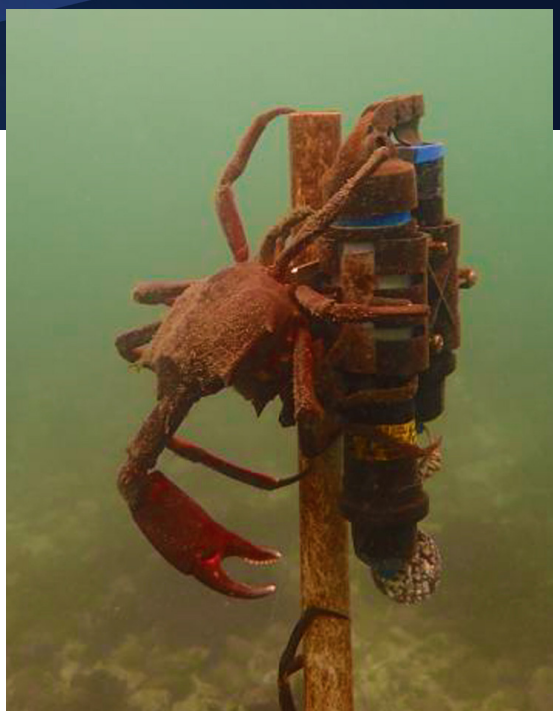

Use Case:
Ecological Monitoring Data Aids Kelp Recovery in Puget Sound

Problem

For several decades, major ongoing declines in the abundance of floating bull kelp have been documented in some places throughout the Pacific Northwest's Puget Sound and Salish Sea. Bull kelp (Nereocystis luetkeana) is a large, fast-growing kelp that creates forage and refuge habitat for a diversity of marine life, contributing greatly to the productivity and biodiversity of coastal marine ecosystems. In 2020, Puget Sound Restoration Fund (PSRF), in partnership with several tribes, government agencies, and nonprofits, contributed to the development of the Puget Sound Kelp Restoration and Recovery Plan. To address the lack of ecological data that's limiting conservation/restoration progress, the plan recommends monitoring kelp canopies from the surface, in combination with a widespread, systematic underwater monitoring network.

Solution

In the summer of 2021, PSRF and partners completed surveys at eight long-term index sites (from Freshwater Bay in the Strait of Juan de Fuca to Squaxin Island in southern Puget Sound) to assess kelp forests through biological surveys. In 2023, three environmental monitoring research buoys were installed, with the goal of establishing paired surveys and environmental monitoring at each of 14 index sites with contemporary or historical bull kelp beds.

To measure and record environmental parameters, the PSRF research team deployed Bluetooth-enabled HOBO TidbiT MX2203 Temperature Data Loggers and HOBO MX2501 pH & Temperature Data Loggers, along with optical HOBO U24-002-C Salt Water Conductivity/Salinity Data loggers and HOBO U26-001 Dissolved Oxygen Data Loggers near-surface and near-bottom of the water column. Photosynthetically active radiation (PAR) sensors were also deployed to measure light, as were HOBO U20L-02 Water Level Data Loggers to measure temperature, water level, and absolute pressure (kPa) at 15-minute intervals. Absolute pressure is used to calculate depth by multiplying by a correction factor based on a constant estimate of barometric pressure for Seattle, WA. HOBOware Pro software is used to streamline this process, automatically converting pressure readings into water level readings after a water level reference point is added.

(Interested in monitoring water conductivity/salinity, temperature, depth, and dissolved oxygen with one data logger? Check out our new HOBO MX800 Multiparameter Water Quality Data Loggers series.)

Read results on reverse

Results

Preliminary data show shifts in taxonomic identity and abundance across the spatial gradient, which hint at the utility of a broad data network to understanding ecological dynamics. PSRF anticipates that data from the monitoring network will help the team to understand the existing natural resources and species that comprise kelp beds, define the environment that will support kelp and improve the team's ability to craft meaningful hypotheses and select restoration sites, detect and interpret change as climate change and other human impacts continue to increase, and connect kelp interests within the region, and more broadly increase understanding of marine systems in the Northeast Pacific.

> *HOBO data loggers are a very useful tool for monitoring kelp growth areas. They're user-friendly, quite resilient, and are easily managed in terms of both deployment and data offload.*
>
> ***-Kari Inch, PSRF Habitat Field Specialist***

Products Used

Product	How it was used
HOBO TidbiT MX2203 Temperature Data Loggers	To measure water temperature
HOBO U24-002-C Saltwater Conductivity/Salinity Data loggers	To measure salinity
HOBO MX2501 pH & Temperature Data Loggers	To measure pH and temperature
HOBO U26-001 Dissolved Oxygen Data Loggers	To measure dissolved oxygen levels
HOBO U20L-02 Water Level Data Loggers	To measure water level
HOBOware Pro software	To automatically convert pressure readings into water level readings
HOBOconnect mobile app	To wirelessly download data from Bluetooth loggers