

RE: Shoreline Stabilization – Comments By WA Sensible Shorelines Assoc. (WSSA)

Following is input by WSSA on shore stabilization. A summary of this input can be found in our notebook of information (provided Council on April 14, 2014) at **Tab 2 under points #43 - #47.**

Topics Covered below -

Purpose & Need	Type & Location	Access & Safety	Existing Vs New	Opportunities
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Purpose and Need -

Bulkheads serve the purpose of preventing shoreline erosion due to destructive wave/wake action. In recent years environmental concerns point to loss of sand-sized particles in the near shore area from waves reflected off vertical concrete bulkheads. This is called scour.

Demands that vertical bulkheads simply be removed would jeopardize existing development, subjecting shores to erosion and destruction of property improvements.



Figure 1 - Destructive Wave Action on Lake Sammamish

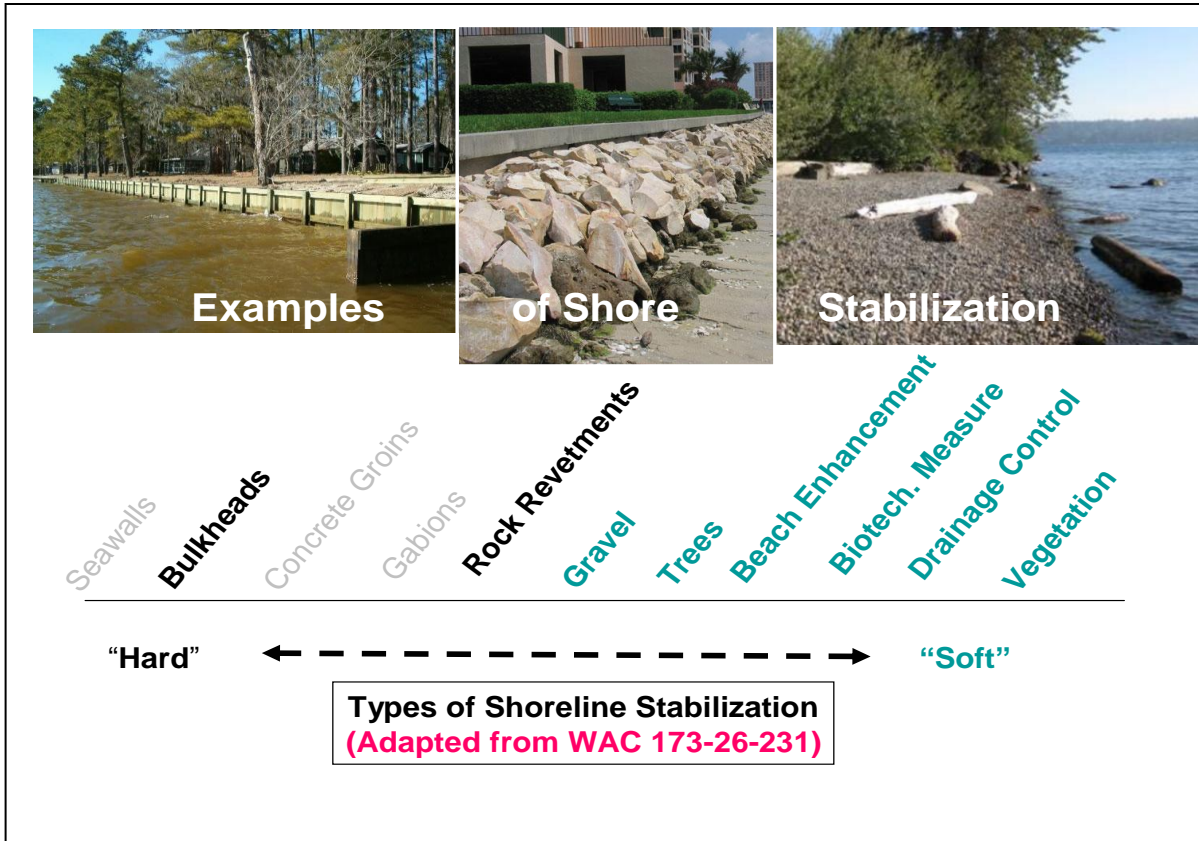
An alternative is needed that balances the competing needs and conditions found along our lake shores.

