER QUALITY (MAP 13)

Not on 303 (d) Category 5 list; TMDL water quality implementation plan for fecal coliform bacteria and temperature; Category 4C listing for instream flow.

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use - Forestry (68%); Residential (18%); and remaining 14% are a mix of Transportation, Vacant, and Agriculture. Ownership – 100% Private.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning districts – Rural Residential 20 Acres (60%) and Rural Residential 5 Acres (40%).
Comprehensive Plan Designations – Rural (99%) and Agricultural Resource Lands (1%).
Existing SED – 100% Conservancy.

SHORELINE MODIFICATIONS (MAP 16)

There is one road crossing in the northeastern portion of the reach at SR 108.

PUBLIC ACCESS (MAP 14)

There are no mapped public access facilities to Skookum Creek Reach 1.

IMPERVIOUS SURFACES (MAP 16)

1.3% of the reach is mapped as containing impervious surfaces (NOAA CCAP, 2006). Aerial photos from 2009 show rural residential development in the lower part of the reach.

AREAS OF SPECIAL INTEREST

No Ecology listed facilities or contaminated sites.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a low to moderate probability of finding unknown artifacts within this reach.

OPPORTUNITY AREAS (MAP 23)

KEY MANAGEMENT ISSUES

Culverts impeding transport of spawning gravels. Protect Little Creek and other tributaries for spawning.

SKOOKUM CREEK - REACH 02

SHORELINE LENGTH

3.7 MI

REACH AREA

552.3 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 88% (483 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

1.8% erosion, 2.4% landslide

LAND COVER (MAP 15)

32% agriculture, 11% forest, 25% wetland, 32% floodplain/riparian (GAP, 2009).

Riparian vegetation: 22% forest cover, 56% non-forest, 22% other natural vegetation (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Coastal cutthroat trout, fall chum salmon, coho salmon, winter steelhead trout; Olympic mudminnow, waterfowl concentrations, and Roosevelt elk.

Wetlands – 118.2 acres (21.4% of reach); wetland habitat types include palustrine emergent, palustrine forested, and palustrine scrub-shrub.

WATER QUALITY (MAP 13)

Not on 30 (d) Category 5 list; TMDL water quality implementation plan for fecal coliform bacteria and temperature.

BUILT ENVIRONMENT AND LAND USE	
EXISTING LAND USES AND OWNERSHIP (MAP 18) Land Use – Agricultural Resource Lands (80%) and Forestry and Vacant (20%). Ownership – 100% Private.	SHORELINE MODIFICATIONS (MAP 16) There are 2 road crossings located in the eastern portion of the reach at Eich Rd and SR 108. Eich Rd is a bridge crossing.
ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21) Zoning districts - Agriculture Resource Lands (74%) and remaining 26% are a mix of Rural Residential 20 Acres and Long Term Commercial Forest. Comprehensive Plan Designations – Agricultural Resource Lands (76%) and Rural (24%). Existing SED – 100% Conservancy.	PUBLIC ACCESS (MAP 14) There are no mapped public access facilities to Skookum Creek Reach 2.
IMPERVIOUS SURFACES (MAP 16) No impervious surfaces are mapped in this reach (NOAA CCAP, 2006). Aerial photos from 2009 show very limited rural residential development in this reach.	AREAS OF SPECIAL INTEREST According to the Ecology facilities/sites database, there are no listed facilities or contaminated sites.
CULTURAL AND ARCHAEOLOGICAL RESOURCES The DAHP architectural and archaeological records show two inventoried early historic sites in this reach. Resource mapping suggests there is a very low probability of finding unknown artifacts within this reach.	

OPPORTUNITY AREAS (MAP 23)

KEY MANAGEMENT ISSUES

Protect upper reach and tributaries for spawning.
Riparian corridor in middle portion of reach is significantly deficient in vegetation/instream shade.
Monitor land management activities to maintain water temperatures.

