

# Section 1

## Introduction

## 1.1 Community Vision

**Growth and Change.** As Everett grows, change is inevitable, and the city's shoreline areas will experience significant redevelopment. With change comes the opportunity for the community to influence the character of its shoreline areas. Everett is the job center for a rapidly growing county, and with an active port and a large number of underutilized waterfront properties, it is likely to witness a transformation of its shoreline areas. Everett will promote a balance between economic diversification, recreational opportunities, and environmental protection and restoration in its shoreline areas.

**Public Access.** Miles of shoreline that many residents have been able to see but not touch or walk beside will become more accessible. Shoreline areas that have been home to industrial uses will be redeveloped with a variety of new activities that allow more people to enjoy views and access to the water's edge. Other areas will continue to be used for water-dependent industries that do not allow direct public access. Population growth in the Everett area will increase the demand for water-oriented recreation. This demand will result in the City working with the Port of Everett, shoreline property owners, and other interested persons to provide additional public access improvements. Eventually, the City will complete a continuous and interconnected system of parks, trails, pedestrian walkways and bicycle paths in and between shoreline areas, including the Silver Lake area.

**Shoreline Development.** The urbanized parts of Everett's shoreline will experience development and redevelopment in areas where the community has invested and committed capital expenditures for transportation and utility infrastructure. Such development will diversify Everett's economic base with water-oriented businesses, recreational activities, open space areas, and a mix of urban uses. Nonwater-dependent uses, where allowed, will be of a high quality that enhances the built environment and protects the natural environment. Shoreline redevelopment will diversify the local economy and create greater opportunities for the public to enjoy the shoreline.

**Environmental Protection.** Although most of Everett's shoreline areas have been highly modified over a century of urbanization, there remain areas providing important shoreline ecological functions. Fish and wildlife species use Everett's shoreline areas for habitat, migration, feeding, and resting. Challenges related to the protection of endangered salmon species have made protection and enhancement of shoreline habitat more critical. Most of Everett's shoreline areas containing quality habitat will be protected and enhanced. In certain areas where development occurs, shoreline ecological functions must be improved as a condition of permit approval. Over time, there will be a net improvement in ecological functions along Everett's shorelines.

## 1.2 Shoreline Management Act

The Shoreline Management Act (RCW 90.58) was passed by the Washington State Legislature in 1971 and adopted by the public in a 1972 referendum. The Act states, “It is the policy of the state to provide for the management of the shorelines of the state by planning for and fostering all reasonable and appropriate uses. This policy is designed to insure the development of these shorelines in a manner which, while allowing for limited reduction of rights of the public in the navigable waters, will promote and enhance the public interest. This policy contemplates protecting against adverse effects to the public health, the land and its vegetation and wildlife, and the waters of the state and their aquatic life, while protecting generally public rights of navigation and corollary rights incidental thereto.”

The Act provides for the state and local governments to engage in a coordinated effort for the planning and administration of the Act. The cities and counties are the primary regulators, while the Washington State Department of Ecology provides technical assistance, approves local master programs, and assures that local government actions are consistent with the master programs and the Act.

The Act encourages full opportunity for citizen involvement in permit decisions as well as in preparing the plan itself, which is expected to contribute to the success of the Shoreline Management Program.

The Act makes each city and county affected by the Act responsible for:

1. Administration of a shoreline permit system for proposed substantial development within shoreline areas.
2. Development of an inventory of natural characteristics and land use patterns along designated water bodies.
3. Preparation of a Master Program to best determine the future uses of local shorelines.

### Scope of Shoreline Act

The requirements of the Shoreline Management Act apply to the following “shorelines of the state” and “shorelands”:

Shorelines of the State

- All marine waters.

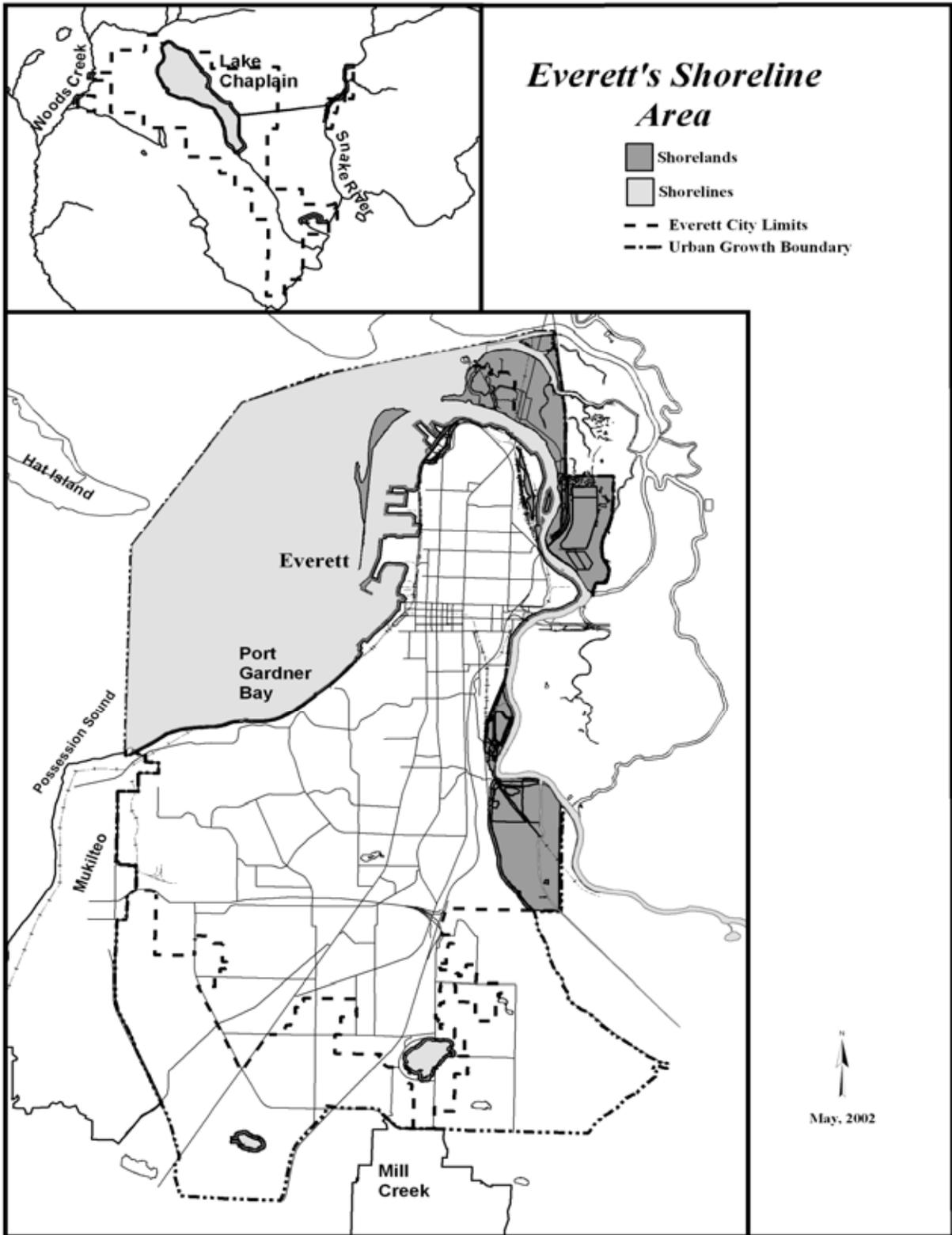
- All streams and rivers from a point where the mean annual flow is twenty cubic feet per second or greater.
- All lakes, including reservoirs, which are twenty surface acres or larger in size.

Shorelands

- All lands extending landward for 200 feet in all directions as measured on a horizontal plane from the ordinary high water mark.
- Floodways and contiguous floodplain areas landward two hundred feet from such floodways.
- All wetlands and river deltas associated with the shorelines described above.
- Some or all of the 100-year floodplain. The City may determine the portion of a 100-year floodplain to be included as long as such portion includes, as a minimum, the floodway and the adjacent land extending landward two hundred feet therefrom.

Figure 1.1 shows Everett's Shoreline Areas (shorelines and shorelands).

Figure 1.1 Everett's Shoreline Area



## Shorelines of State-wide Significance

The Shoreline Management Act designates certain shorelines of the State as "shorelines of state-wide significance." Shorelines thus designated are important to the entire state. Because these shorelines are major resources from which all people in the State derive benefit, Everett's Master Program must give preference to uses which favor public and long-range goals.

Accordingly, the Act established that in the development of Master Programs, preference shall be given to uses along "shorelines of state-wide significance" which meet principles listed below in the order of preference.

- 1. Recognize the state-wide interest over local interest**
- 2. Preserve the natural character of the shoreline**
- 3. Result in long-term over short-term benefit**
- 4. Protect the resources and ecology of shorelines**
- 5. Increase public access to publicly owned areas of the shorelines**
- 6. Increase recreational opportunities for the public on the shorelines**
- 7. Provide for any other element as defined in RCW 90.58.100 deemed appropriate or necessary**

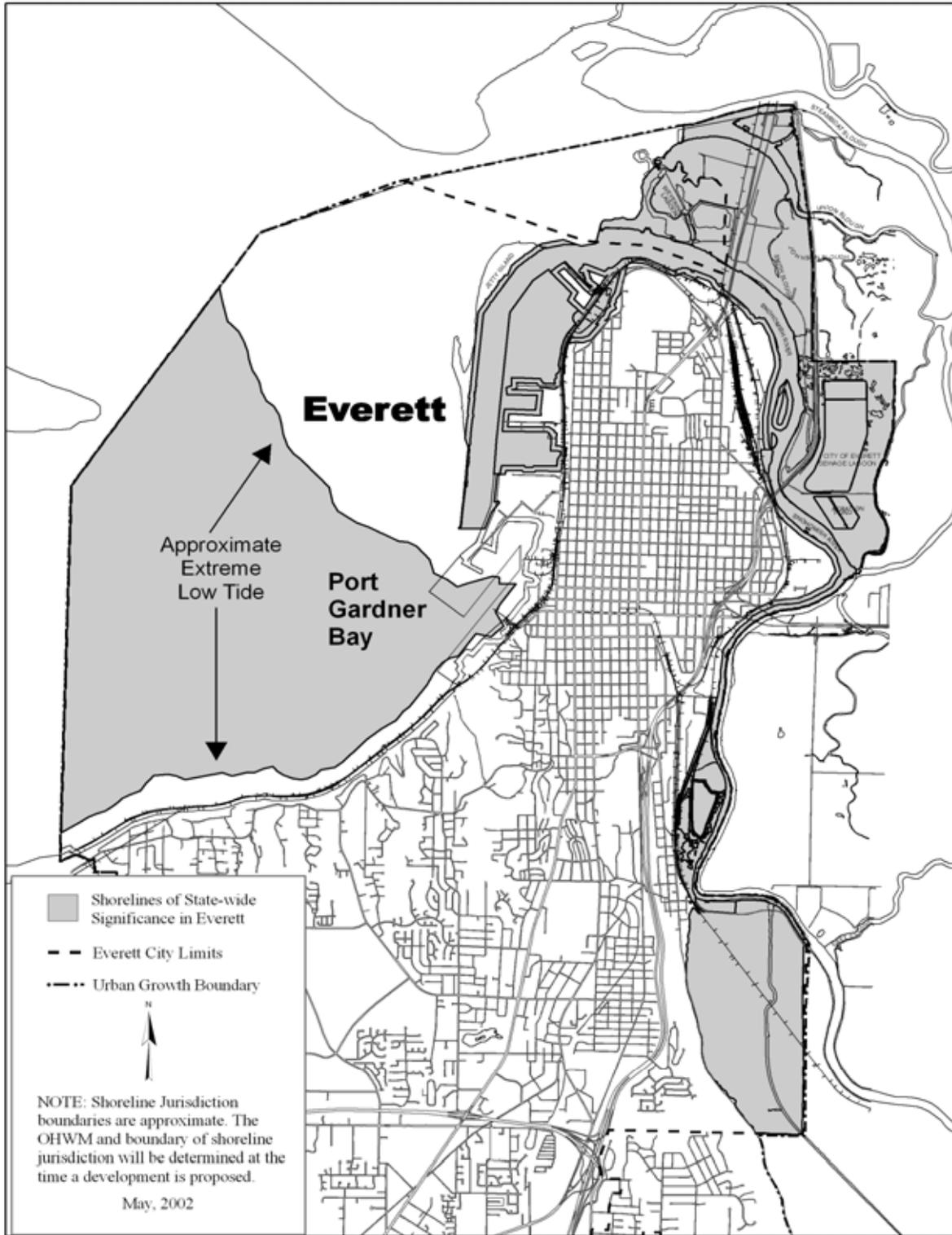
The Act requires more extensive coordination of planning efforts with State agencies, affected Tribes, and the public for shorelines of statewide significance.