Type and Location -

A variety of shoreline protection can be identified; ranging from "soft" to "hard". WA Administrative Code (WAC) provides a spectrum as shown in Figure 2, below.

Location distinguishes bulkheads from other forms of *armoring*. Bulkheads are located at the immediate shoreline, at least part of the time at or in the water. Bulkheads are just one type of *armoring* and there are important distinctions. Upland rockeries, berms, and similar landscape decorative features are also termed armoring, but are located away from the water's edge.

Figure 2 - Types of Shoreline Stabilization (Grayed Items Less Used on Lake Shores)



Here are some distinguishing features of shoreline armoring:

- Vertical faced concrete bulkheads
 - Protect from wind and waves but may cause scour in near-shore waters.
 - Benefits include stability, durability, narrowness (smaller land area consumed).
- Vertical Rip Rap
 - Offers some energy dissipation due to angularity of rocks.
 - Some reduction in scour due to energy dissipation created by crevasses.
- Angled Rip Rap
 - Widely used, mostly on waterways (rivers, for example).
 - Provides greatest reduction in scour via rock crevasses.
 - Provides shelter for smaller fish and in-water food sources.
- "Soft" Stabilization
 - As Figure 2 shows, would consist of planted berms, logs, and boulders.
 - Engineers confirm it is inappropriate on lakes with wind driven waves.
 - Additional engineering required to avoid erosion of nearby bulkheads.
 - Residents are concerned there would be high potential of loss and costs to replace.
 - Consumes a greater amount of land area, but provides less protection.
 - It is difficult to "imitate" a natural shoreline when we've become so urbanized.

Access, Safety, and Liability

Bulkheads are typically narrower than rip rap revetments (taking up less land). And, when water levels recede, they allow use of the shoreline beach area. And, as important, they are durable.

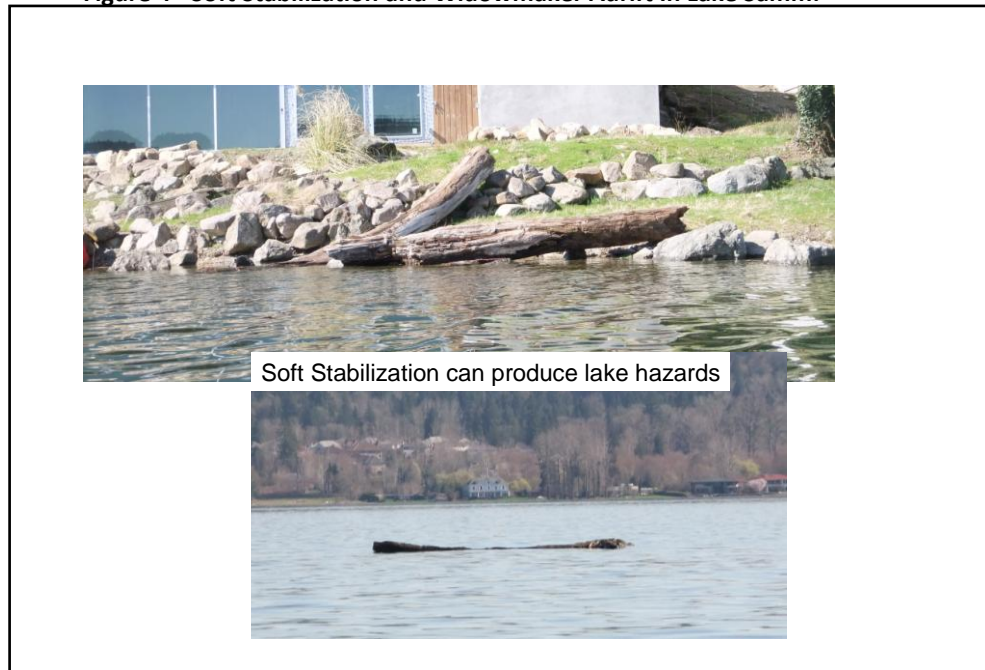
Rip rap revetments, on the other hand, encompass a greater area than a bulkhead, since rip rap would be sloped. But it can present hazards to those tempted to explore its rocky expanse. Likewise, swimmers and boaters, in the water, could be in similar jeopardy if the rip-rap extended further into the water.