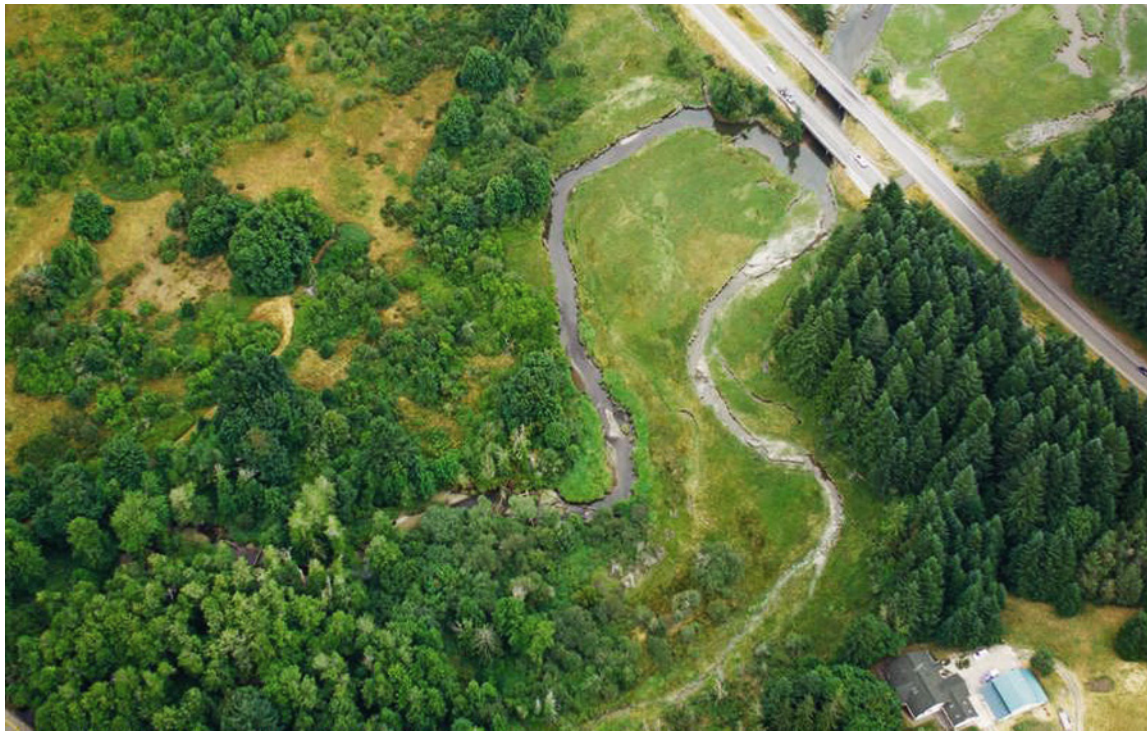
KENNEDY CREEK - REACH 01

SHORELINE LENGTH

1.8 MI

REACH AREA

137.4 AC



PHYSICAL AND ECOLOGICAL FEATURES

HYDROLOGY (MAPS 4 AND 10)

Floodplain - 68% (93 acres) of the reach, excluding open water, is mapped as FEMA 1% annual chance floodplain

HAZARD AREAS (MAP 12)

3.4% landslide

LAND COVER (MAP 15)

3% developed, 6% agriculture, 31% forest, 17% wetland, 43% floodplain/riparian (GAP, 2009).
Riparian vegetation: 52% forest cover, 10% non-forest, 38% other natural vegetation, 1% water (PNPTC, 2011)

HABITATS AND SPECIES (MAP 8)

Coastal cutthroat trout, fall Chinook salmon, fall chum salmon, coho salmon, winter steelhead trout. Several priority vegetation communities mapped; see text.
Wetlands -- 16.6 acres (12.1% of reach); wetland habitat types include estuarine intertidal emergent, palustrine forested, and palustrine scrub-shrub.

WATER QUALITY (MAP 13)

One 303 (d) Category 5 listing for dissolved oxygen; TMDL water quality implementation plan for fecal coliform bacteria.

BUILT ENVIRONMENT AND LAND USE

EXISTING LAND USES AND OWNERSHIP (MAP 18)

Land Use - Forestry (38%); Parks, Open Space, and Recreation Areas (18%); Agriculture (17%); Vacant (17%) and Residential (9%). Ownership – Private (98%) and Public (2%).

SHORELINE MODIFICATIONS (MAP 16)

No shoreline modifications are mapped in the reach.

ZONING AND COMPREHENSIVE PLAN DESIGNATIONS (MAP 21)

Zoning districts - Rural Residential 20 Acres (42%), Agriculture Resource Lands (32%), and Rural Residential 5 Acres (26%). Comprehensive Plan Designations - Rural (68%) and Agricultural Resource Lands (32%).

Existing SED – 100% Conservancy.

PUBLIC ACCESS (MAP 14)

There are no mapped public access facilities to Kennedy Creek

IMPERVIOUS SURFACES (MAP 16)

4.3% of the reach is mapped as containing impervious surfaces (NOAA CCAP, 2006). Aerial photos from 2009 show single-family residences and roads in the eastern section of the reach.

AREAS OF SPECIAL INTEREST

No Ecology listed facilities or contaminated sites.

CULTURAL AND ARCHAEOLOGICAL RESOURCES

There are no listed cultural resources or state or federally listed historic properties. Resource mapping suggests there is a very high probability of finding unknown artifacts within this reach.

OPPORTUNITY AREAS (MAP 23)

KEY MANAGEMENT ISSUES

Comply with Washington Forest Practice Rules

6.13 Data Gaps

The inventory and characterization report relies on GIS data, review of aerial photographs, existing technical reports, existing map products, information from Mason County planning staff and the Joint Technical Advisory Committee (JTAC), as well as input from the Mason County residents.

The following gaps in data or information were identified during this inventory and characterizations of the Kennedy-Goldsborough (WRIA 14) watershed:

- Current quantifiable data on channel modifications;
- Current data on shoreline modifications such as linear feet of hard shore armoring;
- Channel migration zone location and extent;