SHORE STEWARDS NEWS

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This edition of the newsletter was written by Scott Chase, WSU Shore Stewards Coordinator, Island County. In the March/April newsletter, we discussed how bulkheads change the shoreline and the current status of shoreline armoring in Puget Sound. This newsletter covers several natural alternatives to bulkheads. The next edition will provide information on what steps to consider if you are seeking a natural alternative to bulkheads.

Living with Existing Bulkheads

The March/April edition of Shore Stewards News discussed some of the negative impacts created by bulkheads and other "armoring": http://extension.wsu.edu/island/wp-content/uploads/sites/21/2016/04/Issue-108-March-April.pdf Though it is recommended that those considering armoring their shoreline to do so using soft-shore and natural alternatives, it is recognized that not all locations will benefit from this option, and it is not always practical or advantageous to remove existing bulkheads.

The photos below illustrate a situation in which replacing a section of an existing bulkhead with a more natural shoreline was not recommended after a site visit by a well-known engineer who specializes in soft-shore altnernatives. The continuous wood and rocky groin bulkhead, located in front of multiple properties and located just a few feet away from structures, sheds and access trails, was not a good candidate for replacement by more natural alternatives. Removing a short section of bulkhead in a location like this one would likely result in erosion for the property owner and neighboring properties. It is highly unlikely that a property owner today would be allowed to construct any structures so close to the shoreline, but until recently, this was common in many coastal communities.

Camano Island Photos by Scott Chase

Large Wood Placement

Large drift logs and root wads (large woody debris) are readily available on the upper beach tidal zones of Puget Sound, and are being increasingly used in alternative or "natural" shoreline protection projects. As part of a professionally engineered project, the logs are often anchored perpendicular or at an angle to the shoreline, with different results. They can be used to disperse wave energy, or to corral additional wood debris, sand or beach sediment. Logs that are lower on the beach and subject to wave energy may be partially buried, whereas logs higher on the beach may be more loosely placed and used to protect vegetation, which in turn protects against erosion. When possible, logs should be large, with root wads and branches left intact, and include naturally rot-resistant varieties such as Western red cedar and Douglas fir. This method of shoreline protection is often used in conjunction with revegetation and beach nourishment. The photos below show how creosote bulkheads at Cornet Bay on Whidbey Island were replaced by a more natural, sloping beach, with anchored logs placed both parallel to the shoreline on the upper beach area, and also perpendicular to function like a groin. Native vegetation has replaced the grass on the upper beach to protect against erosion.

Photos above by Sarah Schmidt

Large wood placement should always be designed and implemented by a professional who has experience with this method, and has knowledge of coastal processes. Some property owners may attempt to create their own large wood placement, with mixed results. At right is an example of a property owner who used cables and ropes to tie dozens of logs together, adding new ones as they washed up. This has resulted in upper beach erosion.

Photo by Scott Chase

Beach Nourishment

For many low-to-medium wave energy sites around Puget Sound, beach nourishment is often used to slow erosion and restore beach conditions to more closely resemble their past appearance. Used primarily with small scale projects, nearby upland coarse sediments are placed in backshore and upper beach areas to create protective berms. The use of rounded gravel and sand to create a gradual beach grade differs from larger beach-fill situations that increase the height and width of beaches. It is best to match sediment size as closely as possible to the natural sediment found on the beach. The objective is to slow beach erosion by allowing the beach to replicate a natural one. Erosion continues to take place, so periodic material additions may be needed. This method works best in locations where the waves break parallel to the beach, rather than breaking at an angle, which typically causes more erosion and sediment movement. Beach nourishment is often used along with large wood placement.

When considering beach nourishment, it is very important to consult with a professional who is experienced with this technique and understands coastal processes, like a geotechnical engineer or coastal geologist. This is a relatively low-cost alternative that will help you replicate a more natural looking beach.

