

## The Puget Sound Partnership Presents: Draft Action Area Profiles

An important part of the Puget Sound Partnership's work is connecting with citizens, watershed groups and local governments. The legislation that created the Partnership established seven geographic action areas around the Sound to address and tackle problems specific to those areas.

Each of the seven action areas plays a unique role in sustaining the Puget Sound ecosystem. Distinct natural features and ecological process, urban and rural centers, wildlife populations, economics and history, and stressors on the environment characterize the different areas. In an effort to broadly describe the individual areas and ultimately develop tailored solutions to problems, the Partnership compiled information about each action area into an informative overview. The profiles are not meant to be detailed summaries of each action area; rather they are guided tours of what gives it a sense of place and the unique role in the ecosystem. The profiles will be refined to reflect the management actions needed to address threats in each area and be included in the Action Agenda.

The profiles are made up of three sections: the narrative, the action area map, and the action area concept diagram.

- Narrative
  - physical characteristics, demographics, land use, ecosystem characteristics and assets, and threats/stressors
- Action area map
  - base map for each action area, the incorporated and urban growth areas, public lands, tribal reservations, and major landmarks that are described in the text, and points of interest
- Action area concept diagram
  - graphic representation of the narrative related to ecosystem services and stressors

Please take some time to read through these action area profiles and familiarize yourself with an area you may or may not know much about. This is an opportunity to gain some insight and understanding as to how each action area is unique and why it needs attention.

## The Puget Sound Partnership Presents: Hood Canal Action Area Profile

### **Physical Description**

Named for British Admiral Lord Samuel Hood in 1792<sup>1</sup>, Hood Canal is a long, narrow, L-shaped fjord that bisects the Olympic and Kitsap Peninsulas. Hood Canal extends approximately 68 miles from Point Wilson in the north to Lynch Cove, and ranges from one-half to two miles wide. Although the average depth of Hood Canal is 177 feet, the underwater topography can be as deep as 600 feet. On the west side of the Canal, major rivers including the Skokomish, Dosewallips, and Big Quilcene drop rapidly from the Olympic Mountains, while smaller streams such as the Dewatto and Tahuya drain the west side of the Kitsap Peninsula. Precipitation along the Canal varies from 90 inches annually at Skokomish, to only 19 inches in Port Townsend. The northern end of Hood Canal is occasionally impacted by the “Puget Sound Convergence Zone,” whereby the air flow from the Pacific splits around the Olympic Mountains, and collides in north Puget Sound generating unique storm patterns.

Marine water circulation in Hood Canal is naturally poor, particularly in the southern 20 miles. An underwater sill south of the Hood Canal Bridge limits water exchange with incoming ocean water from the Strait of Juan de Fuca. Hood Canal also has poor vertical mixing as fresh water entering from rivers and streams can form a distinct layer at the surface. Dense algal blooms die off, sink, and decay, reducing the dissolved oxygen in deeper layers and degrading water quality for many marine species.

### **Land Use, Population, and Economy**

The overall human population density of the Hood Canal region is low, as the majority of the uplands are managed as private and public forest lands. Continued sustainable harvest of the timberlands is expected by state, federal and tribal land managers. Though impacted by the dissolved oxygen problems and other modifications to rivers and shorelines, fisheries and aquaculture remain economically significant to the Hood Canal region. Commercial and recreational fisheries occur for salmon, spot prawn, Dungeness crab, clams and oysters, and geoduck. Rockfish and flatfish are no longer fishable due to low dissolved oxygen problems. The S’Klallam, Suquamish, and Skokomish tribes retain treaty rights in the Hood Canal region for hunting, fishing and gathering. The Port Gamble S’Klallam Reservation is located at the north end of Hood Canal, while the Skokomish Reservation is located at the south end.

On the eastern shore of Hood Canal is the U.S. Navy Submarine Base at Bangor, the largest industry and development on the Canal. Populated centers in west Kitsap County include Seabeck, Holly and Port Gamble. Much of the west side of Hood Canal borders Olympic

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<sup>1</sup> Originally named Hood’s Canal or Hood’s Channel by Captain George Vancouver, the name was officially designated Hood Canal in 1932 by the U.S. Geographic Board. Hood himself never visited the region, serving in the West Indies, the American War for Independence (1781), and conflicts with France.

