Appendix 9: Draft Dataset description – DNR Kayak

Puget Sound Vital Signs
Floating kelp canopy area indicator: dataset description

Department of Natural Resources central and south Puget Sound kayak monitoring (DNR-Kayak)
Last updated: April 14, 2022

1. Introduction

In 2020, the Puget Sound Partnership added a new *floating kelp canopy area* indicator to the Puget Sound Vital Signs, in recognition that kelp forests are foundations for diverse and productive ecosystems. The indicator fills gaps in scientific information about the condition of floating kelp canopies. It also serves as a communications tool for sharing information with the public.

Floating kelp canopy area indicator results will be available on Puget Sound Info – Vital Signs in June 2023. Detailed indicator information will be available on the Puget Sound Floating Kelp Hub Site.

Summarized indicator results will be presented on the web sites in a format targeted for broad audiences. In addition, three types of technical documents describe the indicator in detail: (1) indicator assessment procedures, (2) sub-basin reports, (3) dataset descriptions which can be found on the Puget Sound Floating Kelp Hub Site.

The purpose of dataset descriptions is to provide key information about datasets that are synthesized in the floating kelp canopy area indicator, including considerations related to dataset integration. Dataset descriptions are not meant to replace detailed metadata, which is available directly from the data owners/maintainers (links below).

This document describes the Washington Department of Natural Resources central and south Puget Sound kayak monitoring (Fig. 1).

2. Dataset description

2.1 Summary

DNR scientists conduct annual monitoring of floating kelp beds at 13 sites in South Puget Sound and Central Puget Sound using kayaks and handheld GPS units. Surveys assess bed area, depth range, density, morphometrics and other parameters. Surveys began in 2013 at the oldest monitoring sites..

2.2 Description

Spatial Extent:	Sites within Central Puget Sound and South Puget Sound
Metric(s)	bed (polygons), minimum/maximum depth
Assessment Units	13 sites with historical or current floating kelp, sites span approximately 0.5 – 1.0 km of shoreline each.
Survey years	2013, 2017-2021 (South Puget Sound), 2018-2021 (Salmon Beach), 2020-2021 (Central Puget Sound)
Frequency	annual
Methods summary	Kayak based delineation of bed perimeter with handheld GPS. Minimum abundance for inclusion: single bulb. Maximum distance among individuals for inclusion in a single bed: 20 m. At a subset of sites, assessed: - density, percent cover and morphometrics at grid of points along regularly placed across-shore transects, - drone or fixed-wing canopy mapping. Information: - 2019 story map - 2017 and 2018 monitoring report - 2013, 2014 and 2016 monitoring report
Access	All survey data is maintained by the Nearshore Habitat Program, in the Washington Department of Natural Resources (nearshore@dnr.wa.gov). Kelp monitoring results and spatial/tabular data are available from: https://www.dnr.wa.gov/programs-and-services/aquatics/aquatic-science/kelp-monitoring

2.3 Considerations for integration in the Floating Kelp Canopy indicator

Kayak based kelp area surveys provide relatively high resolution data on kelp bed area at sites. The bed area estimate is the primary parameter considered in indicator analysis.

Research has shown that environmental factors affect the extent of visible floating kelp canopies (Britton Simmons et al, 2008). So, sea-state, tide height, and current stage are considered during data interpretation.

References

Berry, H. (2017). *Assessment of Bull Kelp at Squaxin Island in 2013, 2014 and 2016.* Nearshore Habitat Program, Washington State Department of Natural Resources. https://www.dnr.wa.gov/publications/aqr_nrsh_squaxin_bullkelp_1217.pdf

Berry, H., Calloway, M., & Ledbetter, J. (2019). *Bull Kelp Monitoring in South Puget Sound in 2017 and 2018.* Nearshore Habitat Program, Washington State Department of Natural Resources. https://www.dnr.wa.gov/publications/aqr_nrsh_bullkelp_sps_2019.pdf

Britton-Simmons, K., Eckman, J.E., & Duggins, D.O. (2008). Effect of tidal currents and tidal stage on estimates of bed size in the kelp *Nereocystis leutkeana*. *Marine Ecology Progress Series, 355*, 95-105.