



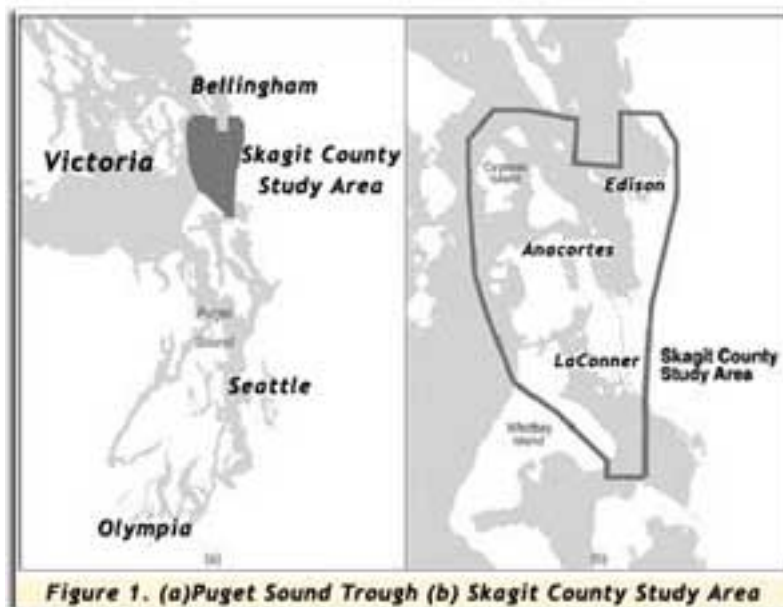
WASHINGTON STATE DEPARTMENT OF  
**Natural Resources**

Doug Sutherland - Commissioner of Public Lands

## Overview of Skagit County Intertidal Habitat Inventory (1996)

In priority areas, that span hundreds of miles, the Nearshore Habitat Program produces **medium-resolution** polygon-based inventory data describing intertidal vegetation and physical characteristics. Two areas were selected as priority areas for **medium-resolution** inventories because of the diverse habitat conditions and management issues relating to conservation, restoration, and development. The inventory describes two components of intertidal habitat: vegetation and shoreline characteristics.

During the summers of 1996 and 1997, 230 miles of shoreline were surveyed in Skagit County area from the northern Skagit county border southward to the north fork of the Skagit River and northern Whidbey Island in Island County.



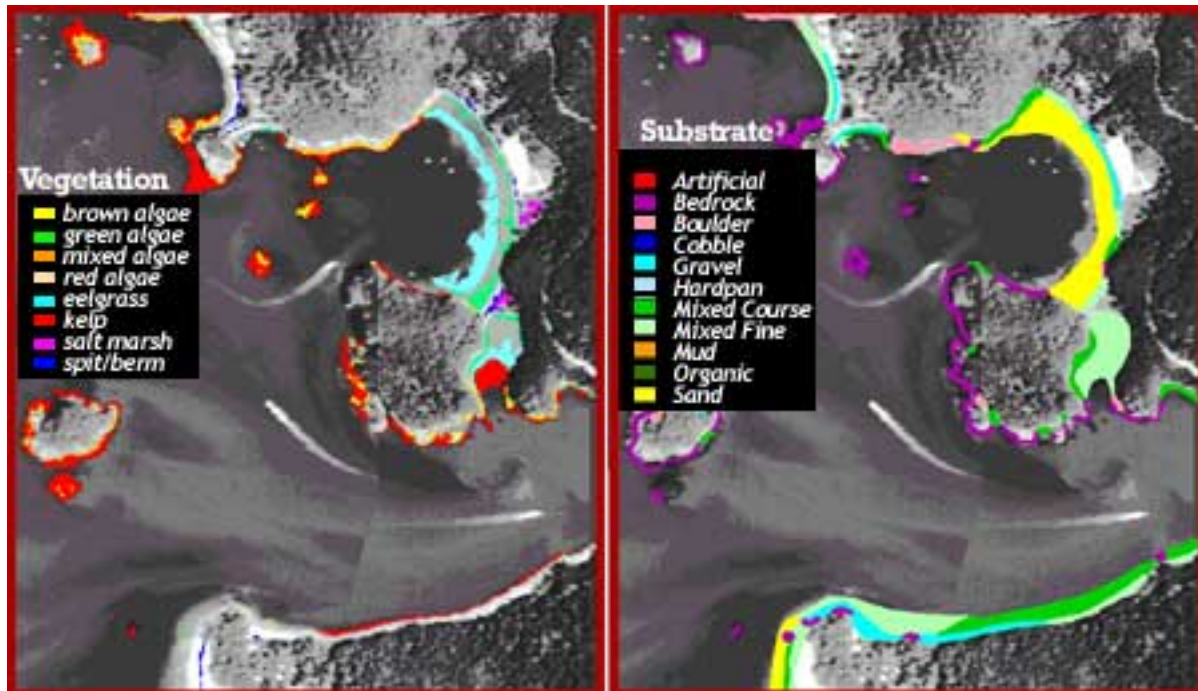
This region supports a range of intertidal habitat types, including rocky and mixed coarse sediment beaches with relatively high wave energy, as well as sheltered sand and mud flats. The Puget Sound Environmental Atlas (Puget Sound Water Quality Authority, 1992) documented habitat use in the area by resident and non-resident populations such as forage fish, red rock and Dungeness crabs, salmonids, groundfish, shellfish, seabirds, and a variety of marine mammals. There is a wide range of land uses along the shoreline, including the urbanized waterfront of Anacortes, industrial sites, low and medium density residential housing, aquaculture in Samish Bay, recreational areas, diked agricultural areas in the Skagit flats, and relatively undeveloped areas such as the DNR Cypress Island Natural Resource Conservation Area and Padilla Bay National Estuarine Research Reserve.

