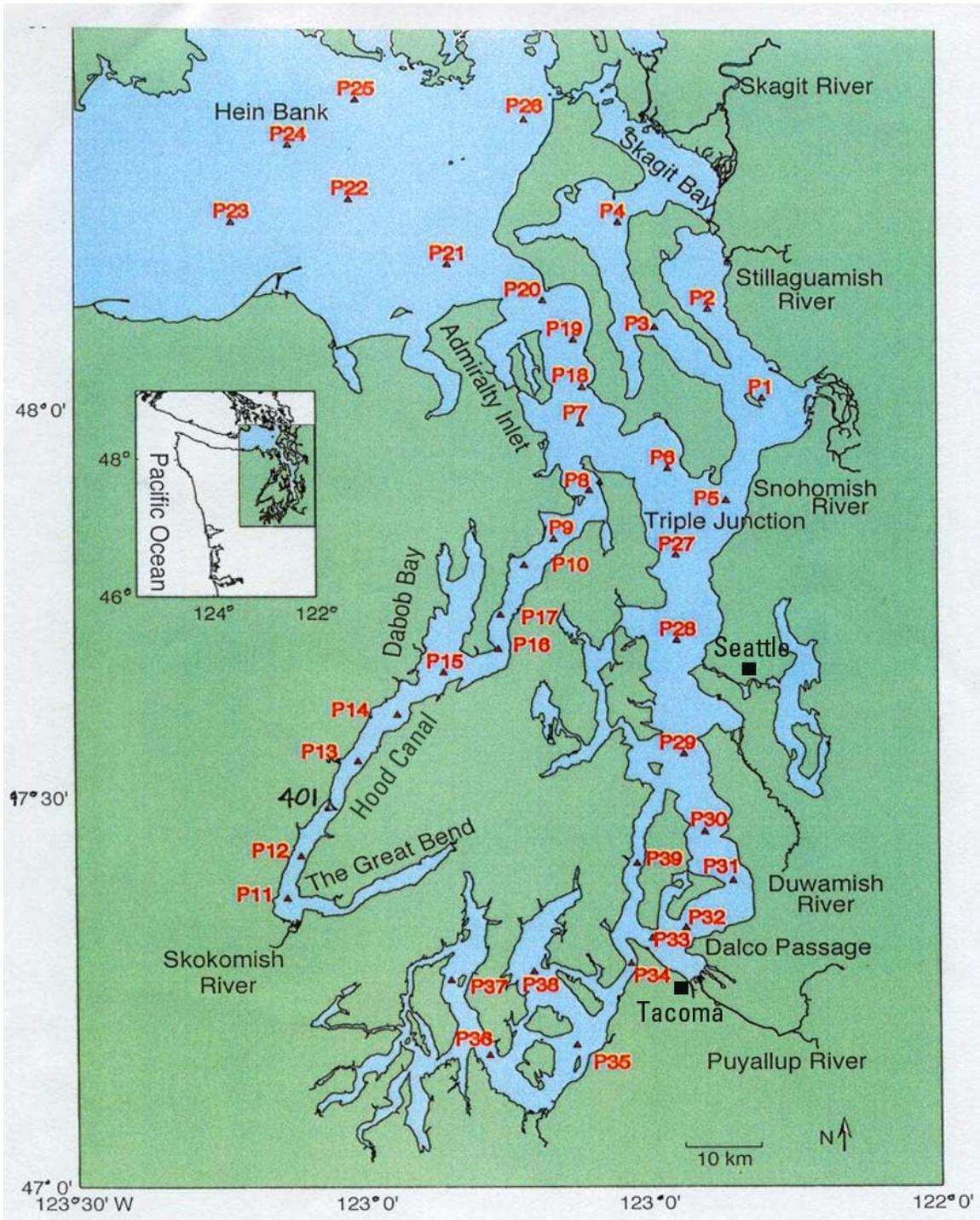


An Introduction to Hood Canal

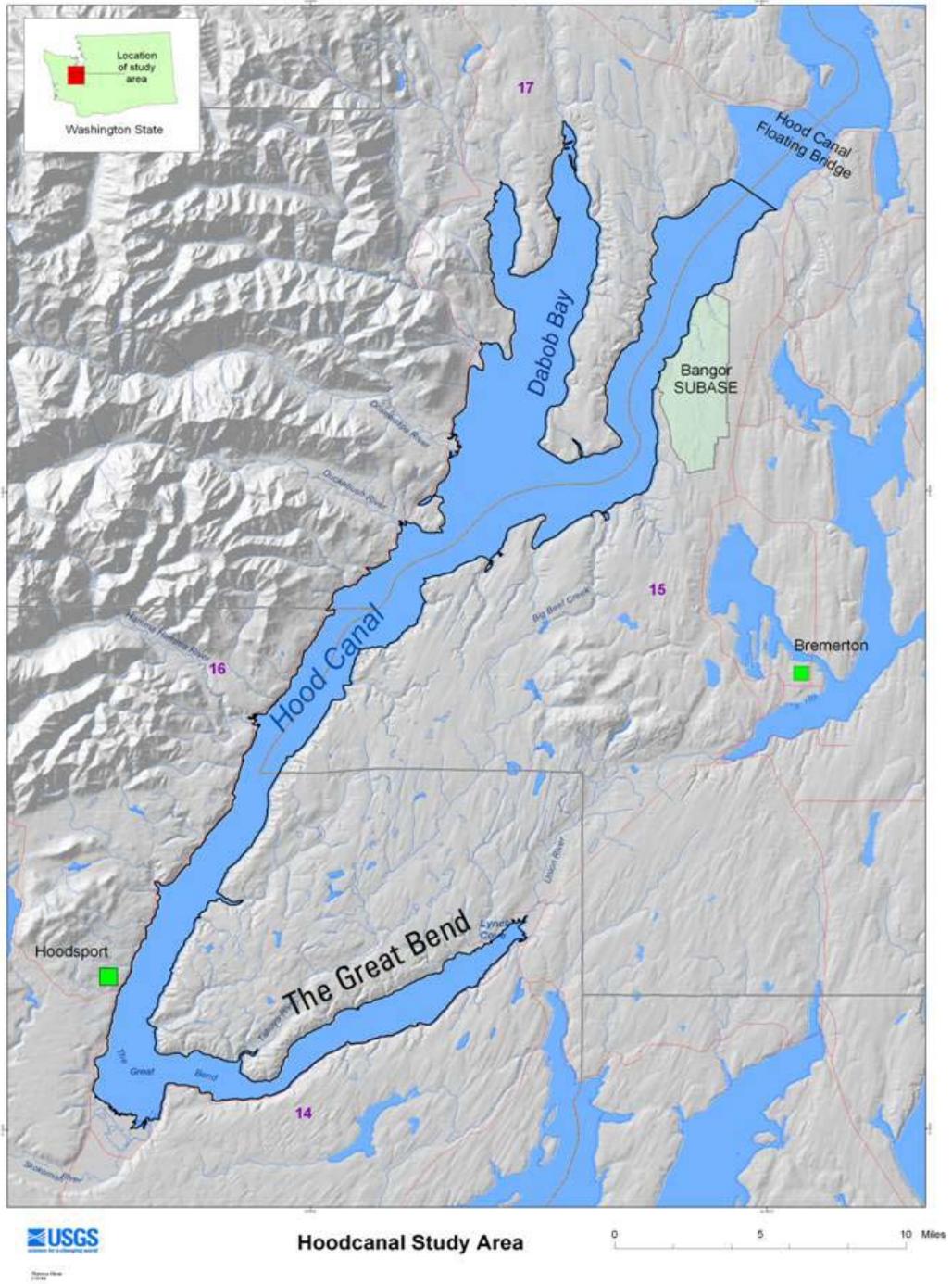
Hood Canal is a fjord-like arm of western Puget Sound in Washington State. The canal is 110 km long with a large 180 degree bend, called the Great Bend, that begins about 80 km into the canal. Over most of its length, Hood Canal is between 2 and 4 km wide. Sills, which rise to within about 50 to 75 meters of the water surface, separate Hood Canal from the main basin of Puget Sound. Past the sills the depth of the canal approaches about 175 m in depth, shallowing to about 40m in the vicinity of the Great Bend. Past the Great Bend to the end of the canal, into Lynch Cove, depths are on the order of 40 m or less.