National Forest and Park, and the narrow fringe of land along the west shore of the Canal supports the major road network and population centers. The Hood Canal Bridge, the 3<sup>rd</sup> longest floating bridge in the world, is a critical transportation link between the Kitsap and Olympic Peninsulas. State Highway 101 is the only north-south transportation corridor along the west side of the Canal, crossing most of the major river deltas and connecting the population centers such as Quilcene, Brinnon, Hoodport, and the Skokomish Valley. The proximity to Olympic National Park and Forest, cultural attractions in Port Townsend and Union, and hunting, fishing and camping opportunities have generated a significant tourism industry and the proliferation of recreational homes.

### **Unique ecosystem characteristics and assets**

Hood Canal is famous for its shellfish. As you drive along the Canal, you pass place names like the “Whistling Oyster” and the “Geoduck Tavern” which reveal the local identity that is associated with the prime growing conditions for oysters and other shellfish species in Hood Canal. Rivers flowing from the Olympics mix with brackish waters at ideal temperature and water conditions that support some of the largest shellfish hatcheries in the world. The native Olympia oysters of Hood Canal were largely overharvested by 1870. Oyster growers introduced the larger, faster-growing Pacific oysters to compensate, and shellfish farms were staked out throughout Hood Canal. Today the oysters of Hood Canal are internationally famous, and connoisseurs identify them by place names including Quilcene, Dabob, and Hama Hama, much like fine wines from specific regions and vineyards. Oysters and other bivalve species are filter feeders, processing hundred of gallons of water daily, and are thus highly vulnerable to pollutants and toxic contaminants.

Hood Canal is home to a number of other important and unique marine and upland species. An “evolutionarily significant unit” of chum salmon that return in the summer spawn only in the rivers and creeks of Hood Canal and the eastern Strait of Juan de Fuca. Other populations of chum, coho, pink, and Chinook salmon spawn, rear, and migrate in Hood Canal, along with steelhead trout, bull trout, and sea-run cutthroat trout. Many of these salmonid species spend a large part of their early lives in the estuary, and water quality conditions in the Canal are essential to their continued survival. Hood Canal is also used by marine mammals, and has unusual timing periods for birthing and pupping of some seal species. Orcas frequent Hood Canal to feed on prey species indigenous to Hood Canal. The close proximity of old-growth forest areas to the marine shoreline provides unique habitats for many bird species and mammals. Herds of elk in the eastern Olympics migrate seasonally along the river corridors.

The natural beauty and warm summer water conditions of the Canal draw many visitors for boating, sailing, water-skiing, swimming, and diving. Year-round and seasonal residents and visitors work hard to understand the physical and biological conditions that affect Hood Canal, and promote activities to restore Hood Canal’s water quality, species, and other ecosystem features. The Hood Canal Coordinating Council, a consortium of tribal and local governments along the Canal, has been collaborating on projects in the Canal since 1985. Several other organizations and individuals such as the Hood Canal Salmon Enhancement Group, watershed

planning units, local health districts, Hood Canal Watershed Education Network, the port districts, state agency staff, and committed volunteers throughout the Canal monitor water quality, conduct salmon restoration projects, clean up marine debris, and work to eradicate invasive species.

## **Ecosystem Stressors:**

The combination of warm water, poor mixing, and limited flow in and out of the Canal spells trouble for many marine species. Seasonal weather effects, such as prolonged wind storms from the south, trigger upwelling that drives water with low dissolved oxygen to the surface, trapping and suffocating fish and invertebrate species. This low dissolved oxygen condition, known as “hypoxia,” has killed rockfish, sharks, sculpins, sea stars, crab, octopi, perch, lingcod, prawns, anemones, and krill. Although some of the hypoxia problem is due to the natural topography and circulation processes in the Canal, it has been exacerbated by human activities. Nutrient input from septic systems, forest conversion to nitrogen-fixing alder trees, and agricultural input increase the density of algal blooms and make conditions worse. The Hood Canal Dissolved Oxygen Program has been coordinated for several years by the University of Washington, the Hood Canal Salmon Enhancement Group, and others to monitor and analyze the causes of hypoxia, work on corrective actions, and inform the citizens living and recreating in the Canal.

