

IMPLEMENTATION STRATEGIES

Shoreline Armoring Implementation Strategy:

*Reducing armor impacts on
Puget Sound shorelines*

APRIL 24, 2018



Habitat Strategic Initiative

Co-led by

Washington Department of Fish and Wildlife and
Washington Department of Natural Resources

in collaboration with:

Shoreline Armoring Interdisciplinary Team

George Blomberg, Randy Carman, Lori Clark, Jessica Cote, Nicole Faghin, Sarah Heerhartz, Lisa Kaufman, Kyle Loring, Susan Meyer, Conrad Newell, Betsy Severtsen, Hugh Shipman, Doris Small (WDFW Strategy Development Lead), Steve Todd, Heather Trim, Stan Walsh

Puget Sound Institute

Puget Sound Partnership

Acknowledgements

Thank you to partners throughout the region who have participated in developing the content herein and providing critical feedback on the Shoreline Armoring Implementation Strategy.

This project has been funded wholly or in part by the United State Environmental Protection Agency under assistance agreement PC-01J22301 to the Washington Department of Fish and Wildlife. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency (EPA), nor does the EPA endorse trade names or recommend the use of commercial products mentioned in this document.

Suggested citation: Habitat Strategic Initiative. 2018. Narrative. Shoreline Armoring Implementation Strategy. Washington Department of Fish and Wildlife and Washington Department of Natural Resources. <https://pspwa.box.com/v/PublicIS-ShoreArmoring>

PUGET SOUND

National Estuary Program

Title: Shoreline Armoring Implementation Strategy: Reducing armor impacts on Puget Sound shorelines

Authors: Habitat Strategic Initiative in collaboration with the Shoreline Armoring Interdisciplinary Team, Puget Sound Institute, and Puget Sound Partnership

Organization: Habitat Strategic Initiative

Year: 2018

Keywords: Shoreline Armoring, Implementation Strategy, Vital Sign, marine shoreline infrastructure, shoreline hardening, sea level rise, behavior change, incentives, compliance monitoring, regulation, effectiveness, landowner, nearshore, ecosystem processes, adaptive management

Series Name: Puget Sound National Estuary Program

State Agencies: Washington Department of Fish and Wildlife, Washington Department of Natural Resources

EPA Grant Number: PC-01J22301

Summary:

The Shoreline Armoring Implementation Strategy describes the regional outcomes necessary to accelerate progress towards the Vital Sign indicator target. It is a road map for aligning opportunities across agencies, programs, projects, and funding and to highlight the areas requiring the most attention in order to sustain and accelerate the progress achieved to-date. This Implementation Strategy identifies four strategies: incentives; regulatory; design and technical training; and planning. Enactment of this Implementation Strategy should increase the health of Puget Sound shores while ensuring people and their property are safe and able to continue enjoying Puget Sound beaches.



Executive summary



The shores of Puget Sound are an integral part of life in the region. They are at the heart of early industry and development, the backdrop for major cities, the location of many transportation corridors, and where people make their homes, recreate, and explore nature. Puget Sound shores have also been integral to Native Americans' lives and cultural practices for millennia and provide important habitat for marine life and food webs. Over time, from the building of homes, roads, and businesses near the water, we have installed "shoreline armor", also known as seawalls or bulkheads, to prevent erosion and today armor lines about 27% of the Sound's shoreline.

Shoreline armor makes a dynamic shoreline static, disrupting many of the natural processes that replenish sand and gravel to beaches and spits of Puget Sound. As a result, beach material can wash away more quickly, threatening infrastructure and nearshore habitat. In some places of Puget Sound, armor must be maintained to protect public safety and existing infrastructure. However, there are many opportunities for restoration (armor removal) and preserving unmodified shoreline along Puget Sound where armor is not necessary. Where shoreline stabilization is needed to reduce risks to property and infrastructure, one alternative is to retrofit existing armor with an engineering technique called "soft shore protection" where appropriate. This uses natural materials to mimic nature and may offer some habitat benefits, although more research is needed to assess its effectiveness.

The Shoreline Armoring Implementation Strategy (Implementation Strategy) draws upon the work and lessons learned from the past decades to accelerate our progress to restore shorelines by removing shoreline armor or preserving unarmored stretches. Enactment of this Implementation Strategy should increase the health of Puget Sound shores while ensuring people and their property are safe and able to continue enjoying Puget Sound beaches.

