PUGET SOUND
VITAL SIGNS

VITAL Sign

BEACHES AND MARINE VEGETATION

A functioning, resilient Puget Sound includes dynamic shorelines and extensive kelp forests and eelgrass meadows. The Beaches and Marine Vegetation Vital Sign tells us about the condition of these nearshore habitats and helps us understand whether restoration and protection efforts are working in Puget Sound.

Beaches and marine vegetation are among the most valuable and fragile of our natural resources. They are critical to iconic species like salmon and orcas and hold great cultural importance to indigenous peoples. Shoreline armor disrupts the natural supply of sediment and can lead to the loss of beaches and degraded nearshore habitat while increasing water temperatures and climate change are emerging concerns for marine vegetation health and viability.



Bull kelp forest near Ebey's Landing. Photo credit: Rich Yukubousky.

VITAL SIGN > INDICATOR	PROGRESS	STATUS
Beaches and Marine Vegetation		
Eelgrass Area	MIXED RESULTS	
Short and long-term change at eelgrass sites	MIXED RESULTS	BELOW TARGET
Floating kelp bed area	GETTING WORSE	
Feeder bluffs in functional condition	NO TREND	
Extent of forest cover in nearshore marine riparian areas	LIMITED DATA	
Drift cells in functional condition	INDICATOR TO BE DEVELOPED	
Understory kelp abundance and condition	INDICATOR TO BE DEVELOPED	
Miles of intertidal beach in functional condition	INDICATOR TO BE DEVELOPED	

Related Strategies

- Awareness of Effects of Climate Change
- Climate Adaptation & Resilience
- Education Partnerships
- Floodplains & Estuaries
- Funding
- Greenhouse Gas Emissions & Carbon Sequestration
- Healthy Shorelines
- Invasive Species
- Research & Monitoring
- Riparian Areas
- Smart Growth
- Stewardship & Motivating Action
- Stormwater Runoff & Legacy Contamination
- Strategic Leadership & Collaboration
- Submerged Aquatic Vegetation
- Wastewater Systems
- Working Lands Runoff

Vital Sign Reporter

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KEY VITAL SIGN MESSAGES

- Puget Sound shorelines offer habitat for small fish such as outmigrating juvenile salmon, beach spawning forage fish such as surf smelt, and shellfish beds. Shoreline armor reduces habitat for fish, disrupts natural beach processes by blocking the movement of sediments, and can reduce safe and easy access to the water, impacting people's access outdoor activity.
- **Feeder bluffs** and the use of soft shore techniques are getting significant attention for targeted restoration, leading to recovery in sediment supply and functions. Quantifying scale of human impacts can be a challenge due to the difficulty and cost of producing regular shoreline armoring maps.
- Like terrestrial forests, **kelp forests** form extensive living structures that provide valuable ecosystem services. There are stark variations in the status of floating kelp in different parts of the Puget Sound, ranging from stable to substantial documented decline, and total loss.
- There are approximately 51,700 acres of **eelgrass** in greater Puget Sound. Despite localized decline in eelgrass area, the stability of eelgrass area since monitoring began in 2000 is reassuring and sets Puget Sound apart from other developed areas where large scale declines are ongoing.
- Eelgrass health is linked to the Marine Water Vital Sign. Excessive input of nutrients and organic matter can lead to algae blooms, overgrowth that shades eelgrass beds, and lowers the density and depth that eelgrass grows. Additionally, eelgrass wasting disease has the potential to become a major stressor under increasing climate change and warmer water temperatures.

BACKGROUND DOCUMENTS

Implementation Strategy

The Partnership and its affiliated network of researchers works with the three Strategic Initiative Lead Teams on Implementation Strategy development and operationalization. Please read more about these teams and our shared work at https://pugetsoundestuary.wa.gov/recovering-puget-sound/

- Habitat Strategic Initiative
  - Marine Vegetation Implementation Strategy
  - Shoreline Armoring Implementation Strategy

Indicator Targets

- Eelgrass 2030 and 2050 Recovery Target Fact Sheet
- 2020 Ecosystem Recovery Targets
  - Leadership Council Resolution 2011-01: Adopting a 2020 ecosystem recovery target for eelgrass
  - Leadership Council Resolution 2011-15: Adopting a 2020 ecosystem recovery target for shoreline armoring
  - Eelgrass 2020 Target briefsheet
  - Shoreline Armoring 2020 Target briefsheet
  - Developing Indicators and Targets for Eelgrass in Puget Sound: A Science Assessment (2010)

OTHER RESOURCES

Marine Vegetation

- The Kelp Forest Monitoring Alliance of Washington State (KelpForestsWA)
- Puget Sound Kelp Conservation and Recovery Plan (2020)
- Puget Sound Eelgrass Recovery Strategy. Washington State Department of Natural Resources (2015)
- Eelgrass Restoration in Puget Sound. Washington State Department of Natural Resources (Gaeckle, 2019)

Beaches and Shoreline Armor

- Functions of Feeder Bluffs in the Salish Sea: Prioritizing Beach Restoration and Protection
- Net change in permitted shoreline armor, formerly a Vital Sign indicator is now a (draft) Action Agenda Progress Indicator
- Armoring on Puget Sound Feeder Bluffs: Implications for the Vital Sign (Shipman, 2017)
- The Use of Soft Shoreline Techniques: Implications for the Shoreline Armor Vital Sign (Shipman 2017)
- Relationship between shoreline armor and sense of place in Puget Sound (Trimbach, 2019)
- Shore Friendly Program: Protecting your Property and Puget Sound
    - Shore Friendly regional effort, Northwest Straits Foundation Nearshore Restoration

Data and Mapping Resources

- Beach Strategies Phase 1 and Phase 2 Reports, prepared by Coastal Geologic Services, Inc.
    - Armor survey methods
- WA Department of Ecology Coastal Atlas map of drift cells, latest armor, and shoreforms, based on the Beach Strategies program data
- WA Department of Ecology Examples of Puget Sound Soft Shore and Armor Alternative Projects
- Puget Sound Eelgrass Monitoring Data Viewer, Washington Deparmtent of Natural Resources

CONTRIBUTING PARTNERS