The shorelines under the jurisdiction of the city which have been designated as having state-wide significance include:

1. That area of Port Gardner Bay lying seaward from the line of extreme low tide.
2. The Snohomish River and the associated estuary areas, including Steamboat lough and Union Slough, and their shorelands.

Figure 1.2 shows Everett's shorelines of statewide significance.

Figure 1.2 Everett's shorelines of statewide significance



## **State Administrative Provisions**

Washington State Administrative provisions that implement the Shoreline Management Act (RCW 90.58) include

- WAC 173-18 Shoreline Management Act – Streams and Rivers Constituting Shorelines of the State.
- WAC 173-20 Shoreline Management Act – Lakes Constituting Shorelines of the State.
- WAC 173-22 Adoption of Designations of Shorelands and Wetlands Associated with Shorelines of the State.
- WAC 173-26 State Master Program Approval/Amendment Procedures.
- WAC 173-27 Shoreline Management Permit and Enforcement Procedures.

These administrative guidelines/requirements were reviewed and implemented in updating Everett's Master Program.

### 1.3 Purpose of Shoreline Master Program Update

Everett adopted its Shoreline Master Program (SMP) in 1976 and the Program has not been revised since then. The City chose to update its SMP for a number of important reasons, including:

- Many circumstances have changed in Everett and its shoreline areas since 1976.
- Shoreline areas annexed to Everett since 1976 were subject to Snohomish County's SMP, until the City updated its SMP to address those areas. This resulted in the City using two different SMPs adopted at different times with different policies and regulations. Annexed areas reviewed under Snohomish County's SMP include portions of the Silver Lake area, Smith and Spencer Islands, and the City's Lake Chaplain properties.
- The City needed to integrate its SMP with its Growth Management Act Comprehensive Plan. The SMP should apply to shorelines within Everett's Growth Management Planning Area, but outside the current City limits, including Lake Stickney
- "Critical area" or "environmentally sensitive area" issues were not adequately addressed in the 1976 SMP. Critical areas such as wetlands were thought of in a different light in 1976. The City has invested significant resources to classify wetland and aquatic functions in the Snohomish River estuary for the *Snohomish Estuary Wetland Integration Plan*. The knowledge gained from this study and other new watershed resource information has been incorporated in the updated SMP.
- Chinook salmon were listed as a threatened species under the Endangered Species Act by National Marine Fisheries Service. In addition, bull trout were listed by the U.S. Fish and Wildlife Service as a threatened species. There may be additional listings under the Endangered Species Act in the future.
- Certain shoreline issues, such as public access, needed to be addressed in more detail.
- New Department of Ecology guidelines for Shoreline Master Programs required major revisions to existing SMPs (WAC 173-26).

## **1.4 Master Program Update Process and Citizen Involvement**

### **2001 Update to Shoreline Master Program**

In June of 1998, Mayor Ed Hansen formed a 24 member Shorelines Citizens Advisory Committee to guide formulation of the Shoreline Master Program update. The Committee met approximately two times per month over a two year period. After holding public workshops and hearings, the Committee delivered their recommendation to the Planning Commission on September 5, 2000. The Planning Commission and City Council also conducted public hearings and considered the recommendations of the Citizens Advisory Committee and those of property owners, resource agencies, and citizens in rendering their decision to adopt the updated SMP.

Public notice was accomplished through a WEB site, mailing of a brochure to interested citizens, displays in the City libraries, presentations to neighborhood groups and other organizations, newspaper articles and legal advertisements, and mailing notices of meetings to interested citizens and organizations.

### **Future Updates to the SMP - Documentation of Project Review Actions, Monitoring and Adaptive Management**

The city's master program, as required by Section 6 of the Act, shall be available for public inspection at the planning and community development department.

The City shall compile all permits and letters of exemption issued annually. In addition, the City shall compile all monitoring reports received annually. Subject to funding by the Department of Ecology or the State Legislature, every five years in conjunction with the Comprehensive Plan review and evaluation program required by RCW 36.70A.215, the City will compile new information regarding shoreline resources, review the development that occurred within shoreline areas during the previous five years, evaluate compliance of those developments with permit conditions, evaluate the cumulative impacts of the developments, and identify recommended changes to the SMP to address cumulative impacts.

The planning and community development department and planning commission shall review all administrative and management policies, regulations, plans and ordinances relative to lands in the city adjacent to the shorelines of the city and recommend appropriate action to the council so as to achieve a use policy on said land consistent with the policy of this chapter, the Shoreline Management Act of 1971, the guidelines, and the city's master program.

The planning and community development department shall submit a report to the commission on the permit activity and recommended changes to the master program. The commission shall make a recommendation to the council, with council's actions conveyed to the Department of Ecology. Public notice will be provided as required by state guidelines.

The planning and community development department may make application to the Department of Ecology or other appropriate agency for such funds as are deemed necessary for updating the master program.

When necessary to achieve implementation of the master program, the council may either alone or in concert with other governmental entities acquire land and easements within the city by purchase, lease or gift.

## **1.5 Relationship to the Comprehensive Plan**

In 1994, the City adopted a Comprehensive Plan per the requirements of the Growth Management Act. The recommendations of the Shoreline Citizens Advisory Committee, Planning Commission, and City Council for the Shoreline Master Program update resulted in the need to revise the Comprehensive Plan to make the two documents consistent. Portions of the Comprehensive Plan were repealed upon adoption of this SMP. Additional revisions to the Comprehensive Plan will be reviewed and adopted after adoption of the Shoreline Master Program to ensure that the documents are consistent. The policies in this Shoreline Master Program (those provisions not designated as regulations) are adopted as an element of Everett's Comprehensive Plan.

## 1.6 Shoreline Inventory

The shoreline inventory is an evolving process. Inventory information was compiled over the two years of meetings with the Citizens Advisory Committee, and continued through Planning Commission and City Council hearings. New information was continually generated in response to listings under the endangered species act and revisions to the State shoreline guidelines. For example, the Snohomish Estuary Wetland Integration Plan was updated to address listing of salmon and bull trout as endangered species. However, the update was not complete at the time the Citizens Advisory Committee delivered their recommendations to the Planning Commission. Information will continue to be compiled to ensure the use of “best available science” during project review. In addition, the City will continue to develop plans to implement the Master Program. For example, following adoption of the Shoreline Master Program, the City plans to develop a city-wide public access plan.

Information compiled includes, but is not limited to, a historic survey of Everett’s shorelines, existing land and transportation facilities, existing and potential public access, an economic assessment of waterfront land uses, and environmental resource information. The Snohomish Estuary Wetland Integration Plan (SEWIP) provides detailed information concerning fish habitat, other wildlife habitat and water quality attributes for substantial portions of Everett’s shoreline. The inventory information is available for review in the Planning and Community Development Department.

## 1.7 Description of Everett's Shoreline Resources

This section summarizes some of the inventory information available for Everett's shoreline resources. Additional inventory information and more detailed information is available from the City of Everett Planning and Community Development Department.

Detailed environmental inventory and analysis of the estuary, including the nearshore areas along Port Gardner Bay, was completed and presented in the Snohomish Estuary Wetland Integration Plan (1993) and the Salmon Update to the Snohomish Estuary Wetland Integration Plan (2000). Significantly less existing inventory information is available for Silver Lake, Lake Stickney and the City's Lake Chaplain Reservoir properties.

### **Snohomish River and Port Gardner Bay<sup>1</sup>**

The Snohomish estuary is approximately 9 miles long and 3 to 4.5 miles broad at its widest point, encompassing six major islands within its 19.5 square miles. The estuary is at the mouth of the Snohomish River, which has the second largest Puget Sound watershed (1,780 square miles). The Snohomish River runs from Monroe, 23 miles upstream from the mouth of the river to the estuary at a gradient which averages 1 ft./mile. The lower portion of the Snohomish River basin, including the portion in Everett's jurisdiction, is flood protected with a series of levees built and maintained by independent diking and drainage districts. Figure 1.3 shows the Snohomish estuary and nearshore area.

### **Ecological Management Units (EMUs)**

The estuary has been divided into Ecological Management Units (EMUs) based on indicators of the degree of fresh water and marine influence.<sup>2</sup> The indicators include plants (vascular and algae) and invertebrates. Figure 1.4 shows the EMU boundaries. The EMUs cross jurisdictional limits with Snohomish County and Marysville. The following information regarding the EMUs is primarily taken from the Snohomish Estuary Wetland Integration Plan Salmon Overlay (Pentec Environmental).

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<sup>1</sup> The description of the Snohomish estuary is excerpted from the Snohomish Estuary Wetland Integration Plan Salmon Update (Pentec, 2000).

<sup>2</sup> The concept of Ecological Management Units (EMUs) is adapted from Pentec (1992a). Pentec's EMUs were modified in *The Snohomish Estuary Wetland Integration Plan*, 1997 and further modified in the Salmon Update to the Plan. The EMUs described here are as defined in the Salmon Update.

