

APPENDIX N
NATURAL SYSTEMS

Introduction

The purpose of this Appendix is to describe the natural environment in the Poulsbo UGA and provide a framework for understanding natural systems during the land use planning and regulatory process. The natural systems addressed include topography, soils, geologically critical areas, aquifer recharge areas, surface water resources, wetlands, frequently flooded areas, fish and wildlife habitat conservation areas, and possible impacts of the Endangered Species Act. (The existing mapped sources are of modest accuracy and will likely be superseded by more accurate maps over the next few years). It should be stated that the City of Poulsbo has proposed a UGA boundary that keeps the entire UGA within the Dogfish Creek Watershed Basin. This area of land is located to the northwest of Finn Hill that approaches the dividing line between the Dogfish Creek Basin and the Hood Canal Basin. The City's intention is to keep the City and its designated UGA within the Dogfish Creek Basin.

Topography

Poulsbo is typical of North Kitsap County, with numerous hills and valleys, streams, and frontage on the waters of the Puget Sound. Elevations range from sea level to 440 feet, with moderate to steep slopes and some level areas adjacent to Dogfish Creek in Big Valley. Two ridges run along each side of Liberty Bay and gradually rise in elevation to the north, accentuating the general topographical trend within Poulsbo. The western leg of the ridge slopes gradually towards Liberty Bay, while the eastern leg slopes in a broken pattern of knolls, valleys, and benches to the eastern shore.

Soils

The primary surface geologic material in the Poulsbo area consists of Vashon Till (hardpan) with a depth ranging from 20 to 40 inches. The vast majority of the general soils within the UGA is composed of the Poulsbo-Ragnar unit, typically with an overlay of decomposed needles, leaves, and wood fragments and a subsurface layer composed of a gravelly sandy loam. The soils profile is nearly level to moderately steep, moderately deep, and moderately well drained on broad uplands.

Geologically Critical Hazardous Area

Geologically critical hazardous areas are places highly susceptible to erosion, landslides, earthquakes, or other geologic events. In Poulsbo, the most hazardous of these areas is typically found along the marine shoreline and stream ravines.

In many cases, these areas may be extremely desirable for development because of their scenic views or water and beach access, but their development may endanger people, property, and surface water resources unless properly engineered.

Insert Map N-1 Critical Areas

The Poulsbo area contains a number of potentially steep, unstable slopes that have been mapped in the County Geographic Information System and are shown on Map N-1 the City requires all development proposals in critical areas to be accompanied by geotechnical studies demonstrating the project can be built in a manner that will not pose a danger to public health or safety.

Aquifer Recharge Areas

The Poulsbo aquifer is the only groundwater resource that lies within the Poulsbo UGA. It is identified by the Draft Kitsap County Water Management Plan, 1991, (GWMP) as a concern because it has high permeability and potential for contamination. For this reason, the aquifer is not considered a primary source aquifer. The Dogfish Creek Basin, is fed by several streams, springs, and streams and is used as the City's primary source.

Surface Water Resources

Surface water bodies are the bays, creeks, and wetlands in the watershed area. The Poulsbo UGA is comprised of West Liberty Bay and its affiliated tributaries, Big Scandia Creek and Johnson Creek. Lemolo Creek flows through the southeastern section of the UGA.

Liberty Bay

Liberty Bay and the Liberty Bay Estuary are the two major bodies of water in the UGA. Relatively narrow and shallow, the bay serves as the receiving water for Dogfish, Johnson, Little Scandia, and Big Scandia Creeks, as well as for a number of intermittent and ephemeral streams. Due to its distance from the main body of Puget Sound and the small streams that feed into it, the bay flushes poorly and appears to be the most affected by the influence of polluted water discharges (i.e., streams and stormwater).

Dogfish Creek

Dogfish Creek is the largest stream system in the UGA. It is comprised of approximately 4,700 acres, is composed of the main stem (also called the North Fork), the East Fork (or the Middle Fork), the South Fork (also known as Harding Creek), and several small tributaries.

Big Scandia Creek

Big Scandia empties into the south shore of Liberty Bay. The lower reaches of the stream contain a few pools and gravel; otherwise, the streambed consists primarily of fine sediment.

As a result of livestock access to the stream bank and the clearing of riparian vegetation up to the edge of the stream, sediment erosion has filtrated into the creek.

Johnson Creek

Johnson Creek flows into Liberty Bay through an area of semi-rural/urban development to the west and supports chum and Coho salmon, and species of trout. The North Fork of Johnson Creek has been the site of chum salmon enhancement efforts by the Suquamish Tribe and the Department of Fisheries in past years.

The Lemolo Creeks

The Lemolo Creeks consist of three streams that flow into the northeastern portion of Liberty Bay. The creeks support cutthroat trout, while chum and Coho salmon spawn in the lower reaches.

All streams draining the Liberty Bay Watershed and all surrounding marine waters have been rated Class AA (extraordinary) water. Class AA waters receive the highest level of protection in the state and must meet the requirements to support all beneficial uses. The sub area planning process can be seen as a mitigation measure to reduce water quality degradation in the Liberty Bay Watershed.

Wetlands

Several palustrine wetlands are located around Liberty Bay, and estuarine wetlands ring the shoreline of the bay. The U.S. Fish and Wildlife relied upon aerial photographs to classify these wetlands for the National Wetland Inventory. As a result, more wetlands are likely to be present in the UGA than currently appear on the National Wetland Inventory. (Remote sensing for wetland I.D. is currently underway countywide to improve upon these sources)

The Sensitive/Critical Area Map in the City of Poulsbo's Comprehensive Plan (1994) identifies over 30 wetlands located within the Urban Growth Area, 12 of which are located in the city limits (1994). The largest and most numerous freshwaters in the UGA are located in Big Valley and are associated with Dogfish Creek, Big Valley Springs, Big Valley Well, and Lincoln Well (City of Poulsbo, 1994). Estuarine wetlands within the City are associated with the shoreline of Liberty Bay and the lower reaches of Dogfish Creek. In addition, there is a high probability that other unmapped wetlands will be uncovered as development occurs within the UGA.