Natural bacteria in Hood Canal associated with mud flats and warm water affect seasonal oyster edibility, but pathogens from human and animal waste are also considered to be contributing factors. Harmful algal blooms seasonally affect shellfish consumption in the northern portion of Hood Canal (north of Seabeck). Toxic algal blooms have also closed public access to some lakes in east Jefferson County.

Throughout Hood Canal, the shoreline has been developed for summer cabins and year-round residences with associated septic systems, docks, bulkheads, shoreline armoring and vegetation removal. Although only 2% of Hood Canal is incorporated or included in an Urban Growth Area, an estimated 27% of the Hood Canal shoreline has been modified. Inland lakes also have significant shoreline residential development. Roadways along the Canal traverse many creeks and river mouths, and bridges, culverts, and fill have removed or modified saltmarsh habitat. Dikes and drainage systems to convert some of the flat deltas to farmland were installed over a century ago. These structures have cut off rivers from floodway channels and estuary sloughs. Lowland areas of the Skokomish River valley are subjected to frequent and sometimes severe flood events as the river has limited pathways to discharge its flood waters.

Historically, forest practices and the removal of large woody debris damaged stream habitat for salmon and increased sedimentation downstream. Logging and forest access roads remain problematic in some locations. Many forested and former agricultural areas along Hood Canal are undergoing land conversion to residential development, and stepped-up efforts for wastewater treatment and stormwater management are frequently cited as an emerging need. Other impacts to the Canal include major areas of gravel extraction (existing and proposed),

and the ship traffic and ongoing operations of the Bangor submarine base. Recent infestations of tunicates are being aggressively eradicated, as these invasive species have the potential to wreak havoc with the local shellfish industry as well as clogging the surface areas of docks and vessels.

The north fork of the Skokomish River is entirely blocked to fish passage by the Cushman Dam, which generates power for the City of Tacoma. Water diversions from Hood Canal rivers also supply power and/or water for the City of Bremerton, Lilliwaup, Port Townsend, and the Port Townsend paper mill. Low flows are one of the factors limiting salmon productivity. Hood Canal/Eastern Strait of Juan de Fuca summer chum and other salmonid and bull trout populations in the area are federally listed as threatened species. The presence of summer chum in the Canal represents the southern limit of their range, and these chum return at a time when water flows are low and temperatures are high. Summer chum are thus highly susceptible to stress from potential changes in flow and temperature that are projected due to climate change. Changes to water temperature, flow and mixing that affect dissolved oxygen levels in the Canal are also anticipated from climate-related impacts.

**Hood Canal Action Area**  
**DRAFT**  
**July 11, 2008**

**Cities (Incorporated Areas)**

Bremerton  
 Port Townsend

**Counties**

Clallam  
 Grays Harbor  
 Jefferson  
 Kitsap  
 Mason

**WRIAs**

(14b) Kennedy-Goldsborough  
 (15) Kitsap  
 (16) Skokomish-Dosewallips  
 (17) Quilcene-Snow

**Tribal Lands**

Port Gamble S'Klallam Tribe  
 Skokomish Tribe

**Places of Interest**

Anderson Lake State Park  
 Alderbrook Resort and Spa  
 Bangor Naval Submarine Base  
 Belfair State Park  
 Big Beef Research Station  
 Buckhorn Wilderness  
 Camp Wesley Harris Naval  
 Dosewallips State Park  
 Eells Springs Hatchery  
 Foothills County Park  
 Fort Flagler State Park  
 George Adams Hatchery  
 Hoodspout Trail State Park  
 Kitsap Memorial State Park  
 Lake Cushman Park  
 Mount Skokomish Wilderness  
 Mystery Bay State Park  
 Old Fort Townsend State Park  
 Olympic National Forest  
 Olympic National Park  
 Olympic Wildlife Area  
 Pleasant Harbor State Park  
 Point Whitney Shellfish Laboratory  
 Pottlatch State Park  
 Scenic Beach State Park  
 Shine Tidelands State Park  
 The Brothers Wilderness  
 Thelar Wetlands  
 Triton Cove State Park  
 Twanoh State Park  
 Union River Wildlife Area  
 West Dewatto Tidelands  
 Wonder Mountain Wilderness