Shoreline Armoring Vital Sign

Indicator Target

- From 2011 to 2020, the total amount of armor removed should be greater than the total amount of new armor installed in Puget Sound

Shoreline armor indicator status 2011- 2016

- Sound-wide net increase of 0.8 miles of permitted armor
- Five counties (geographic boundaries with numerous jurisdictions) had net decreases in permitted armor

Recent improvement

- 2014 and 2016 had Sound-wide net annual removal in permitted armor

Data used to track the indicator: [WDFW Hydraulic Project Approvals](#) *data are permitted armor, not observed armor.

Learn more: [Partnership Vital Sign website](#)

What is an Implementation Strategy? The Shoreline Armoring Implementation Strategy describes the regional outcomes necessary to accelerate progress towards the Vital Sign indicator target (see inset box). It is a road map for aligning opportunities across agencies, programs, projects, and funding and to

highlight the areas requiring the most attention in order to sustain and accelerate the progress achieved to-date.

Goal The Implementation Strategy’s goal is accelerate progress towards achieving the Vital Sign indicator target. Progress toward the target helps to reduce the negative impacts of shoreline armor so that protecting land for human uses does not impede shoreline processes, such as the supply and movement of sediment. Sustaining these processes provides the beach habitat that is necessary to support a diverse and resilient marine food web, including invertebrate prey for salmonids and spawning habitat for forage fish. Sustaining dynamic shoreline processes also provides opportunity for adaptation in face of sea level rise and other climate-driven changes. A functioning nearshore also provides beaches for recreation and natural shoreline buffer that protects waterfront properties. Meeting the Vital Sign indicator target is central to this goal.

Opportunities to make gains towards the Vital Sign indicator target are not equal throughout the Sound. In the near-term residential and publicly-owned parcels represent the greatest opportunities for meaningful gains. Armor on residential parcels represents the majority (about 60%) of the armored shoreline along Puget Sound. In the long-term, major gains toward the goal on non-residential parcels can be achieved by working to reduce armor impacts associated with roads and industrial or commercial development where solutions may have longer planning horizons.

Strategies The Implementation Strategy includes four strategies. Each strategy aims to accelerate the rate at which habitat protection and restoration actions reduce the impacts of shoreline armor and progress towards the Vital Sign indicator target. Enacting these strategies does not reduce the need to continually implement the on-the-ground projects necessary for recovery.

1. Incentives strategy: Improve and expand incentives and education for residential property owners to support their efforts to remove hardened shoreline or protect unmodified shorelines.	
Why this strategy?	What do we need to achieve now? Near-term priorities
Residential parcels account for over half of Puget Sound’s shoreline length. Shoreline property owners’ concerns about erosion often result in management decisions, such as installing armor, which can have negative impacts on shoreline processes. This strategy builds upon the substantial progress made to develop incentive and education programs for property owners in the Puget Sound region with the long-term goal of sustained program resources to motivate voluntary actions for healthy shorelines.	<ul style="list-style-type: none"> Expanded financial incentive alternatives available to property owners to motivate ecologically friendly shoreline management Continued and expanded property owner site visit programs to provide technical assistance Sustained funding for incentive and outreach programs focused on shoreline property owners

2. Regulatory strategy: Increase and improve regulatory implementation, compliance, enforcement and communication to increase habitat protection and improve opportunities for the restoration of shoreline processes and habitat.	
Why this strategy?	What do we need to achieve now? Near-term priorities
Existing shoreline regulations are designed to protect species and ecosystems while protecting private property, public safety, and public access. Regulatory agencies, however, face	<ul style="list-style-type: none"> Increased training and technical support for local jurisdiction regulatory staff

challenges implementing and enforcing existing regulations for new or replacement armor and hurdles for armor removal remain high. This strategy identifies effective implementation, compliance monitoring and enforcement improvements within and across regulatory agencies in Puget Sound to reduce new (and especially illegal) armor, reduce the impact of repairs and replacements, and encourage armor removal. The strategy also identifies improved communication among regulatory agencies and with the public as a way to achieve efficiencies and improve outcomes.	<ul style="list-style-type: none"> • Regulatory implementation and effectiveness monitoring • Active compliance monitoring and enforcement programs Sound-wide • Political support cultivated for regulatory implementation, compliance monitoring, and enforcement
--	--