Figure 1.3 Snohomish Estuary and Near shore Planning Area

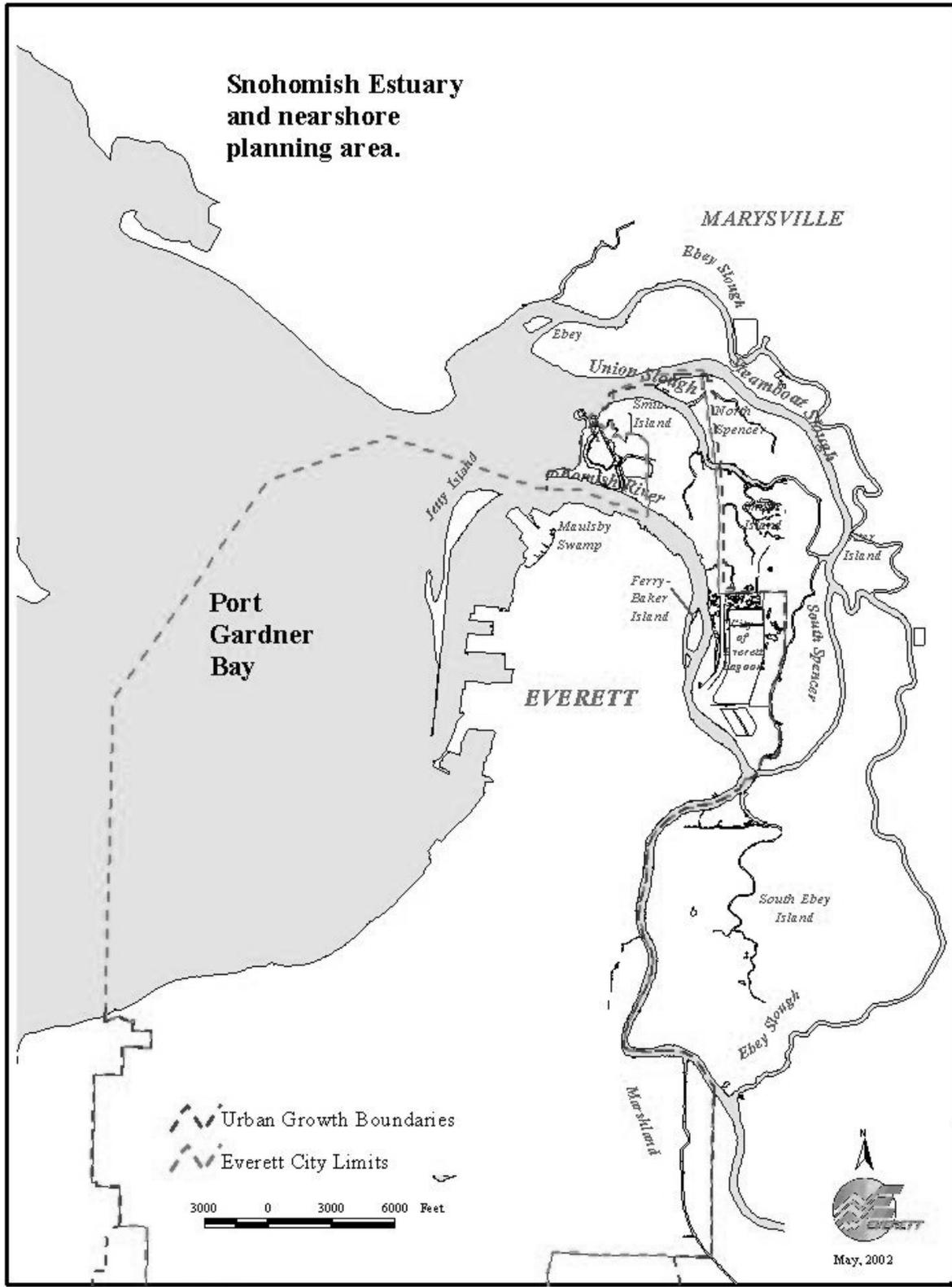
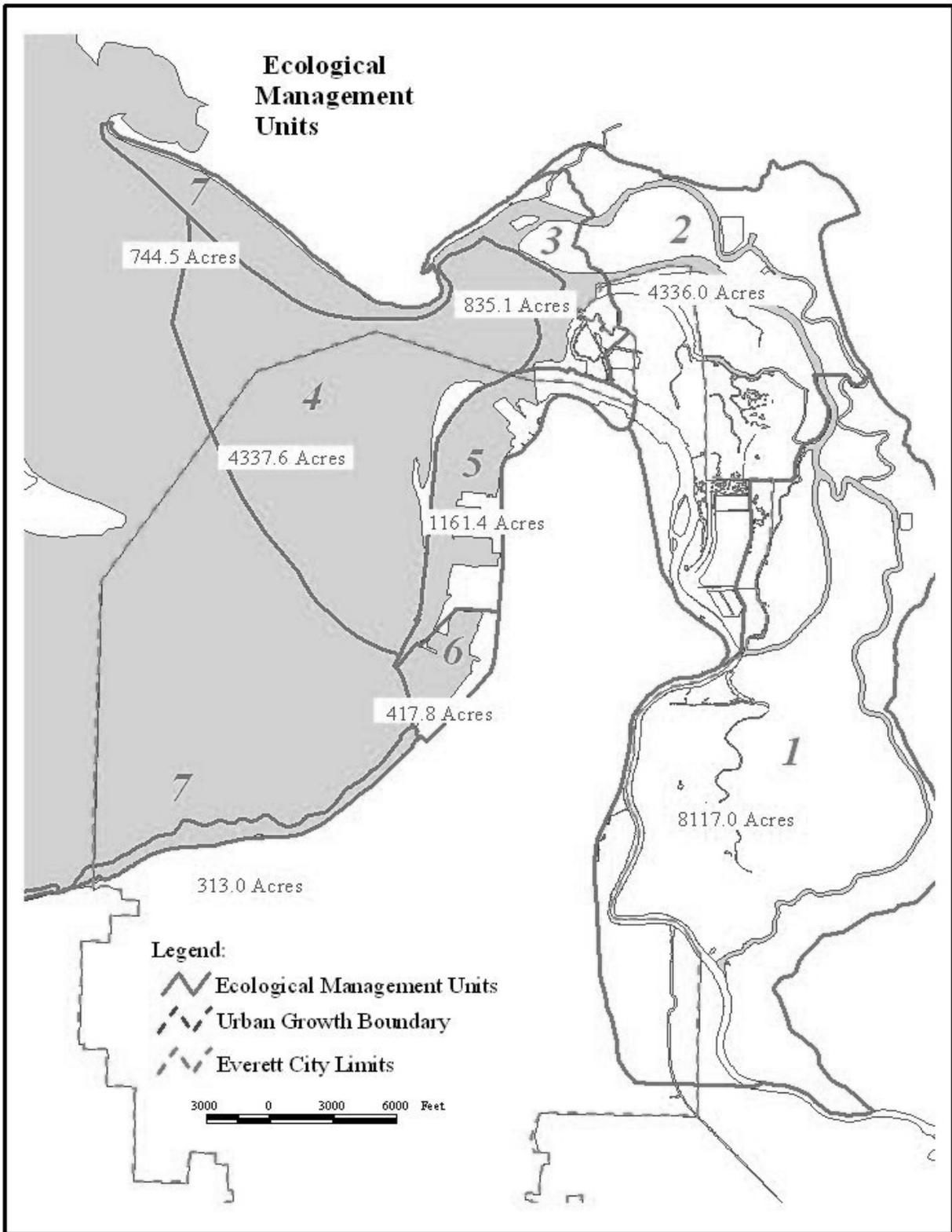


Figure 1.4 Ecological Management Units



EMU 1 - Fluvial Freshwater (Forested Riverine/Tidal)

EMU 1 generally includes freshwater wetlands in the southern portion of the estuary. Salt sensitive plant species that distinguish this area include skunk cabbage, yellow marsh marigold, and red osier dogwood. Historically the area was a mosaic of tidal marshes, forested wetlands, and sloughs that were flooded daily. However, today the majority of wetlands within this unit are diked and in agricultural production. Two notable exceptions are Otter Island, which was never diked, and South Spencer Island, which has been partly restored to intertidal influence. Two dead-end sloughs, Deadman and Deadwater, are hydrologically connected to the River.

River and slough banks are typically steep in EMU 1 and consist mainly of sands with rock riprap and occasional pilings present on the Snohomish River. A narrow shoreline of sandy silts (mud) is present throughout most of the EMU.

EMU 1 is predominantly within unincorporated Snohomish County, with only the left bank of the Snohomish River and a portion of Smith Island in Everett's jurisdiction. Agriculture has been the predominant land use in this unit. Uses along the river within Everett's City limits include log yards, heavy equipment storage, and aggregate storage. Tidal restoration to improve salmon rearing habitat has occurred at a breached dike wetland site at South Spencer Island. Rotary Park and pedestrian paths occur at the south bend in the River.

EMU 2 – Fluvial Brackish Water (Emergent/Forested Transitional)

EMU 2 generally includes the northern portion of the estuary immediately east and west of I-5. The area is comprised of brackish tidal marshes and diked palustrine marshes. Salt tolerant and moderately tolerant plant species in this area include Lyngby's sedge, Baltic rush, seaside arrowgrass and Pacific silverweed.

River and slough banks are moderately sloped and sandy with rock riprap and pilings dominating banks along much of the Snohomish River mainstem. A narrow shoreline of sandy silts (mud) is present throughout most of the EMU. Wider shoreline mudflats are found primarily along Steamboat and Ebey Sloughs at lower tides. Prior to diking this EMU was dominated by extensive tidal marshes with dendritic channel systems, interspersed with islands of forested wetlands.

Historical industrial uses in this unit include the closed Weyerhaeuser mills, the Burlington Northern Railroad delta yard in the southwest portion of the EMU, as well as the Buse Mill, log yards, St. Regis building materials supplier (now BMC West), boat storage, sand and gravel barge facilities (Lone Star/Glacier), and wood chip facilities on Smith Island. The middle portion of the unit, including the Biringer Farm on North Spencer Island and the central portion of Smith Island are in agricultural use. Other uses

include the City of Everett Water Pollution Control Facility and Treatment Ponds, and Langus Park on the southern portion of Smith Island.

This unit differs from EMU 1 in that the majority of the eastern islands located outside Everett's City limits (Mid-and North Ebey and Mid-Spender Islands) have broken dikes and are subject to tidal inundation. These islands have reverted to a condition more closely resembling the pre-development condition of the EMU. Additionally tidal restoration has occurred at the Marysville sewer treatment mitigation site.

#### EMU 3 – River and Slough Mouths (Estuarine Emergent Marsh)

This EMU extends southwest along Quilceda Creek tidal wetlands toward Priest Point, and south from the mouth of Quilceda Creek across salt marsh and sandflats to the right bank of the Snohomish River west of SR 529. Aquatic habitat consists of a combination of brackish wetlands, saltmarsh, and low gradient mud and sand flats. While considerable mixing of river and marine water occurs in this area, the saltwater influence results in the presence of marine species such as eelgrass, brown and green algae, and eastern soft shell clam. Salt-tolerant plant species, including Lyngby's sedge, Baltic rush, seaside arrowgrass, and seaside plantain dominate the marsh vegetation

Relative to EMU 1 and 2, diking is limited in EMU 3 and confined to the west end of Smith Island. In contrast, the undiked portions of the unit at the mouths of Quilceda Creek and Ebey and Steamboat Sloughs are close to the natural historical condition of this part of the estuary.

Log raft storage has been and continues to be the major industrial use in this unit. However, recent declines in timber harvest have resulted in substantial reductions in the intensity of log raft storage over the delta area in this EMU.

#### EMU 4 – Delta Sand Flats

This EMU encompasses the extensive sand and mudflats of the inner and outer Snohomish River delta and Jetty Island. Because the area is subject to the waves and currents of Puget Sound and salinities exceeding 30 parts per thousand, it is predominantly marine in character. Small brackish marshes and salt marshes are found on Jetty Island and extensive eelgrass beds are present west of the Island. Salinities are affected by freshwater flows from the estuary; however, Jetty Island channels the majority of this flow west of the Island and south into Port Gardner Bay. High river flows during winter months result in significant sediment accretion in this unit. The shorelines and shallow areas surrounding Jetty Island are highly productive, supporting many species of fish and invertebrates.