Low concentrations of dissolved oxygen in Hood Canal during late summer and early fall have been observed as far back as the 1950s. Available data suggest that even though concentrations vary from year to year, they have been trending lower over time, and the duration of low concentrations is more persistent. The low dissolved oxygen condition is worst from the Great Bend to end of the canal. The low dissolved oxygen has led to numerous extensive fish kills.

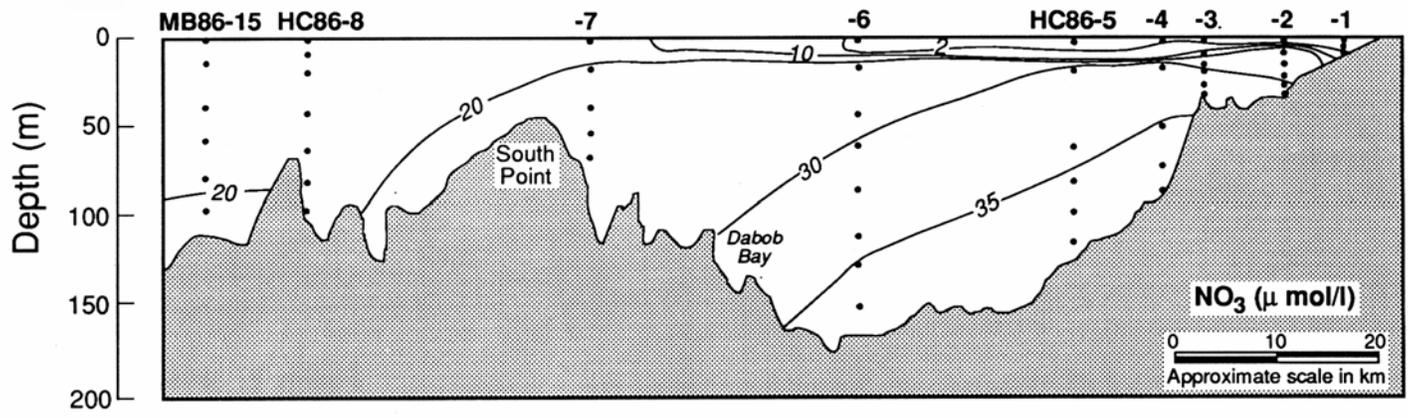
Poor deep circulation and the decomposition of large amounts of algae are primary factors that contribute to the low concentrations of dissolved oxygen in Hood Canal. The sluggish circulation and stratified water column of Hood Canal produce characteristics that are similar to classic fjords. Unlike many fjords with shallow sills, the bottom waters of Hood Canal are not as anoxic as the middle layer because cold, saline, oxygenated ocean water sinks to the bottom as it spills over the sills. Because fresh water inflows from rivers and streams tend to stay on the surface of the canal, the oldest water is confined to the middle layer where it stagnates because mixing between layers is limited. Poor circulation and stratification set up conditions so that the re-oxygenation rate is not sufficient to meet the demand for oxygen caused by decomposition of algal biomass produced in the surface layer. Nutrients, especially nitrogen compounds, entering Hood Canal from a variety of sources, accelerate algal production and increase the amount of biomass, which eventually settle and decay increasing the demand for oxygen. Low nitrogen levels typically limit algal growth in marine waters.



Location of Hood Canal within Puget Sound. Numbered triangles represent established sampling locations for University of Washington PRISM (Puget Sound Regional Synthesis Model) program. (From UW PRISM program, and Jan Newton of Washington Department of Ecology.)



Hood Canal Close-Up.



Depth profile of Hood Canal (from Paulson and others 1993).

Station 7, near the sill is the point of estimation for marine inputs of nitrogen to all of Hood Canal. Station 3, east of the Skokomish River, is the approximate location of this summer's current measurements by USGS.