The photo at left, courtesy of Hugh Shipman, Washington State Dept. of Ecology, shows a nourishment project from the north side of Weaverling Spit on southern Fidalgo Bay. This was undertaken several years ago.

The 2005 Marine Park Beach restoration project in Bellingham included the replacement of 5,600 tons of concrete rubble and rock on the shoreline with a gently sloping 300 foot wide sand and cobble beach. Photo at right courtesy of Hugh Shipman.

Reslope and Revegetation

In locations where there is slope instability due to erosion of the bluff toe, or upland causes that create an over-steep and unstable upper bluff face, resloping may be a relatively inexpensive and natural solution. This may be done in conjunction with site drainage and vegetation management. If the location is currently in a relatively stable condition, or has ample native vegetation, the benefits may be offset by the disturbance of the slope caused by resloping, and may not be recommended. This alternative may also not be feasible for locations with erosion caused solely by wave energy.

Bluff resloping or recontouring and revegetation refers to the reduction or lowering of the slope's grade to increase stability, accompanied by the planting of vegetation, preferably native species best suited for marine environments. Generally, the upper portion of a steep slope is graded so that the crest of the slope is laid back. Vegetation is then planted to intercept precipitation and thereby reduce surface erosion and surface water runoff. The root network will increase soil cohesion and reduce the erosion of the surface soils on the bluff. The roots will also help aerate the soil, as well as wicking the water from the soil and evaporating it into the air through the leaves of the vegetation, a process known as evapotranspiration. This helps reduce the quantity and weight of the water on the bluff, lessening the chance of slides.

In more serious situations, engineered structural solutions may be considered when resloping, including crib walls, gabion walls, and other soil- erosion due to high energy wave activity. Information on these is not covered in this newsletter. In some instances, resloping and revegetation may be done along with beach nourishment or use of large log placement.

Photos courtesy Washington Dept. of Fish and Wildlife

The two photos above illustrate reslope and revegetation undertaken at a medium-high bank site in Puget Sound. A bluff slump had left the upper bluff area overly steep and unstable, with the sediment accumulating at the toe. The slope was regraded, then planted with appropriate native species.

Resources

1. Rethinking Shoreline Armoring – *A series of Salish Sea Currents magazine.* Encyclopedia of Puget Sound. (The Encyclopedia of Puget Sound is published by the University of Washington's Puget Sound Institute) https://www.eopugetsound.org/magazine/shoreline-armoring
2. Barnard, Bob, 2010. . Developing a Guidance Document for Puget Sound Marine Shorelines. U.S. Geological Survey Scientific Investigations Report 2010-5254, p. 205-212. http://pubs.usgs.gov/sir/2010/5254/pdf/sir20105254_chap21.pdf
3. Marine Shoreline Design Guidelines. Prepared for The Aquatic Habitat Guidelines Program, 2014. Washington Dept. of Fish and Wildlife. http://wdfw.wa.gov/publications/01583/wdfw01583.pdf
4. Your Marine Waterfront, 2016. Washington Dept. of Fish and Wildlife. http://wdfw.wa.gov/publications/01791/wdfw01791.pdf
5. Shipman, H., Dethier, M.N., Gelfenbaum, G., Fresh, K.L., and Dinicola, R.S., eds., 2010, Puget Sound Shorelines and the Impacts of Armoring—Proceedings of a State of the Science Workshop, May 2009: U.S. Geological Survey Scientific Investigations Report http://pubs.usgs.gov/sir/2010/5254/pdf/sir20105254.pdf
6. Guide for Shoreline Living, 2015. Washington State University Extension. http://shorestewards.cw.wsu.edu/guidelines/
7. Menashe, E., 2004. Shoreline Management and Stabilization Using Vegetation. Greenbelt Consulting, Clinton, Washington. http://greenbeltconsulting.com/ctp.html
8. Summaries: Shoreline Stabilization Measures, Washington Dept. of Ecology. http://www.ecy.wa.gov/programs/sea/shorelines/stabilization/summaries.html

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