The creation of Jetty Island from dredge spoils and material has been the major impact upon this unit. Prior to the creation of Jetty Island, this area consisted of intertidal and subtidal sand and mudflats with meandering channels but lacked shoreline and island habitat. Deflection of approximately 50% of the Snohomish River flow and sediment down the Lower Snohomish Channel (EMU 5) likely has allowed expansion of eelgrass within EMU 4. A joint Corps of Engineers/Port of Everett project constructed a 2,500 foot long berm of dredged material on the west side of the island, greatly enhancing habitat for juvenile salmon, surf smelt and shorebirds.

#### EMU 5 - Lower Snohomish Channel

EMU 5 contains highly modified or artificially created habitats in the Snohomish River channel. This EMU includes the industrialized area of the Everett waterfront, extending from Preston Point southward to Naval Station Everett, and the east shore of Jetty Island. Prior to the construction of Jetty Island, this EMU resembled the extensive mud and sand flats that persist today in EMUs 3 and 4. Other emergent marshes similar to Maulsby swamp likely were present along the base of the bluff south toward the Naval base. Farther south, the littoral area was probably comprised of mixed sands, silt and mud. The mainstem Snohomish River likely meandered out over the delta, but certainly was shallower and wider than its present configuration.

Much of the Everett waterfront shoreline has been modified by hard structures, including rock riprap, pilings, concrete bulkheads, docks and adjacent roads, parking lots and industrial yards and buildings. This area has been extensively dredged and filled, primarily for timber related industries, since the inception of the City of Everett. Filling has occurred just south of Preston Point, at the 10<sup>th</sup> Street boat launch, the North and South marinas, and the Naval Base. It is estimated that this activity has reduced the area of historical intertidal mudflats by approximately 50% (Pentec, 1992). Extensive mudflats do persist waterward of Maulsby swamp and along the east side of Jetty Island, but have been extensively used for log raft storage.

#### EMU 6 – Everett Harbor (East Waterway)

The East Waterway was transformed into a deepwater port by dredging and filling in the early part of the last century and has provided shipping and processing facilities for timber, pulp and alumina. As a result, this EMU consists primarily of highly modified deepwater and some limited shallow subtidal and intertidal habitat. Littoral habitats largely are associated with fill, as nearly all mudflat areas have been eliminated by dredging, fill, riprap or bulkheads. This area is primarily marine in nature.

Prior to alteration, this area was probably comprised of beaches consisting of cobbles and mixed sands and silts similar to those that currently line the Mukilteo shoreline to the south.

### EMU 7 – Port Gardner Nearshore, Tulalip Nearshore

This EMU includes intertidal beach habitat and subtidal areas to –30 feet MLLW. Mid- and upper-intertidal areas are comprised of cobble and gravel, while lower intertidal and subtidal areas are predominantly mixed sands and silts. The EMU stretches from the entrance to Tulalip Bay south to Priest Point and from the mouth of Pigeon Creek No. 1 southwest towards Mukilteo. This EMU is primarily marine, but is influenced by freshwater from the Snohomish River and local streams. Sediment flows from these creeks have created small to moderate sized deltas along the southern shoreline. The upper beach in the Everett portion is highly modified by railroad lines. The Tulalip shoreline is less affected by single family residential development and associated losses to riparian habitat from bulkheading, and substantial reaches of feeder bluffs remain in the Mission Beach.

### **Salmonids**

The Snohomish River supports seven species of anadromous salmonids: chinook, coho, chum, pink, steelhead, cutthroat and Dolly Varden/bull trout. Chinook salmon and bull trout were listed as threatened with extinction under the Endangered Species Act in 1999. Coho salmon are listed as a candidate species for federal protection. All salmonid species spawn in freshwater upstream from the estuary. Adult use of the estuary is largely limited to migration and physiological transition. Adults may return to fresh water during every month of the year, and spawning times vary by species and stock. There is considerable variation in length of residence by juveniles in estuaries by species, stock type, and life stage. Juvenile salmonids are dependent on the estuary for feeding, physiological transition, migration and refuge from predation or displacement as they migrate from freshwater to marine habitats.

### **Other Fish**

In the Snohomish Estuary, the most abundant non-salmonid species include juvenile starry flounder (*Platichthys stellatus*), peamouth chub (*Mylocheilus caurinus*), the Pacific staghorn sculpin (*Leptocottus armatus*), and prickly sculpin (*Cottus asper*). Three spined sticklebacks (*Gasterosteus aculeatus*), shiner perch (*Cymatogaster aggregata*), juvenile smelts, and lampreys are also found in the study area. Less abundant species include candlefish (*Thaleichthys pacificus*), Pacific herring (*Clupea pallasii*), and pumpkinseed (*Lepomis gibbosus*).

In the more marine EMUs 6 and 7, in Port Gardner and Possession Sound, starry flounder and English sole (*Parophrys vetulus*) are common flatfish. Surf smelt (*Hypomesus pretiosus*) and sand lance (*Ammodytes hexapterus*) are both very important forage fish

that are abundant in the shallow waters of EMUs 3, 4, 5, 6, and 7. Numerous other species, typically associated with estuarine habitats for at least part of their life history, are also found in Port Gardner. These species include: tadpole sculpin (*Enophrys bison*), striped seaperch (*Embiotoca lateralis*), Pacific tomcod, (*Microgadus proximus*), saddleback gunnel (*Pholis ornata*), sand sole (*Psettichthys melanostictus*), Pacific hake (*Merluccius productus*), walleye pollock (*Theragra chalcogramma*), copper rockfish (*Sebastes caurinus*), spiny dogfish (*Squalus acanthias*), snake prickleback (*Lumpenus sagitta*), and bay goby (*Lepidogobius lepidus*).

## **Invertebrates**

Common invertebrate species present in EMUs 3, 4, 5, 6, and 7 include: snails (*Littorina* spp.), mussels (*Mytilus* cf. *edulis*), clams (*Macoma balthica*, *Macoma* spp., *Cryptomya* spp.), cockles (*Clinocardium* sp.), jingle shells (*Pododesmus macroschisma*), polychaetes (*Nereis* spp., *Notomastus* spp., *Nephtys* spp., *Glycera* spp.), barnacles (*Balanus glandula*), shore crabs (*Hemigrapsus* spp.), isopods (*Gnorimosphaeroma oregonensis*), ghost shrimp (*Callinassa* sp.), blue mud shrimp (*Upogebia pugettensis*), Dungeness crab (*Cancer magister*), and red crab (*Cancer productus*). Anemones (*Mertridium senile*) are present in EMUs 3, 5, 6, and 7. Of these invertebrate species, Dungeness crab is the most significant commercially and is considered a priority species because of the limited habitat available in both the Everett area and Puget Sound.

## **Other Wildlife**

The Snohomish Estuary is important as wildlife habitat on several geographic scales. Estuary habitats function locally as a corridor/refuge within the lower Snohomish River watershed for small mammals, herpetiles, and invertebrates, and function regionally in the extended Snohomish River basin for medium and large mammals and birds. The estuary links urban and rural open space from the Puget Sound lowlands to the Cascade Crest. Estuary wetland habitats also function regionally, nationally and internationally as a stop-over and wintering area in the Pacific Flyway for migratory waterfowl, including ducks, geese, and swans; and neotropical migrants, such as certain passerines and raptors.

A variety of rare and uncommon species are present in addition to the great diversity of common species. During the field inventory process for SEWIP (City of Everett 1997), 63 species of birds, 15 species of mammals, and four species of herpetiles were observed in the estuary. During a 1978 to 1980 US Fish and Wildlife study of the estuary, 116 species of migratory and resident birds were identified (Zeigler 1996). An example of the large numbers of individuals using the estuary is provided by a 1980 survey in which 17,524 ducks and geese were recorded in a single day.

Of the 62 “wetland associated” Priority Species listed by the state, approximately 40 occur in the estuary (Priority Habitat and Species Program [WDFW 1993]). The status of these species ranges from federally endangered or threatened to state monitored (surveillance of a given species).

## **Birds**

The Snohomish Estuary is a staging and stop-over area for bird migration along the West Coast Flyway. Snohomish Estuary habitats are also important to Puget Sound and resident bird populations.

The lower estuary supports a variety of marine birds, waterbirds, waterfowl, and raptors. Observed species in EMUs 2, 3, and 4 include red-breasted mergansers, loons, goldeneyes, scoters, western grebes, cormorants, pigeon guillemots, brants, eagles, ospreys, peregrine falcons, merlins, gulls, and terns (Carroll and Pentec 1992). Most species are more common in the winter than in other seasons of the year. The SEWIP field team counted over 60 active cormorant nests near the mouth of Union Slough during the summer of 1994 (City of Everett 1997). Ospreys also nest on pilings, with about 15 nests located in the lower estuary (Meehan-Martin, pers. comm., 1996). Marbled murrelets use Port Gardner Bay and Possession Sound for foraging (Carroll, pers. comm., 1996).

Shorebirds use the estuary during both the spring and fall migrations, and some species are present nearly year-round. Spring migration is dominated by shorebirds, and fall migration by waterfowl and raptors. During spring migration the number of shorebirds passing through the estuary is greater than during the fall migration, but there are fewer species except on Jetty Island (Carroll 1992). Dunlin and western sandpipers are the most common species in the spring. Baird’s, sharp-tailed and pectoral sandpipers, and golden plovers, though uncommon, are sometimes observed during fall migration. Dowitchers, dunlin, black-bellied plovers, western sandpiper, and yellowlegs are common in both spring and fall (Meehan-Martin, pers. comm., 1996).

Because shorebirds feed on benthic invertebrates in fine sediment and mud, several mudflats within the study area are used heavily by shorebirds. These include: the Maulsby Mudflats, especially the area directly north of the 10th Street boat launch, which has less log rafting activity than the rest of the flats; the Jetty Island berm and west Jetty Island, where 18 species of shorebirds have been observed and over 8,700 individuals were reported on April 27, 1995 (Pentec 1996); South Spencer Island, where more than 50 western sandpipers have been observed at one time (Carroll pers. comm., 1996); and the mudflat area south of the sunken barges (breakwater) at the mouth of the estuary. The recent construction of Naval Station, Everett, has eliminated the Caspian and Artic

tern colonies in the estuary and significantly reduced the number of Caspian terns present.

Other water birds common throughout the estuary are American bittern, sora (breeding season), wintering common snipe, Virginia rails and greater yellowlegs. Fourteen Virginia rails were observed at Spencer Island during the 1995 Christmas Bird Count.

A wide variety of waterfowl use the estuary including Northern shoveler ducks, American coots, ruddy ducks, northern pintail ducks, and several species that breed in the estuary, including Canada geese, mallard and gadwall ducks. The flooded agricultural pastures and fields in EMUs 1 and 2 provide significant overwintering habitat for thousands of dabbling ducks and several trumpeter swans. Great blue heron use the drier portions of agricultural fields when higher tides reduce hunting opportunities outside of the dikes (Meehan-Martin, pers. comm., 1996). A flock of snow geese and a rare emperor goose have been reported along the lower Snohomish Channel (Pentec 1996). Brant feed on eelgrass west of Jetty Island (100 to 290 individuals in January through March). Over 25 species of waterfowl have been observed on and just off shore of Jetty Island, including American wigeon (1,000 to 3,000 individuals in the October/November peak) which use the west shore of Jetty Island as a resting place at night (Carroll, pers. comm., 1996; Pentec 1996).