3. Design and technical training strategy: Increase and improve coastal processes-based design and technical training to continue to expand technical solutions and capacity.	
Why this strategy?	What do we need to achieve now? Near-term priorities
Each shoreline parcel requires individual assessment to determine potential risks associated with its unique shoreline attributes and upland features. The regulatory environment, property owner, and the restoration community depend upon regional technical capacity to evaluate site characteristics and determine appropriate solutions including no armor, armor removal, or soft shore protection. The outcome of this strategy is improved technical capacity including access to designs, guidance, and training to implement environmentally protective projects throughout Puget Sound.	<ul style="list-style-type: none"> • Compilation and analysis of existing monitoring information on implemented removal and soft shore projects (to improve designs and site selection) • Development of additional, complementary guidance to the Marine Shoreline Design Guidelines (to improve implementation of removal and soft shore projects)

4. Planning strategy: Improve long-term strategic planning to support and connect regional and local partners to develop integrated habitat restoration and protection, transportation, and infrastructure improvement plans.	
Why this strategy?	What do we need to achieve now? Near-term priorities
Land use planning related to development patterns, infrastructure replacement, and future climate change scenarios influence shoreline armor trends over timescales of 10 – 50 years. If the tools and resources needed to support long-term planning are not initiated today, we may be unable to address foreseeable challenges in the future. This strategy describes the planning efforts, research questions, and monitoring that should be in place today in order to effectively reduce armor impacts in the future.	<ul style="list-style-type: none"> • Completed mapping of Puget Sound shoreline attributes using standardized methods • Improved quantification of shoreline armor impacts on the Puget Sound nearshore ecosystem • Successful case studies that leverage non-restoration-focused projects to remove shoreline armor are scaled up into regional programs (including coordination among large partners) • Identification of vulnerable and aging infrastructure and unarmored shorelines vulnerable to armor installation

Research The last decade has seen a substantial increase in our understanding of the physical and biological processes that sustain the structure and ecological function of Puget Sound shorelines. We have also made some progress understanding the human-dimension of shoreline armor – who owns the

shoreline and what influences their decision to install, maintain, or remove armor. Outstanding questions remain that limit our ability to evaluate key assumptions of this Implementation Strategy or to support the site-level decisions that ultimately result in progress. Key research needs identified during the Implementation Strategy development include:

- Comparison of the ecological effects (structure, processes, function) of soft shore designs, removal projects, and hard armor
- Comparison of short-term (installation) and long-term (maintenance) costs between hard armoring and soft shore protection designs

Climate change Research is underway to develop improved, finer scale projections of sea level rise and storm surge under different future scenarios for Puget Sound, which are variables that influence shoreline processes and affect risk and risk perception. Building upon this research, the region should adopt a standardized set of best available science and place-specific estimates for climate change variables, especially sea level rise and storm surge projections, which are used to plan for sea level rise resilience and adaptation across sectors and locations. A standardized set of resources would improve planning outcomes by: providing a level of predictability to people and institutions that are interacting with the state on various climate-related activities; help to standardize approaches across the region and reduce redundancy (i.e. one climate vulnerability assessment would state requirements for most processes); and provide a quick reference to determine risk tolerance for those organizations that do not have the time, capacity, or training to do a “risk assessment.”

Sea level rise and extreme precipitation will increase erosion risk in some areas, but may also increase the perception of increased risk more widely. Rising sea level is also expected to magnify storm surge effects and increase the likelihood that inundation occurs in low-lying areas. The Implementation Strategy identifies climate vulnerabilities for each strategy, including direct physical impacts and human behavioral responses, as well as example actions that can help mitigate these vulnerabilities.

Implementation and Partners Achieving the outcomes described in the Implementation Strategy will require the ongoing and coordinated efforts of partners throughout the Puget Sound region. The current efforts of local, state, and federal governments, tribes, NGOs, Conservation Districts, and restoration and recovery groups are crucial to achieving the strategy’s goal. Throughout this Implementation Strategy, there is a strong theme of consistent, standardized, and transparent decisions, coordination, and communication that will better allow individual organizations and agencies to collectively assess the causes and consequences of our actions for Puget Sound shorelines. The Habitat Strategic Initiative has identified how to support strategy implementation through grant funding, staff capacity, and communication.

Adaptively managing the strategy Adaptive management—the process of continuous improvement based on new data, analysis, and learning—forms the basis for planning, implementing, and improving Puget Sound recovery. The Habitat Strategic Initiative team, in collaboration with regional partners, will host an annual forum to update the Implementation Strategy’s performance metrics, highlight and incorporate new information that is vital to the strategy, and determine if the regional planning community should make any changes to the strategy. This strategy seeks to support long-term behavior change in how Puget Sound communities manage the shoreline. The strategy near-term priorities focus on the immediate steps needed to accelerate progress; however, adaptive management is crucial in order to address the long-term vision of behavior change.

