Eelgrass in Puget Sound: 2000-2002 Monitoring Results

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[Editor's note: A complete report on the first three years of this project can be found in: The Nearshore Habitat Program. 2003. Puget Sound Submerged Vegetation Monitoring Project: 2000-2002 Monitoring Report. Washington State Department of Natural Resources, Olympia Washington.]

Extended Abstract

As part of the Puget Sound Ambient Monitoring Program, WA DNR Nearshore Habitat Program implemented the Submerged Vegetation Monitoring Program in 2000.We are monitoring the abundance and distribution of eelgrass as an indicator of nearshore habitat health. The first objective of the program is to track changes in abundance and maximum subtidal growth of *Zostera marina* (eelgrass) of Puget Sound and the Straits of Juan de Fuca because these plants are indicators of water quality conditions and a vital nearshore habitat. Study area boundaries encompass the Puget Sound north to the Canadian border, west to Cape Flattery and south to Carr Inlet and Johnson Point in South Puget Sound.

To balance our desire to detect trends over time and characterize the status throughout the entire study area, we chose a stratified random design to sample 70 sites. This approach provides the ability to estimate as little as a 20 percent change over a 10-year period and allows us to attach confidence limits to our estimates. Our stratification includes dividing the study area into two types of eelgrass beds flats (embayments) and fringe sites (narrow bands of eelgrass along the shoreline). We have also chosen 6 additional sites as core sites that will be sampled each year. At each site, using a transect-based sampling method, we obtain data to delineate minimum and maximum depth and estimate eelgrass coverage. The site data are then used to extrapolate eelgrass abundance for each strata over the entire study area. To improve our ability to detect trends, we use a retrospective adjustment for the status estimate that uses data from the previous year to improve the estimate. Initially, pair-wise comparisons are used to assess trends in abundance of eelgrass. After five years of data are collected, we can test for trends using a linear regression. We estimate there are approximately 200 square km of eelgrass in Puget Sound. There is more eelgrass in the flats stratum—60%—but there are more miles of coastline with fringe habitat. One large flats site, Padilla Bay contains 16% of the eelgrass in the study area. We estimate that there was a 3% increase in eelgrass from 2000 to 2001 and a 1% increase in eelgrass from 2001-2002. Maximum depth of eelgrass at a site ranges from –0.3m to –6.9m. These data provide the first comprehensive baseline for Puget Sound and help direct resource management programs designed to monitor water quality and protect nearshore habitat.