Raptor species are widely dispersed throughout the estuary habitats, including mudflats, emergent marshes, agricultural fields and forested swamps. Species that nest in the estuary include red-tail hawks, northern harriers, ospreys, Cooper's hawks, great horned owls, screech owls, and bald eagles. Bald eagles use the estuary because of the abundance of food available on the mudflats. Seven nesting pairs of bald eagles are confirmed in the estuary, and two additional pairs may be present (Carroll 1996; Carroll and Pentec, pers. comm., 1992). Eagles prey on gulls and probably on stranded fish and crabs in the estuary mudflat areas. Eagles use mudflats year round, with the highest concentration occurring during April through June (due to the presence of sub-adults).

Osprey have been observed in the brackish marsh areas of the estuary, including southern EMU 2 and northern EMU 1, but are more common in the marine areas, where they nest on pilings. Peregrine falcons are present most of the year in the lower estuary and prey on shorebirds, waterfowl, and gulls (Carroll 1996). Occasional turkey vultures, which are cliff nesters and come from upland forested areas, have been seen scavenging in the estuary (Meehan-Martin 1996).

Seasonally flooded agricultural fields attract northern harriers, red-tail hawks, peregrine falcons, rough-legged hawks, and merlin. The northern harriers, red-tail hawks, and rough-legged hawks primarily hunt small mammals, while peregrine falcons prey on shorebirds, waterfowl, and gulls. Merlins prey on smaller birds. The Cooper's hawk and

sharp-shinned hawk find refuge in the hedgerows and forested areas in the estuary (Meehan-Martin 1996).

Warblers and passerines migrate through the estuary in spring and fall, traveling as far north as Alaska. In the estuary, they are attracted to riparian corridors, scrub/shrub, and forested habitats. Numerous warblers have been observed at Spencer and Smith islands in the remaining riparian vegetation along the public access paths. Marsh wrens are common, as are red-winged blackbirds. Uncommon species include the Harris' sparrow and a nesting pair of purple martins near the 10th Street boat launch.

## **Mammals**

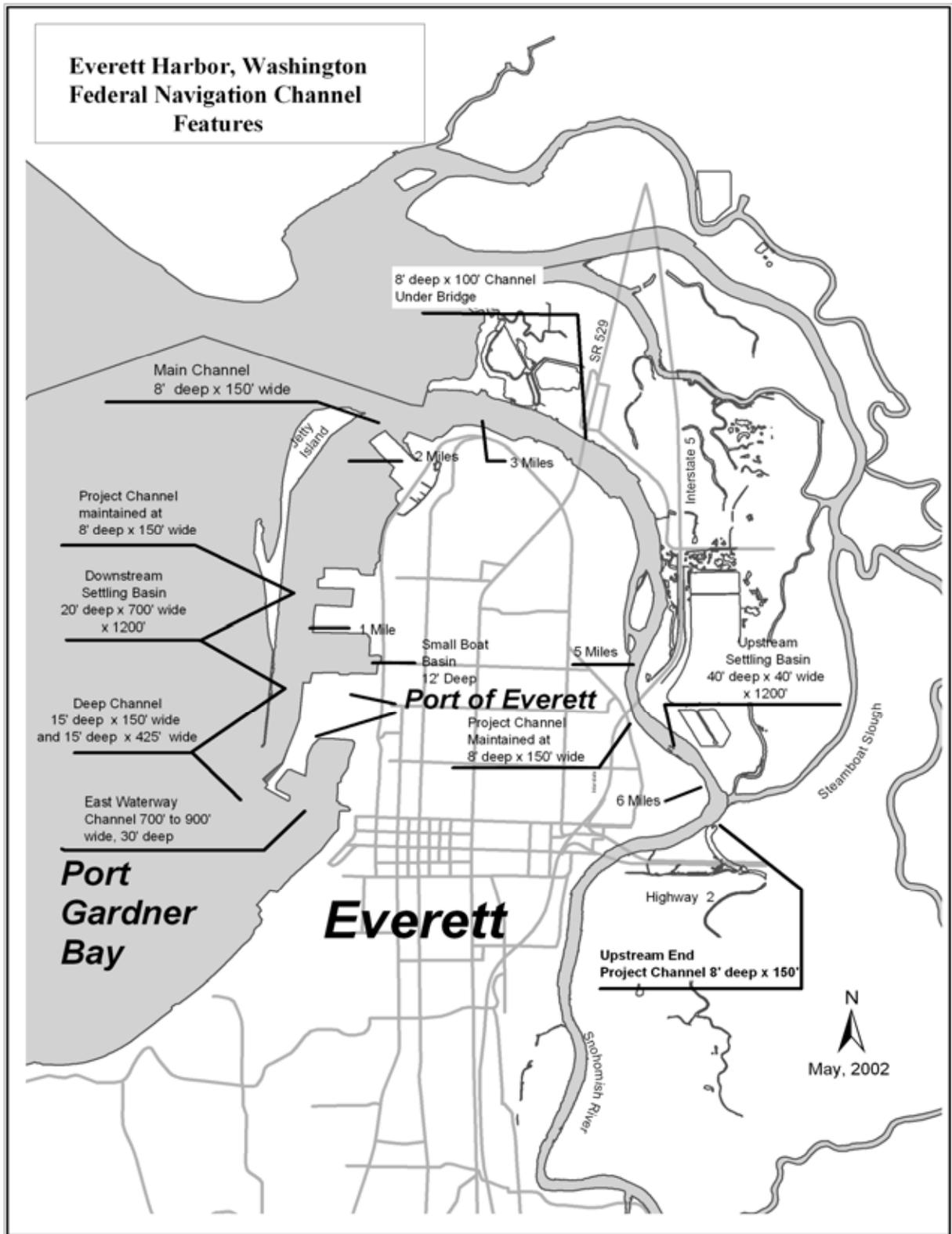
River otters, mink, muskrats, weasels, beavers, coyotes, raccoons, and deer are all common throughout the estuary. Larger mammals, such as cougar or bear, are rarely observed in the estuary. This reflects the loss of upland habitat, the loss of forested habitat within the estuary, and the loss of corridors connecting the estuary to upland habitat.

Jetty Island observations include coyote (which cross over from Smith Island on the mudflats at low tide), river otter, Townsend's voles, and rats. Marine mammals in the estuary include California and Steller sea lions and harbor seals (Carroll, J.R., pers.comm., 1996). In spring and summer, migratory or resident gray whales are typically seen on the estuary delta front. A March 1995 aerial survey resulted in a count of 689 California sea lions on the East Waterway log boom adjacent to the Navy pier (Lambourn, D., WDFW Marine Mammal Investigations, pers. comm., 1995). Gray whales are a common spring migrant along the outer reaches of the Snohomish delta and north into Port Susan. Gray whales feed on benthic invertebrates and remained in the SEWIP study area through at least July 2000 (Houghton, J., Pentec, pers. obs.).

## **Snohomish River Federal Navigation Channel**

The Port of Everett operates an active deep water port facility served by a federal navigation channel which runs six miles upstream. See Figure 1.5. The channel is maintained by the US Army Corps of Engineers through sponsorship of the Port of Everett. Approximately 150,000 cubic yards of dredged materials are removed from the navigation channel on an average annual basis. In addition, the Port carries out its own dredging activities in waterways under its jurisdiction, including those waterfront areas along the east side of the navigation channel from 4<sup>th</sup> Street south to the end of the deep water terminal. In addition, smaller property owners have dredged to gain access to the navigation channel and operate water-dependent businesses. Maintenance dredging is also required for these activities.

Figure 1.5 Snohomish River Federal Navigation Channel.



Shallow Draft: BST Associates completed an Economic Assessment of Waterfront Land Uses in the City of Everett, which describes limitations to navigation based on channel depth and width and bridge height. The majority of the navigation channel is maintained at a depth of 8 feet. This limits boat traffic primarily to barges that can operate with the tides. Taking into account loaded draft and the vessels' fixed heights, only 31.8% of the commercial vessels operating in Washington state can transit the channel during the average low tide. During the average high tide, 90% of the commercial vessels can transit the channel.

The BST report concluded that there is a cumulative demand for approximately 75 acres of waterfront industrial land in the shallow draft area through 2020. They anticipated demand for 17 acres between 1999 and 2005, 18 acres between 2005 and 2010, 19 acres between 2010 and 2015, and 21 acres between 2015 and 2020. Most of the demand is expected to occur in manufacturing (small boat repair), wholesale trade (aggregate distribution) and construction. There are currently about 71 acres of vacant industrial zoned lands within 200 feet of the shoreline, and an additional 61 acres that are underutilized and could be redeveloped if the owners were willing.

In addition to the 75 acres needed for waterfront industrial uses, there is also strong demand for increased wet moorage space, as evidenced by the current waitlist at the Port of Everett's Marina, which consistently stands at 530 (or more) boats. The demand for moorage for longer vessels is especially strong.

## **East Waterway**

The Corps of Engineers maintains the East Waterway to a depth of approximately 30 feet MLLW. This area is primarily used for the US Navy base and port-related deep water shipping operations. The east waterway is also used by Kimberly Clark for barging of wood chips and hog fuel. Along the marine terminal shipping berths in the East Waterway, the Port of Everett maintains water depths to approximately 40 feet MLLW. The Port of Everett facilities are utilized for a variety of uses, which include, but are not limited to, coastwise and international trade, vessel repair, fishing vessel resupply, and temporary lay-up. The US Navy maintains its berths and turning basins at approximately 55 feet MLLW. In addition to the commercial activity of the Port of Everett and the presence of the US Navy, the East Waterway is used for mooring barges, log rafts, and small commercial vessels.

## Silver Lake

Silver Lake is an approximately 110 acre lake located in southeast Everett south of 112<sup>th</sup> St. SW and south/west of SR 527. A lily pond located east of SR 527 and north of 116<sup>th</sup> St. SE is connected to Silver Lake by a 30 inch culvert and was likely cut off from the lake by the initial construction of SR 527. Wetlands within shoreline jurisdiction are located at the south end of the lake and east of SR 527 south of Lake Heights Drive. Silver Lake is located within the North Creek watershed, which drains to the Sammamish River and Lake Washington. Surfacewater drains southeast to Ruggs Lake, then south to Thomas Lake and Penny Creek, a tributary to North Creek. Silver Lake Creek collects drainage from properties to the north of the lake and enters Silver Lake at an outfall at Thorton A. Sullivan Park near the City beach (and through an outfall at 19<sup>th</sup> Ave. SE). Silver Lake Outlet Creek exits the south end of the lake and drains towards Ruggs Lake. See Figure 1.6.

During the year, Silver Lake receives considerable recreational use including swimming, boating, fishing, and specialized events such as mini-hydro races. Most of the lake shoreline has been developed. Land uses along the shoreline include single family, multiple family, commercial (restaurant), SR 527, and public recreation, including Thorton A. Sullivan Park, Hauge Homestead Park, and public access between SR 527 and the shore.