## VEGETATION INVENTORY

Eight nearshore vegetation types were classified using multispectral imagery: eelgrass, brown algae, kelp, green algae, mixed algae, salt marsh, spit and berm vegetation, and red algae. The vegetation types encompass most common macroscopic vegetation found along Puget Sound's shorelines. They were selected based on aquatic resource management priorities and multispectral detection considerations.

Vegetation types were produced from multispectral imagery using ground data to guide the classification. Aerial imagery was collected during July and August when tides were below Mean Lower Low Water in most of the study area and at sun angles which minimized sun glint. A CASI (Compact Airborne Spectrographic Imager) sensor collected 11 bands of reflectance data, ranging from 470 nanometers (nm) to 876 nm, at a resolution of approximately 13 feet (4 meters). Color infrared photography was collected simultaneously at 1:11,000 scale. The imagery was rectified using Global Positioning System (GPS) data collected in-flight (differential corrections were applied in post-processing), and control gained from Washington State Department of Natural Resource's digital orthographic photography. Most areas were mapped to within 40 feet (12 meters) relative to the control points.

Ground data were collected throughout the study area between June and September. The location of sites with greater than 25% vegetation cover were recorded using differentially corrected Global Positioning System (DGPS) data or aerial photograph annotation. Sites were assigned to one of eight vegetation classes, according to the type that comprised 75% or more of the vegetated cover. Sites were then divided into groups and used: (1) to guide classification of multispectral CASI imagery, or (2) to assess the accuracy of the classified image. Overall classification accuracy was 75%. The classified raster CASI data were then translated into a vector coverage and generalized.



## SHORELINE CHARACTERISTICS

Physical attributes in intertidal areas were characterized according to *A Marine and Estuarine Habitat Classification System for Washington State* (Dethier, 1990). This system builds on the U.S. Fish & Wildlife Service's National Wetland Inventory system (Cowardin et al., 1979), with modifications relevant to marine and estuarine communities. The following classification levels were delineated: System, Subsystem, Substrate, Energy, and Water Regime.

Intertidal shoreline classification was completed using ground data in conjunction with photo-interpretation of color infrared aerial photos ranging between 1:11,000 and 1:13,000 scale. The minimum mapping unit was approximately 0.2 hectares (0.5 acres). Final delineations were completed on 1:12,000 scale DNR orthophoto maps using a Zoom Transfer Scope and then digitized.