Frequently Flooded Areas

Frequently flooded areas are lands inundated with water during periods of high rainfall, extreme high tides, or strong winds. They typically lie adjacent to streams, rivers, lakes, and coastlines and include wetlands associated with these areas. Development in these areas is not only hazardous to the property owner, but development may also aggravate flood conditions on neighboring lands and compound damage to the natural environment.

Kitsap county and the USDS are collecting detailed terrain data for the purpose of updating flood potential maps.

Areas designated as 100-year flood zones are located along the western and eastern sides of Liberty Bay. A 100-year storm event has a 1 percent chance of occurring each year, although this type of storm may occur more frequently (Kitsap County, May 1998).

Portions of the designated 100-year floodplain associated with Dogfish Creek lie within the study area. The floodplain has an associated mud flat that extends north of NW Lindvig Way. Historically, flooding has occurred in areas upstream and downstream of SR 305 and along the creek downstream of Big Valley Road (Poulsbo, 1994).

Fish and Wildlife Habitat Conservation Areas

The City of Poulsbo contains a rich diversity of species of plants, fish and wildlife, and habitat types. This diversity is attributable to the topography and vegetation found in the area. The most common mammals found within the Poulsbo UGA are rabbits, squirrels, raccoons, black-tailed deer, and various small mammals.

According to the Washington Department of Ecology's Coastal Zone WDFW Habitat and Species Map, several priority habitats are found within the Poulsbo UGA (WDFW, September 1999). The entire northern portion of Liberty Bay is listed as an estuary, which is considered by WDFW to be a priority habitat. A great blue heron (*Ardea herodias*) rookery is located north of Liberty Road, east of SR 3, and south of Finn Hill Road. Great blue herons are not a federal or state listed species; however, their breeding areas are listed as priority habitats. In addition, a single occurrence of a Pacific harbor seal (*Phoca vitulina*) haul out area is identified on the eastern shore of Liberty Bay, near Anderson Parkway (WDFW, September 1999; Boughton, 1999 personal communication). The City Marina Breakwater is also a well-known harbor seal habitat area.

The Kitsap County area supports an abundance of bird species. According to the Breeding Bird Atlas project, approximately 75 species of birds use habitats within and surrounding the area during all or part of the year.

Fisheries

Several finfish species can be found in the streams and bays of the watershed, many of which have very different habitat requirements. Fish species located in the Poulsbo UGA include, but are not limited to, Coho and chum, salmon; surf smelt; Pacific sand lance; herring; and native trout. The Audubon Society has identified the Western Brook Lamprey, the Shorthead Sculpin, and the Torrent Sculpin as locally important in Kitsap County.

Dogfish Creek supports Coho and chum salmon and had historically been among the top three Coho producing streams on the North Kitsap Peninsula (City of Poulsbo, 1994; Williams et al., 1975). Hatchery produced Chinook, Coho, chum, and pink salmon have been released into Dogfish Creek since the mid-1950s.

Liberty Bay is the temporary habitat for juvenile Coho and chum salmon migrating from streams in Puget Sound and also spawning grounds for surf smelt. The bay also serves as a nursery for fish such as herring and Pacific Sand Lance and juvenile chum from May to early July. These juvenile fish seek refuge in the nursery atmosphere of Liberty Bay and are most susceptible to environmental and food supply disturbance.

Fish production research facilities such as locations of eggboxes, egg tubes, spawning channels, spawning pads, hatcheries, and rearing ponds can be found in local streams. These research facilities are evident along the east fork, south fork, and main tributary of Dogfish Creek.

Nonpoint pollution controls have been established in some critical areas to protect sensitive marine species. The designated controls include the establishment of a 25' to 40-foot buffer¹ landward from the mean high water line of tidal waters, streams, and wetlands. The Forest Practice Applications, Shorelines Management Master Program, and the Critical Areas Ordinance provide goals and policies to govern, protect, restore and preserve the bay and tributary systems. The cumulative effects of nonpoint pollution activities within a single watershed can drastically affect water quality and critical shellfish resources.

Endangered Species Act (ESA)

In May 1999, the National Marine Fisheries Service (NMFS) listed the Puget Sound Chinook and Hood Canal Summer Chum salmon as “threatened.” These listings, established under the federal Endangered Species Act, will result in changes in the way land use is managed throughout the state.

In addition to the two species recently listed for protection and recovery, other salmon species and several Puget Sound bottom fish are under study for possible listing. Additional listings will increase the concern for how future development occurs within the Puget Sound Basin, including Kitsap County.

The Poulsbo UGA falls within the Liberty Bay watershed and contains a number of stream basins including Dogfish, Johnson, Big and Little Scandia Creeks. In addition, Liberty Bay contains several miles of nearshore and estuarine habitat important to salmon, bottom fish, smelt, sand lance, and other marine species.

¹ In most instances buffer widths are the result of a site specific analysis conducted by a qualified biologist familiar with buffer requirements appropriate for protecting wetlands, riparian habitat and near shore areas.

Through the ESA implementation process specific streams and shorelines will be determined to be “critical habitat” for the listed species. Those areas are likely to be subject to higher standards of protection and review when development is proposed. Under ESA, Kitsap County intends to carry out watershed-specific studies so the long-term resource protection is carried out on a watershed-by-watershed basis. Map N-2 shows Salmonid Refugia Habitat in the Poulsbo UGA.

Insert Map N-2 Salmonid Refugia Habitat