BEST PRACTICES

Puget Sound's Underwater Forests

Under the surface of the Salish Sea, you'll find one of the most ecologically productive habitats on Earth—kelp forests. Kelp forests play a vital role in deep water and nearshore marine environments. Like tropical reefs and rainforests, kelp forests create and sustain life.

Over 20 kelp species can be found in the nearshore intertidal and subtidal zones of Puget Sound. Nearshore habitats are an important part of the marine ecosystem. Kelp are part of the rich marine biodiversity of Puget Sound and a huge part of our Northwest culture, contributing to our quality of life. Nearshore kelp forests provide critical refuge, food and nursery grounds for species like salmon, forage fish and rockfish. They also support local and distant food webs that sustain birds like cormorants and herons and marine mammals like Southern Resident orcas, seals and gray whales that live in or near Puget Sound.

Vanishing Bull Kelp

Bull kelp, an iconic annual seaweed, is one of the main species that help form underwater kelp forests. Each spring bull kelp emerges with their root-like structures, or holdfasts anchored to the rocky sea floor. Their long stems or stipes, buoyant bulbs and wavy leaf-like blades can grow up to 90 feet, absorbing nutrients and sunshine at the water's surface, where they create a floating surface canopy.

Over the past 40 years, large bull kelp losses have been observed throughout our region. Entire kelp beds have vanished between Tacoma and Olympia. Ecologists with the Washington State Department of Natural Resources (DNR) have been studying four locations of kelp south of Tacoma since 2013, two of the four sites are now gone.

New Research May Help

A recent study led by Helen Berry, and a team of DNR researchers, used historical documents to identify long term trends in South Puget Sound kelp beds by reconstructing kelp distribution patterns over the past 145 years. The team used historical records such as historic maps, navigational charts and documents, combined with modern data sources, to piece together an assessment of changes over time. They found a staggering 80% loss of bull kelp in South Puget Sound since the 1870s, when European colonizers began arriving. The remaining bull kelp is mostly contained in two areas, the Tacoma Narrows, and a second site near Squaxin Island, located in Mason County. Ecologists have compared populations of bull kelp near Salmon Beach in the Tacoma Narrows to kelp near Squaxin Island, finding that the Tacoma Narrows area has better habitat conditions which may be attributed to stronger currents and more intense tidal mixing than the Squaxin Island site.

The study examines many factors of widespread kelp loss versus pockets of remaining kelp which provides clues about what is impacting kelp beds. Two key factors contributing to the loss of kelp are warming waters and negative human impacts on water quality. Human impacts include stormwater pollution, nutrient loading, increased turbidity, high sediment loading and the introduction of invasive species. Additionally, kelp forests grow best in cold water. Warming marine waters and other impacts resulting from climate change pose new and growing threats to kelp resilience. Since 2013, elevated water temperatures caused by warmer waters from the "Blob" and El Nino have accelerated kelp loss in South Puget Sound. This research has been documented in an interactive story map titled *Patterns of Loss and Persistence in Kelp Forests South Puget Sound (1873-2018)* created in March of 2021.

Kelp Recovery Plan

Groups, including the Northwest Straits Commission, NOAA's National Marine Fisheries Service, Puget Sound Restoration Fund, DNR and Marine Agronomics, are pursuing ways to reduce environmental impacts on kelp. In May of 2020, the Puget Sound Kelp Conservation and Recovery Plan was released which lays out a vision for coordinated research and management actions to protect kelp in Puget Sound.

Within the plan are six strategic goals:

1. Understand and reduce kelp stressors;
2. Deepen understanding of the value of kelp to Puget Sound ecosystems and integrate into management;
3. Describe kelp distribution and trends;
4. Designate kelp protected areas;
5. Restore kelp forests;
6. Promote awareness, engagement, and action from user groups, Tribes, the public and decision-makers.

To see the entire plan visit: **nwstraits.org/media/3020/pugetsoundkelpconservationandrecoveryplan.pdf**

A Recent Kelp Expedition

In July 2021, an expedition set off to explore kelp forests in Puget Sound. It was a chance to see kelp forests up close, and ignite a broader effort to protect and restore our local kelp forests. During the expedition, partners and

work groups visited key kelp forests and other significant kelp locations throughout Puget Sound to conduct research, map kelp beds and participate in two gatherings to build community awareness and support for kelp forests. The goals of the expedition were:

- Spotlight the importance of kelp forests.
- Showcase coordinated actions across tribes, agencies, NGOs and researchers.
- Facilitate collaborative science and research to fill information gaps.
- Share knowledge about kelp forests.
- Celebrate the role of kelp forests with communities throughout Puget Sound.

A beautiful interactive story map was created to share knowledge about the cultural and environmental importance of our region's kelp forests and to highlight the kelp expedition. You can take a look by visiting **storymaps.arcgis.com/stories/124e9d24ec1d4e419ea4e32a5ccb42fa**.

Actions We Can Take

It's hard to imagine our region without kelp forests. Here are some actions each of us can take to help protect marine habitats:

- Prevent stormwater pollution with small actions like picking up pet waste, avoiding yard chemicals, using commercial car washes, checking for and fixing auto leaks and installing rain gardens.

- Keep fishing boats to the edge of kelp beds, if passing through kelp cut your boat's engine.
- If harvesting kelp, do so sustainably so it can regrow.
- Talk about the value of kelp to Puget Sound ecosystems with friends, family and community leaders.

Source: Stream Team News, Spring 2022