# Shoreline Restoration Effectiveness in Puget Sound

Monitoring Program Summary

Target audience: regional policy makers and managers of agencies and organizations that support Puget Sound recovery
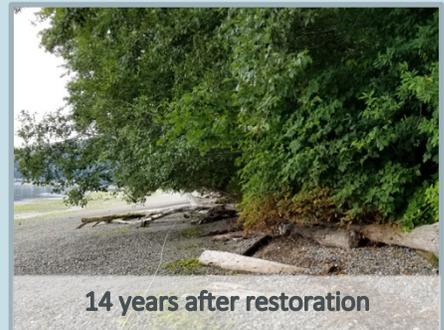
Nearly one third of Puget Sound's shorelines are armored (e.g., seawall, bulkhead, riprap). Armoring has documented negative impacts on the flora and fauna that benefit from healthy intertidal beaches. Recent beach restoration efforts have focused on removing armor to recover natural function. Through regular monitoring, we can determine the effectiveness of these restoration efforts and their value to the nearshore ecosystem, applying what we learn to future management scenarios.
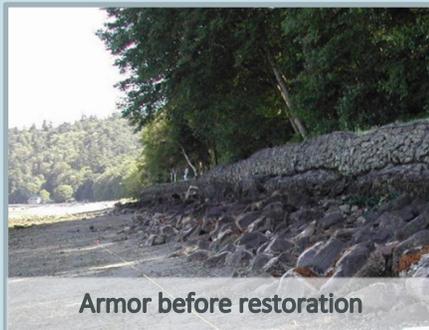
Armor before restoration | 1 year after restoration | 14 years after restoration

Armor removal and restoration at Seahurst Park, a site of longer-term monitoring.

Summary of Monitoring Efforts Our focus is on sites where shoreline armor has, or will be removed, including additional techniques from the Marine Shoreline Design Guidelines (MSDG) and Your Marine Waterfront: sediment nourishment, log placement, and vegetation planting. Our site list currently details 62 sites, of which 45 had armor removed as of March 2023, totaling 22,693 feet of armor removed. Our goal is to evaluate effectiveness of restoration projects and generate information that can be used in guidance to inform future armoring removals. This addresses a near-term priority outcome

Monitoring at Bowman Bay

in the Shoreline Armoring Implementation Strategy – "Existing monitoring information on implemented removal and soft shore projects compiled and analyzed to improve designs and site selection."

Shoremonitoring.org
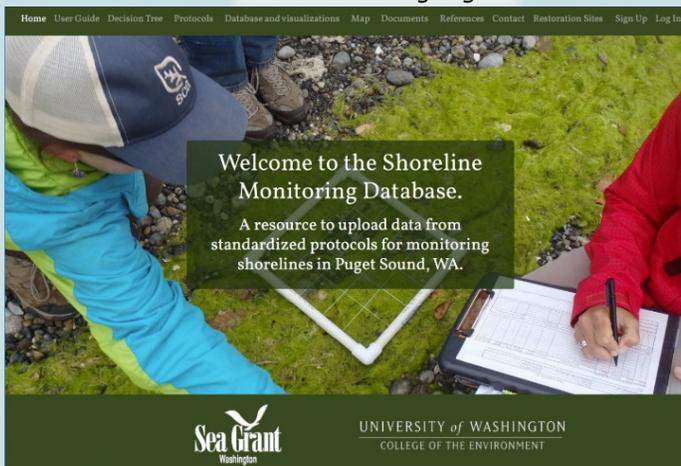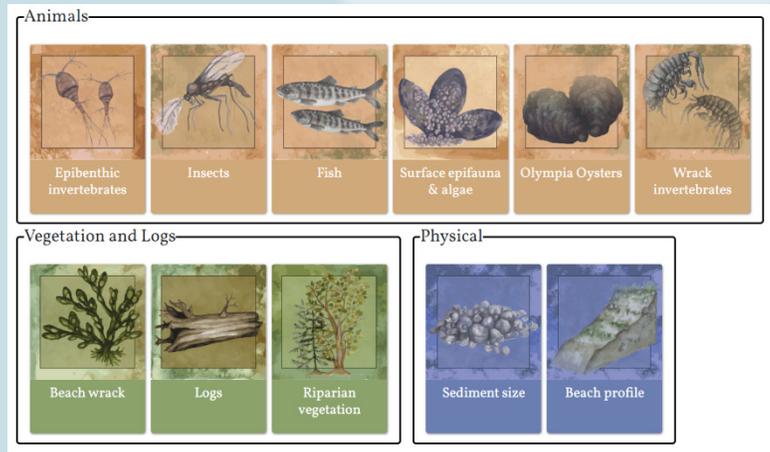
Organizations Involved in Funded Near Term Actions (NTA) Current funding for groups involved with this memo supports coordination of data collection, stewardship, and analysis. These NTAs through the Habitat Strategic Initiative Lead (HSIL) implement priorities of the Action Agenda. NTA 2018-0219 has supported data collection at 28 sites, with over 100 volunteers trained, recording more than 2,700 volunteer hours. NTA 2018-0525 enables anyone to upload data to a centralized Shoreline Monitoring Database (shoremonitoring.org), which combines multiple datasets and ensures data longevity and compatibility across groups.

Funding is instrumental for shoreline monitoring as successful volunteer and student involvement requires ongoing training, staff time for organizational support, and stewardship and analysis of the data. Funding has allowed for the addition of more protocols to the database, incorporation of historical data, improvement to database features, addition of data visualizations, and analysis of data to evaluate restoration effectiveness. So far, 35 organizations – citizen science groups, agencies, and academics – have uploaded and downloaded data. We have also participated in

The eleven protocols in the database

outreach tools, in partnership with Shore Friendly guidance efforts for waterfront landowners. Expansion of data collection and interpretation provide an adaptive management framework to evaluate restoration project effectiveness, and generate information that can inform future armor removals. Main Partners include the University of Washington, Washington Sea Grant, Northwest Straits Foundation, Washington Department of Fish and Wildlife, the Vashon Nature Center, and Sound Data, and additional collaborations with Friends of the San Juans, Salish Sea Stewards, Sound Water Stewards, and Marine Resources Committees for Whatcom, Skagit, Island, Snohomish, and Jefferson Counties.

Citizen Science Spotlight As an example of citizen science engagement, the Northwest Straits Foundation has been leading volunteer surveys at Bowman Bay since 2013, documenting success stories such as forage fish spawning 4 years after restoration. The **Vashon Nature Center** BeachNET program engaged 289 volunteer hours in 2022, monitoring restoration effectiveness across five sites. These citizen scientists were a mix of community volunteers, high school students, and land trust interns, and have changed the views of local citizens.

Priorities for Future Monitoring HSIL funding has been vital for continued data collection using consistent protocols. Although we have made large strides in recent years in coordinating efforts and standardizing protocols across diverse groups, given the range of organizations and geographic scope involved, continued support will make levels of effort consistent across regions. Future efforts will focus on maintaining long-term monitoring of before and after restoration data, in order to learn from the temporal trends that can inform management actions. Restoration sites are often unique in their setting and design application. New sites will be incorporated to expand our spatial framework for analysis, and address specific design details. By addressing both physical and ecological functions of beach restoration, we will be able to better plan for restoration actions that will be sustainable, especially when faced with coastal resiliency and sea level rise. More information on monitoring efforts and data interpretation can be found at the Shoreline Monitoring Database.