



Understory kelp monitoring in Washington State

Kelp beds are highly productive nearshore habitats that support salmon, Orca killer whales, forage fish, invertebrates and marine birds. Washington State is home to more than 20 species of kelp, making it a global hotspot for kelp diversity.

While many people recognize bull kelp and other species that form floating canopies, few are familiar with understory kelp – only the shallow edge of understory kelp beds is visible at extreme low tides.

Understory kelp is more abundant and diverse than canopy-forming kelp, yet scientific information is extremely limited because it is difficult to access. Improved understanding of understory kelp has been identified as a research priority in the *Puget Sound Kelp Conservation and Recovery Plan*. To meet this need, DNR has initiated a series of projects to inform science and management.

In King County, DNR completed high resolution surveys of understory kelp and other macrovegetation in order to improve habitat information for local management and to guide eelgrass restoration actions.

At the Elwha River, DNR is studying canopy and understory kelp response to dam removal in collaboration with USGS, UW, Seagrant and others.

Throughout greater Puget Sound, DNR is surveying kelp and other marine vegetation to document regional fish habitat patterns.



Sugar kelp, a common understory kelp in Puget Sound, visible from a kayak at low tide.

Why does this matter to DNR?

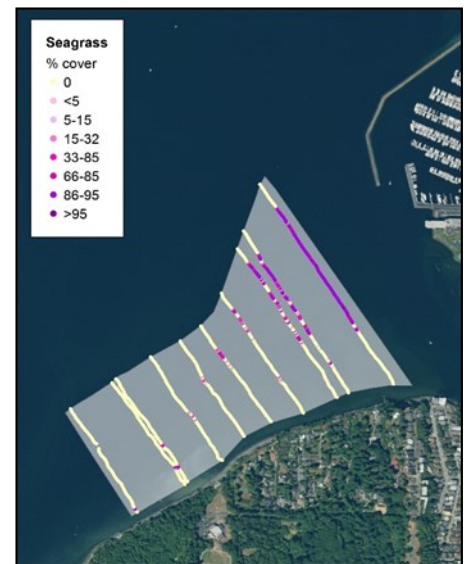
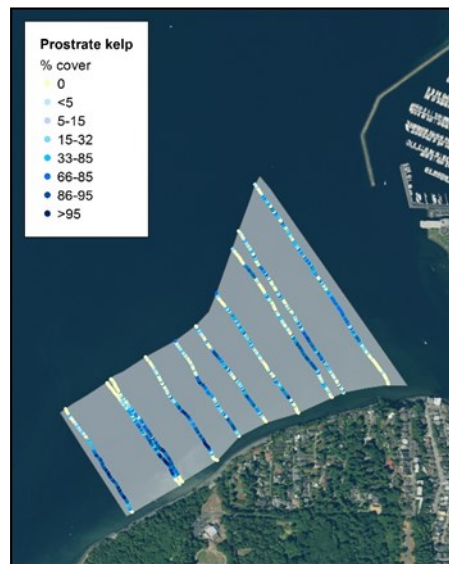
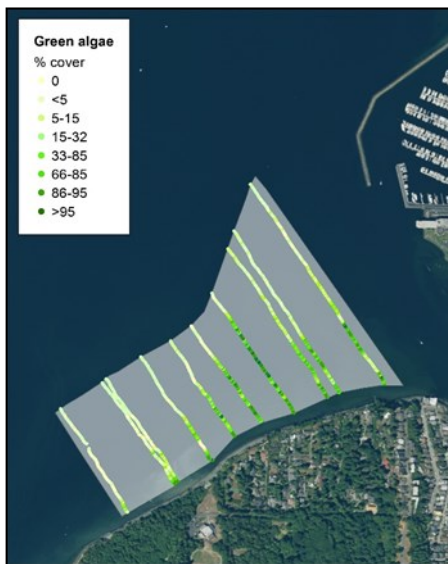
Kelp forests are the foundation for the diverse and productive nearshore ecosystems in greater Puget Sound.

DNR is the state steward of kelp and other aquatic resources. Through research and monitoring, DNR can increase understanding of this important habitat and target management actions to optimally protect it.

Project Participants

These projects are the result of a series of collaborations between DNR, the City of Bainbridge Island, Suquamish Tribe, King County, US Geological Survey, the University of Washington and SeaGrant; and funding from the Pacific Marine & Estuarine Fish Habitat Partnership.

DNR employs Marine Resources Consultants (MRC) to collect towed underwater imagery.



Estimates of % cover for different vegetation types along transects sampled near Shilshole Marina in King County. The spatial patterns are likely due to changes in depth, substrate and competition between vegetation types.

Project Outcomes

Preliminary results from intensive surveys of the King County nearshore indicate that understory kelp is widespread throughout the Central Basin. We estimate that there was approximately 950 ha of understory kelp and 1260 ha of eelgrass present between 0.5 and -6m relative to MLLW. This information will help to guide local management of nearshore habitats.

At the Elwha River, DNR documented massive understory kelp losses in response to elevated sediment loads associated with dam removal. Recovery began soon after sediment loads decreased, which demonstrates that kelp can recover quickly if stressors are removed.

DNR's project to document regional habitat patterns will provide critical understory kelp data to fish habitat planning efforts. This project is leveraging DNR's existing long-term eelgrass monitoring program by expanding the methods to include other types of vegetation.

For more information

<https://www.dnr.wa.gov/programs-and-services/aquatics/aquatic-science/kelp-monitoring>

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Project Outputs

[Increased sediment load during a large-scale dam removal changes nearshore subtidal communities. Rubin et al. 2017. PLOS ONE.](#)

[Spatial and depth distribution of understory kelp and other marine vegetation in Central Puget Sound. Salish Sea Ecosystem Conference, 2020.](#)



Future Opportunities

DNR's understory kelp research projects are filling important information gaps. The results inform local management efforts. They are also a first step towards development of a regional program to track status and trends of understory kelp.