Silver Lake has mean/maximum depths of 6.6m/15m. The lake bottom drops off relatively quickly beyond the shoreline, with bottom slopes of about 15 percent on the southeast side of the lake and about 25 percent on the north end of the lake. A relatively thick layer of peat-like soils has accumulated on the bottom of the lake since it was formed by glacial action approximately 10,000 years ago. These deposits may reach depths of 20-25 feet or more at the middle of the lake.<sup>3</sup>

## Water Quality

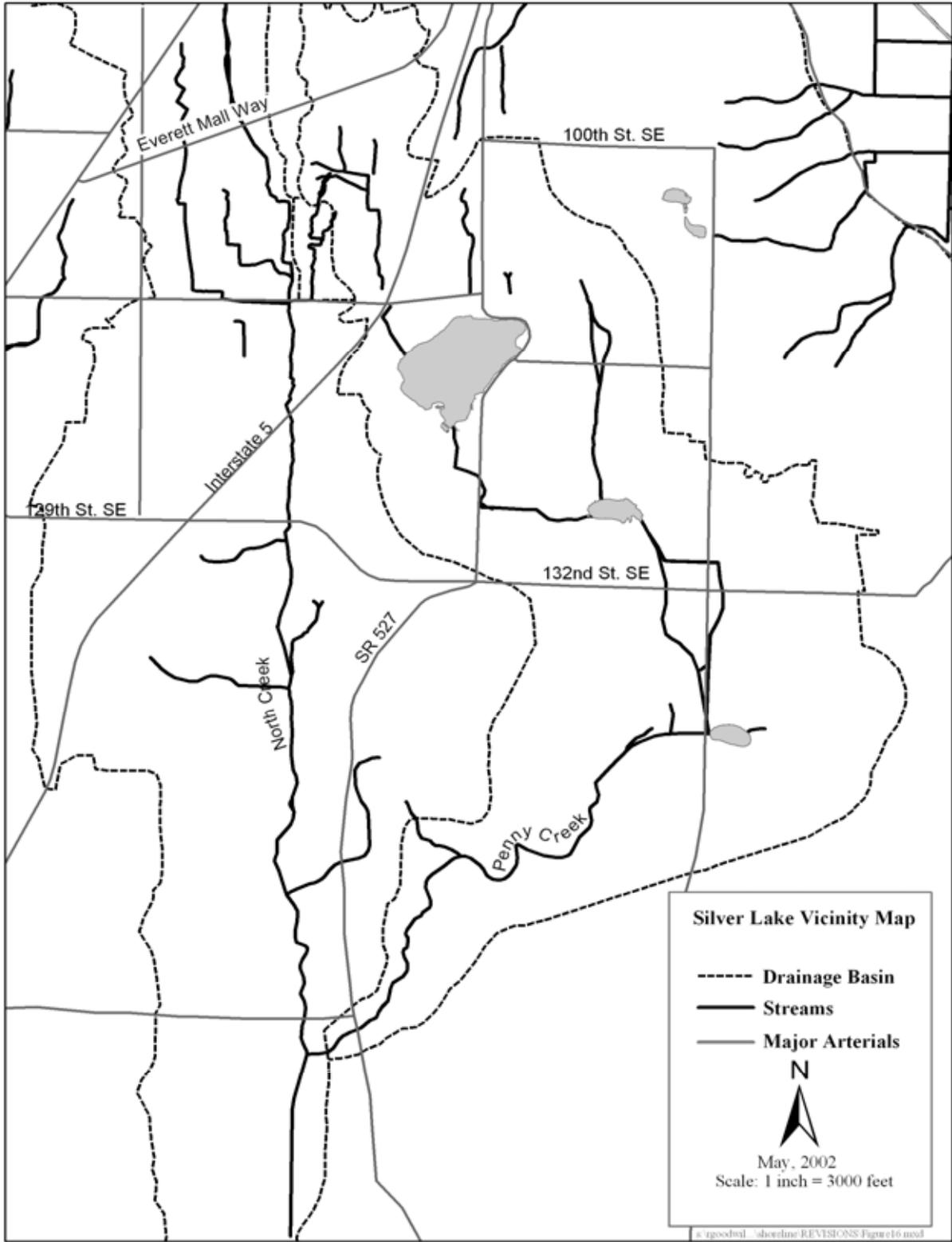
### Nutrients

All lakes naturally go through a process called eutrophication, and gradually fill in with plants and sediments in response to nutrient enrichment. Lakes can be oligotrophic (have low nutrient levels needed for basic plant and animal production), mesotrophic (intermediate in fertility, neither notably high nor notably low in its total productivity), or eutrophic (well-provided with the basic nutrients required for plant and animal production). Eutrophication can be greatly accelerated by human activity in the

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<sup>3</sup>Entranco. *SR 527/Silver Lake Final EIS*. August, 1995.

Figure 1.6 Silver Lake Vicinity Map



watershed of a lake. Due to the urban nature of its watershed, Silver Lake is at risk for premature eutrophication. A 1986-87 study by the University of Washington<sup>4</sup> found that Silver Lake is currently oligotrophic, which means that nutrient concentrations (phosphorus) in the lake are low, that growth of algae is correspondingly low, and water clarity is high.

The University of Washington Study concluded that thermal stratification in Silver Lake is very strong due to its relatively great depth-to-surface area and considerable protection from strong southwesterly winds. Such pronounced stability may account for the lake's rather high quality, considering the extent of development in its watershed. The temperature profile of the lake segregates into 3 layers. The surface layer is the epilimnion. Water temperatures are fairly constant in the epilimnion which is the warmest of the three layers. Beneath the epilimnion is the metalimnion. Water temperatures cool rapidly with depth through the metalimnion. Beneath the metalimnion is the hypolimnion, which extends to the lake bottom. The hypolimnion is the coolest of the three layers. Similar to the epilimnion, water temperatures are fairly constant in the hypolimnion, with gradually decreasing water temperatures with depth. During stratification the cooler, denser hypolimnetic water does not mix with the warmer, less dense epilimnetic water. This reduces the supply of oxygen to the hypolimnion, causing the hypolimnion to become anoxic. During anoxic conditions, phosphorus is typically released from the lake sediments into the hypolimnion. Thermal stratification prevents the hypolimnion from contributing to algal growth in the epilimnion during the warmer summer recreational season.

Phosphorus is present at higher concentrations in the epilimnion, primarily during the spring months, apparently due to the input of stormwater runoff. The increased phosphorus at these times has resulted in algae blooms in the lake in February and March, before the lake stratifies, if the weather is sunny and warm. However, once the lake stratifies, phosphorus concentrations in the epilimnion decrease, chlorophyll a concentrations (a measure of the amount of algae in the water) decrease, and the water clarity increases.

Urban development which results in more impervious surface and increased stormwater runoff has the potential to greatly increase phosphorus inputs into the lake. The City has implemented several measures to limit the impacts of development on eutrophication of the lake including construction of a regional stormwater treatment facility, as well as more stringent runoff treatment standards<sup>5</sup>, nutrient source control measures<sup>6</sup>, and

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<sup>4</sup> Eugene B. Welch, Jory S. Oppenheimer, Richard R. Horner, Dimitris E. Spyridakis, University of Washington Department of Civil Engineering, Environmental Engineering and Science. *Silver Lake Water Quality, Nutrient Loading and Management*, Water Resources Series Technical Report No. 106, May, 1988.

<sup>5</sup> In the Silver Lake drainage basin development projects must provide runoff treatment by a wetpond in series with a biofiltration swale if infiltration is not an option.

wetland protection/mitigation standards<sup>7</sup> in the Silver Lake drainage basin. In addition, the City began monitoring of Silver Lake in 1989 following the University of Washington study. The City monitors lake stratification by measuring temperature and dissolved oxygen at 5 foot depth intervals. In addition, samples from specific depths are analyzed for chlorophyll *a* concentrations, total phosphorus and ortho-phosphate concentrations; and lake clarity is measured through use of a secchi disc<sup>8</sup>. The samples collected by the City generally show that Silver Lake continues to remain oligotrophic, though it hovers near the oligotrophic threshold. Monitoring of the lake's trophic status will continue, in order to detect any declines in the lake and to allow the implementation of additional measures should they be needed.

### Fecal Coliforms

In 1998, the Department of Ecology recommended to the Environmental Protection Agency that Silver Lake be included in the 303(d) list of water bodies not complying with state water quality standards. This listing was due to fecal coliform concentrations in 1984 along the lake shore that exceeded state water quality standards. Fecal coliform bacteria are associated with the feces of warm-blooded animals and are measured as indicators of the potential presence of diseases such as cholera and hepatitis. Fecal coliform contamination could be caused by waterfowl, failing septic tanks, pet waste, and/or stormwater runoff. The City is now collecting and analyzing water samples for fecal coliforms. Over the past year, each of six shoreline locations have been sampled and analyzed for fecal coliforms twelve times. Sampling has occurred during summer and fall when biological activity is high and fecal coliform counts would also be expected to be high. Two of the sampling stations have average fecal coliform counts less than one-fifth of the state water quality standard (WQS) of 50 colonies per 100 milliliters with no exceedances of the WQS. Two other stations have average fecal coliform counts approximately one-half of the WQS, with one or two WQS exceedances. One sampling station has an average fecal coliform count approximately 30% above the WQS, with one WQS exceedance. The remaining sampling station has an average fecal coliform count approximately twice the WQS with 5 WQS exceedances. However, this sampling station is located at the lake outlet. The lake is very shallow, the water is typically turbid and there is an extensive wetland at the lake outlet. Under these conditions, fecal coliform

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<sup>6</sup> Source control measures include best management practices for Vegetation Management/Integrated Pest Management, Maintenance of Storm drainage Facilities, and Street Sweeping of Impervious Areas.

<sup>7</sup> The size of wetlands that may be altered is reduced, and compensatory mitigation is required even for very small wetland alterations.

<sup>8</sup> Secchi depth is determined by lowering a 20 cm disk into the lake until the disk disappears. The disk is then raised slowly until it just becomes visible again. That depth is recorded as the secchi depth and is indicative of water clarity.

concentrations would be expected to be high. Furthermore, bacteria naturally associated with vegetation, such as *Klebsiella*, could account for many of the fecal coliform colonies

found in samples collected at the lake outlet. Finally, all of the sampling station have average fecal coliform counts well below the Snohomish County Health District threshold for closing public beaches (200 fecal coliform colonies per 100 milliliters).

### Metals

The City also collects stormwater samples from two lake inlets. One of these inlets, 19th Avenue SE consistently has exceeded state water quality standards for copper, lead and zinc. Given these results, the City decided to begin sampling for metals at the in-lake station to determine if water within the lake also exceeds state water quality standards for copper, lead and zinc. Sampling showed that, except for lead, in-lake samples did not exceed state water quality standards. For lead, the laboratory detection limit exceeds the water quality standard. Since lead was below the detection limit for all but one sample, it was not possible to determine if the water samples exceeded the water quality standard for lead. Given the very low concentration of metals in the water samples, metals sampling was discontinued.

### Sedimentation

Sedimentation is occurring at the City beach at Thorton A. Sullivan Park near the outlet of Silver Lake Creek. Parks Department representatives stated that approximately 2 feet of sedimentation has occurred since the early 1970's when the Parks Department did some clam shell dredging at the beach. The diving platform has been frequently relocated to deeper water, and the City may prohibit diving next year. The Parks Department is considering additional dredging to deepen the swimming area in the future.<sup>9</sup> A draft Silver Lake Public Access Plan recommended that the outfall to Silver Lake be extended so that it discharges at a greater depth. This would reduce sedimentation at the beach and could slightly reduce the potential for nuisance algae blooms.<sup>10 11</sup>

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<sup>9</sup> Personal Communication with Daryl Bertholet, Parks Department.

<sup>10</sup> Nuisance algae blooms generally occur during the warm time of the year. The water in the City Beach inlet during the warm time of the year is cooler than the lake water. If the City Beach inlet is extended to a depth below the thermocline, there would likely be less mixing of the hypolimnion and epilimnion. This would reduce the potential for nuisance algae blooms.

<sup>11</sup> It's unlikely that the sediment deposition at the City beach is related to the erosion on the northeast portion of the lake, since the particle size being eroded is sand and would drop out of the water close to shore. In addition, winds are predominantly from the SW so it is unlikely eroded sediments at the north and east portions of the lake would be carried to the west.

## Vegetation

Submersed, rooted aquatic macrophytes existing in a narrow ring along most of the shoreline in Silver Lake. Canada waterweed (*Elodea canadensis*) occurs most frequently. Other species include water lilies (*Nymphaea* sp.), *Brasenia* sp., *Potamogeton berchtoldii*, and *Vallisneria* sp.<sup>12</sup> The shallow cove near the outlet has the most aquatic vegetation, largely because it is shallow. Plants on the north, east and west sides of the lake are more restricted in area due to the smaller nearshore area that is shallow. The UW study concluded that plant growth is limited by low nutrient levels and the organic content of the nearshore sediment.

In 1991 Eurasian watermilfoil (*Myriophyllum spicatum* L.) was found in Silver Lake. The milfoil was concentrated in a narrow band around the lake at water depths between 4 – 10 feet. Milfoil was most likely introduced into Silver Lake as fragments carried on boats, trailers or fishing gear that entered the lake. The Eurasian watermilfoil is a notoriously aggressive competitor and is capable of crowding out native vegetation in a short period of time. It can form dense mats that can obstruct water flow, interfere with recreational and other water uses, and seriously affect existing aquatic habitat and organisms. The City developed a management plan for control of Silver Lake. After initial dredging operations to remove large concentrations of milfoil, for the last 3 or 4 years, milfoil has been handpicked by divers.

Much of the Silver Lake shoreline has been modified by development. The largest area of native vegetation remains in and adjacent to wetlands at the south end of the lake. Smaller patches of vegetation occur around the lake. The City beach area is devoid of vegetation in large areas. At the north end of the lake, single family homes have lawns planted to the shoreline. Most of the shoreline along the northeast and east side of the lake includes a narrow band of land between the lake and SR 527. These areas are thinly vegetated with some soft rush, sweet gale, and cottonwood trees. Emergent wetlands sparsely dotted along the shoreline extend out into the lake only a few feet. Much of the area is either gravel shoreline or exposed soils due to high pedestrian traffic, uncontrolled roadside parking, and the impacts of wind and wave erosion. Planned road and public access improvements for SR 527 will stabilize the shoreline and prevent further erosion by concentrating public access in hardened pedestrian corridors, anchoring logs and/or downed trees at the shoreline edge parallel to the shoreline, and planting of beach, wetlands and remaining areas between the trail and the lake with native plantings. Large portions of the north and east shore have been hardened with bulkheads.

## Wildlife

### Priority/Endangered Species

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<sup>12</sup> Welch et.al. *Silver Lake Water Quality, Nutrient Loading and Management*

There is no existing or historic use of Penny Creek or its tributaries by Chinook salmon or bull trout. However, seasonal use by bull trout during periods of cooler water temperatures is possible. Coho salmon use North and Penny Creeks. Coho are presently restricted to areas downstream of Thomas Lake in the Penny Creek system. However, a review of historic records indicate that coho salmon once used Penny Creek all the way up to Silver Lake, including the Silver Lake Outlet Creek.<sup>13</sup>

Silver Lake is used regularly by bald eagles as a forage site. The primary diet of the bald eagles at Silver Lake is likely water fowl and salmonids. No nests or roosts are known to occur in the area, though up to 3 eagles have been seen perching in trees around the lake.<sup>14</sup>

The Washington Department of Fish and Wildlife lists Silver Lake as priority habitat for providing important over winter food resources for diving ducks, herons and cormorants and loafing habitat for other waterfowl. Other waterfowl on the lake include, but are not limited to, mallards and Canada geese.

The USFWS reports that Northern red-legged frogs, a Candidate species for listing under the Endangered Species Act, are likely to inhabit the wetlands and lake environs in the Silver Lake area.<sup>15</sup>

### Other Wildlife

Beavers living in Silver Lake build dams in the outlet creek that restrict flows from the lake and cause high lake water levels. The City has tried many methods to control the beavers and relocate them from the lake, but none have been entirely successful.

Silver Lake is managed by WDFW for trout. The Washington Department of Fish and Wildlife 2000 Hatchery Trout Stocking Plan included placement of 980 Triploid Rainbow trout in early April and 4,500 Rainbow trout in early May.<sup>16</sup> Stunted yellow perch also are well established in Silver Lake. Kokanee salmon (a landlocked sockeye salmon) also occur in Silver Lake.<sup>17</sup>

The City does not know of any wildlife surveys that have occurred at Silver Lake. Other wildlife expected to occur in the area include raptors, songbirds, and small mammals.

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<sup>13</sup> Entranco. *SR 527 Roadway Widening Project Biological Assessment for Chinook Salmon, Coho Salmon, and Bull Trout*. October 2000.

<sup>14</sup> Entranco. *SR 527 Roadway Widening Project Biological Assessment for Bald Eagles*. October 2000.

<sup>15</sup> SR 527/Silver Lake FEIS. August, 1995.

<sup>16</sup> Washington Department of Fish and Wildlife Internet Site.

<sup>17</sup> SR 527/Silver Lake Final EIS.

## Lake Stickney<sup>18</sup>

Lake Stickney is an approximately 25.7 acre<sup>19</sup> lake located south of Everett's current City limits, but within Everett's Urban Growth Boundary. The lake has a volume of approximately 280 acre-feet and a maximum depth of 34 feet. Lake Stickney is located within the Swamp Creek watershed. Swamp Creek flows into the northwest portion of Lake Stickney and out the southwest portion. Large wetland areas associated with Swamp Creek are also in shoreline jurisdiction.

Most of the Lake Stickney shoreline is developed with single family residential use, except that the wetlands associated with Swamp Creek are relatively undeveloped. In addition, a Department of Fish and Wildlife boat launch area is located on the northern portion of the lake.

Lake Stickney's watershed (drainage area) is approximately 3.56 square miles and is highly urbanized. The watershed extends north to Casino Road, and includes portions of Paine Field and Highway 99/Evergreen Way. As of 1995, Snohomish County estimated that 80% of the watershed was developed, with much of the development consisting of industrial, commercial, and high density residential uses. (Snohomish County)

As of 1994, there were 45 homes near the lake shore, and 29% of the homes had bulkheads or fill. 40% of the homes had some native vegetation near shore. Significant native vegetation still occurs in the Swamp Creek wetland areas to the northwest and west of the lake.

### Aquatic Vegetation

The near shore aquatic areas that are less than 5 feet deep are primarily vegetated with dense stands of yellow water-lily (*Nuphar polysepalum*) with associated common bladderwort (*Utricularia vulgaris*), common elodea (*Elodea canadensis*), thin-leaf pondweed (*Potamogeton* sp.), stonewort/muskgrass (*Chara* sp.), water moss (*Fontinalis* sp.), tapegrass (*Vallisneria americana*), and false loosestrife (*Ludwigia palustris*). Several concentrations of dense fragrant water-lily (*Nymphaea odorata*) are interspersed on the west side of the lake.

Aquatic areas between 5 and 10 feet deep are moderately densely vegetated primarily by common elodea (*Elodea canadensis*), common bladderwort (*Utricularia vulgaris*), and coontail (*Ceratophyllum demersum*). Other plants in this area include thin-leaf

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<sup>18</sup> Information on Lake Stickney is primarily based on computer printouts of data compiled by Snohomish County.

<sup>19</sup> WAC 173-20-640 states the acreage as 25.7 acres. Snohomish County's *Swamp Creek Watershed Management Plan Final Technical Supplement* states the acreage as 19 acres. The City has not attempted to locate the OHWM to determine the actual lake size.

pondweed (*Potamogeton* sp.), stonewort/muskgrass (*Chara* sp.), brittlewort (*Nitella* sp.), and water moss (*Fontinalis* sp.).

Purple loosestrife (*Lythrum salicaria*), a noxious invasive plant, is widespread around the lake shore.

### Water Quality

Based upon limited water quality data provided by Snohomish County<sup>20</sup>, it appears that Lake Stickney could be considered a mesotrophic lake.

The trophic status of lakes is typically determined based upon three water quality parameters: secchi disc depth, total phosphorus concentration and chlorophyll a concentration. All three of these water quality parameters can be indicative of the tendency of a lake to experience nuisance algae blooms during the summer. Nuisance algae blooms can interfere with recreation, decrease the aesthetic value of a lake, negatively impact fisheries resources and, in extreme cases, render the lake toxic to wildlife and humans.

There are three trophic classifications for lakes, oligotrophic, mesotrophic and eutrophic. Oligotrophic lakes have good water clarity (high secchi disc values), low phosphorus concentrations (normally the limiting nutrient for algae growth) and low concentrations of chlorophyll a (an indication of primary productivity or algae growth). Nuisance algae growth is rare in oligotrophic lakes due a low supply of nutrients. Lakes with a trophic status indicator (TSI) below 40 are considered oligotrophic. (Lake Chaplain is an example of an oligotrophic lake.)

Eutrophic lakes have poor water quality, high total phosphorus concentration and high chlorophyll a concentrations. Eutrophic lakes have a TSI greater than 50. Nuisance algae growth is common due to an ample supply of nutrients either from sources within the watershed or from sources within the lake itself.

Mesotrophic lakes have water clarities and nutrient loadings that are between the oligotrophic and eutrophic classifications with a TSI between 40 and 50. Silver Lake has TSI near 40, so it is an example of a lake at the mesotrophic threshold.

Lake Stickney TSIs are in the mid to upper portion of the mesotrophic range (Secchi Disc – 45, Total phosphorus – 48, Chlorophyll a – 55). Based upon this data, Lake Stickney likely commonly experiences algae blooms in the summer.

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<sup>20</sup> Data was collected by Citizen Volunteers and Snohomish County Surface Water Management Staff between 1993 and 1999.

The bottom of the lake was anoxic (little or no dissolved oxygen in the water) just a few meters below the surface in 1996, 1997 and 1998. When a lake becomes anoxic, phosphorus can be released from the sediment which can supply nutrients for algae growth in the surface water. The dissolved oxygen data, therefore, supports the idea that nuisance algae growth could be common during the summer in Lake Stickney.

From July 1990 to October 1991, Snohomish County monitored water quality in Swamp Creek at the Lake Stickney outlet at Jefferson Way as part of a monitoring program for the urban portions of Snohomish County. The Swamp Creek Watershed Management Plan Final Technical Supplement January, 1994 stated, "Samples were collected monthly, except when the sites were dry in the summer. The samples were analyzed for fecal coliform bacteria, turbidity, alkalinity, conductivity, ammonia, nitrate-nitrite ( $\text{NO}_2\text{NO}_3$ ), total Kjeldahl nitrogen (TKN), total phosphorus (TP), soluble reactive phosphate (SRP), oil and grease, total petroleum hydrocarbons (TPH), total suspended solids (TSS), hardness, and total organic carbon. Field measurements were made for dissolved oxygen, temperature, and pH. In addition, samples were analyzed every two months for the following metals: arsenic, antimony, aluminum, cadmium, chromium, copper, lead, manganese, mercury, nickel, silver, and zinc." The results were compared to the criteria for State Class AA surface waters.

The samples at the Lake Stickney outlet exceeded the State Class AA criteria for fecal coliform. The geometric mean was 58 colonies/100ml versus the standard of 50 colonies/100ml. The mean dry season temperature never exceeded 16 C, the criteria for Class AA waters. Mean values of dissolved oxygen met the Class AA criteria of at least 9.5 mg/l during the wet season. However, the mean standard during the dry season was 8.2, falling below the Class AA criteria.

No problems were found with excess nutrients as indicated by nitrogen or phosphorus levels, turbidity and suspended solids, oil and grease, or total petroleum hydrocarbons.

Six samples were taken for metals at the outlet from Lake Stickney. One of the samples violated state standard for copper, one violated the state standard for mercury, and four samples violated the state standard for lead. None of the six samples violated state standards for zinc or aluminum.

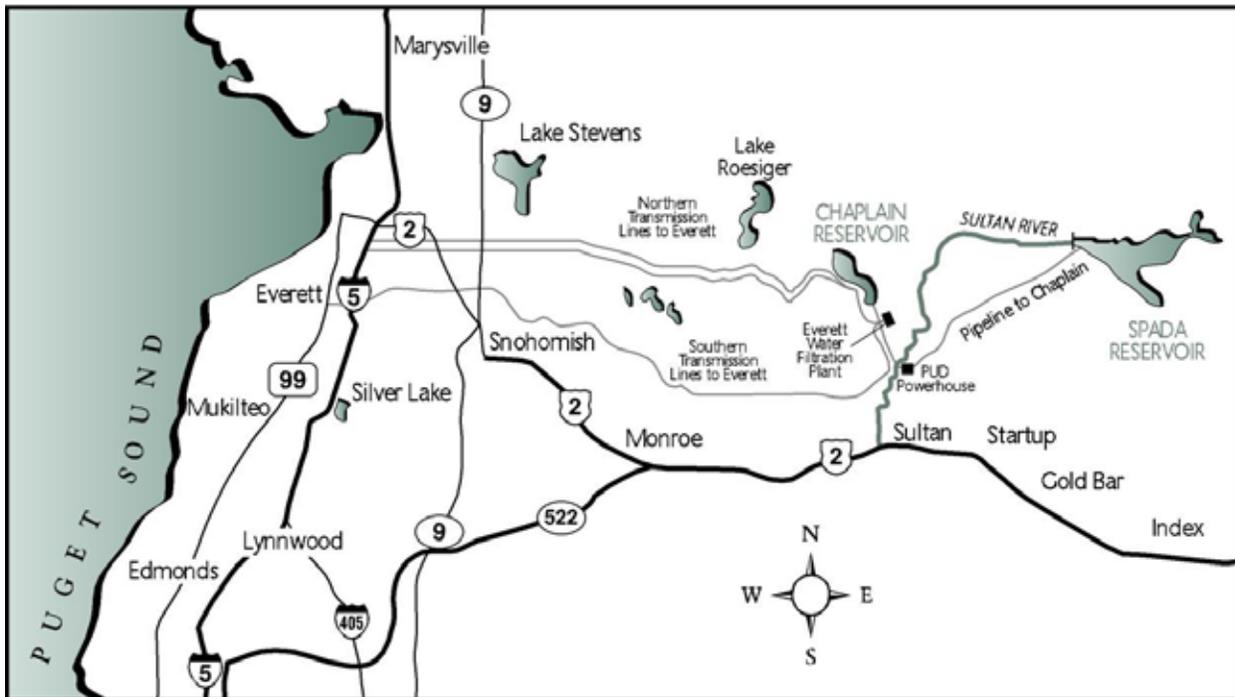
## Lake Chaplain Reservoir, Woods Creek and the Sultan River

The City of Everett and Snohomish County PUD are co-licensees under the Federal Energy Regulatory Commission (FERC) for the construction and operation of the Henry M. Jackson Hydroelectric Project on the Sultan River. The project supplies the water for Everett’s water utility, and Spada Lake Reservoir, which was built as part of the project, is the main water reservoir for the City of Everett. Spada Lake Reservoir is located approximately 7 miles east of Lake Chaplain Reservoir. It is about 1,870 acres and holds about 50 billion gallons of water. See Figure 1.7. Spada Lake Reservoir is not in Everett City limits and is regulated under Snohomish County’s Shoreline Master Program.

### Lake Chaplain Reservoir

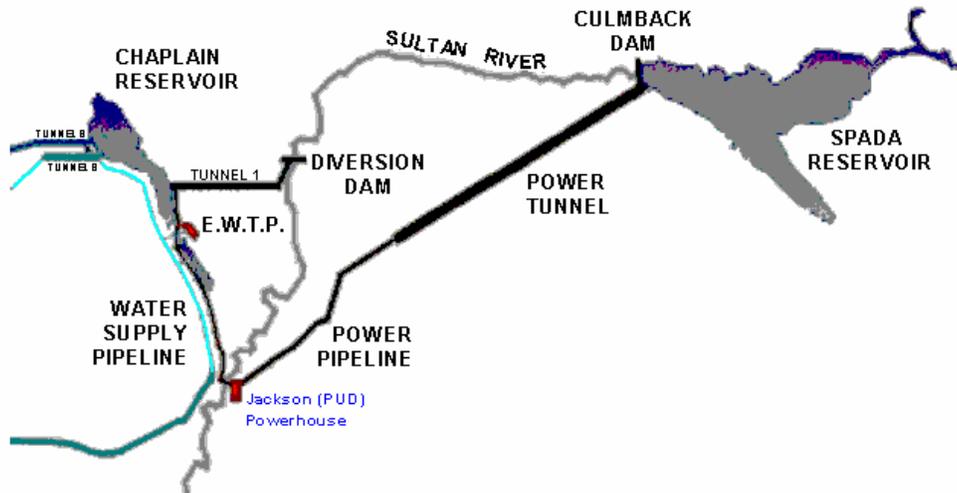
Lake Chaplain Reservoir is located approximately 6 miles north of Sultan, Washington. It is an approximately 441 acre reservoir and holds about 4.5 billion gallons of water. The surrounding tract and watershed property are owned by the City of Everett and are within Everett City limits.

**Figure 1.7: Lake Chaplain Reservoir Vicinity Map**



Lake Chaplain Reservoir was formed by construction of two dams in a side valley near the Sultan River. A concrete diversion dam constructed in the Sultan River originally diverted water to the Reservoir. However, since construction of the Jackson Hydropower project and raising of Spada Lake Reservoir, water is routed from Spada Reservoir to the Jackson powerhouse. Then part of the water is routed back to Portal 2 (west end of tunnel 1), where the water is split. Part of it goes into Lake Chaplain Reservoir where it is held for treatment. The rest goes back through tunnel 1 to the diversion dam where it is released into the Sultan River for fish flows. The City's water filtration plant is located at the south end of the Lake Chaplain Reservoir.

Figure 1.8 Lake Chaplain Reservoir



The protection of water quality for public water supply is the primary concern around Lake Chaplain Reservoir. Public access is prohibited in the watershed and limited in surrounding areas. Facilities located around the reservoir and within shoreline jurisdiction include logging roads, water pipelines, telephone and electrical utilities, a chlorine solution line, dams, a backwash solids drying bed, and the water filtration plant. Many of the utilities and pipelines are located in the roadways, but the water pipelines extend into the reservoir. Most of the water filtration plant is located outside of shoreline jurisdiction. The primary activities expected to occur in shoreline jurisdiction in and around the reservoir in the future include utility and road construction and maintenance; forest practices, including construction and retrofitting of drainage improvements on existing roads; and sampling and monitoring activities.

The Federal Energy Regulatory Commission (FERC) license for the Jackson Hydropower project requires the implementation of a Wildlife Habitat Management Plan to mitigate for the impacts resulting from the construction and operation of the Jackson Project. Except for the water filtration plant site, including the adjacent grass field, the 2,216 acres of City-owned lands around Lake Chaplain Reservoir (Lake Chaplain Tract) are managed under the Wildlife Habitat Management Plan. The existing vegetation on the Lake Chaplain Tract is predominantly second growth coniferous forest; with lesser amounts of old-growth forest, mixed forest, deciduous forest, wetland and permanent shrub/brush. Approximately 55 acres along the east shore of Lake Chaplain have never been harvested and now support old growth forest. The Wildlife Habitat Management Plan calls for the preservation of existing old-growth, mixed forest, deciduous forest and wetland habitats, and the management of second growth coniferous forest on a 60 year rotation to maximize habitat value for a wide range of wildlife species. See Figure 1.9.

### **The Sultan River**

The City owns and operates a diversion dam in the Sultan River. Originally the dam diverted water from the Sultan River to Lake Chaplain Reservoir for water supply, but today water is diverted from the Jackson powerhouse back to the Sultan River to supplement flows for fish. Facilities associated with the dam include a logging/access road, small operations/maintenance building, parking area, grassy area between the building and the road, and monitoring equipment.

At this location, the Sultan River is a Type 1 stream, meaning it is a shoreline of the state. The diversion dam results in a complete blockage to upstream migration of fish in the river. Downstream of the dam, the River supports chinook salmon, recently listed as threatened under the Endangered Species Act by the National Marine Fisheries Service. Approximately 36 acres of small coniferous and mixed forest surrounding the diversion dam site will be managed for old-growth under the Wildlife Habitat Management Plan, and no timber harvesting will occur in this area. Maintenance of existing facilities is the primary activity expected to occur in and adjacent to the River in the future, unless actions to allow fish passage are required.

### **Woods Creek**

The City owns an area near Lake Chaplain within City limits adjacent to Woods Creek that includes two tunnel portals for water transmission pipelines, small valve house buildings, and a logging road. The piping and valves send water to town through three large transmission lines. The area has not been surveyed, so it is not clear if Woods Creek and/or an associated wetland are actually in the City limits. This analysis assumes that it is in Everett City limits. A survey may be needed at the time any development

activity is proposed in the area to determine whether the City or County shoreline master program applies.

Woods Creek in this area is also classified as a Type 1 stream by DNR, meaning it is a shoreline of the state. The area surrounding the tunnel portal and associated facilities will be managed for Permanent Mixed Forest under the Wildlife Habitat Management Plan. No forest practices activity is expected in this area, except for snag monitoring and maintenance.

Figure 1.9 Lake Chaplain Tract Wildlife Habitat Management Plan