Figure 3 - Shoreline Stabilized by Angled Rip Rap

Utilization of "soft" stabilization, as opposed to vertical bulkheads or angled rip rap, presents concerns of safety and liability for residents. Some soft stabilization methods will not minimize erosion given fluctuation lake levels and wave action. Attempts to incorporate logs or live trees on shorelines that witness fluctuations in water levels and wave action may produce dangerous situations. Should trees die and fall, or, in the case of logs, which can come loose and float into navigable waters, who will be liable? Requiring applicants to absorb the associated liability, and hold the City harmless, is not acceptable to residents.

Figure 4 - Soft Stabilization and Widowmaker Adrift In Lake Samm.



Existing Vs New Stabilization -

Existing stabilization measures, especially bulkheads, are needed to protect property and shoreline stability. Repair should be allowed, as proposed by the Commission. New bulkheads would face stricter requirements and justification. Finally, replacements would be restricted to their current location and size, along with specific design criteria cited in SMP draft.

Opportunities (and Obligations)

Repair of eroded areas - we believe that rip rap treatments also offer an opportunity for low cost repair of shoreline losses such as those due to fluctuating water levels on Lake Sammamish. As seen in Figure 5a and 5b, an incentive program might be offered homeowners suffering eroded shoreline.

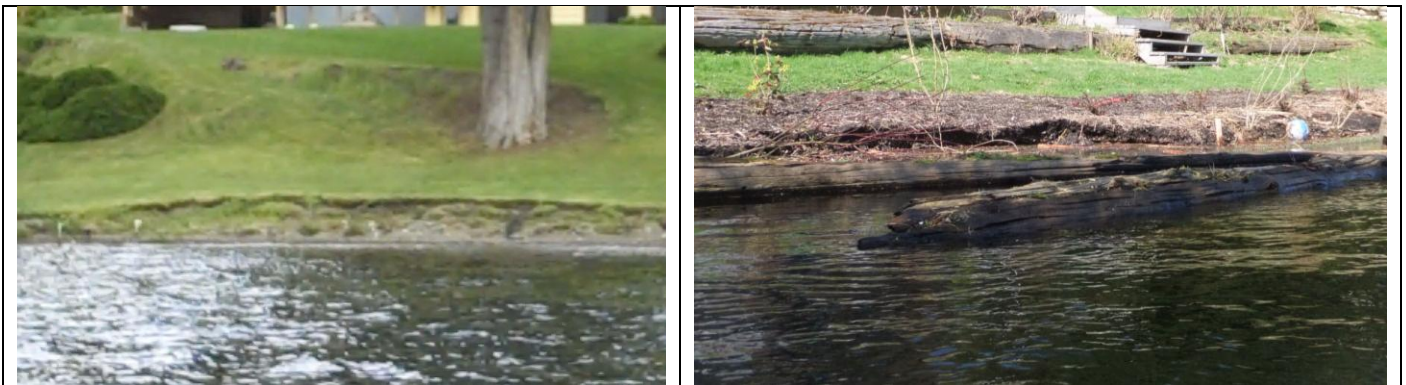


Figure 5a and 5b - Eroded Shorelines Possibly Benefiting from Rip Rap Placement

Conclusion - State Master program regulations at RCW 90.58.100(6) call for "... *the protection of single-family residences and appurtenant structures against damage or loss due to shoreline erosion... with preference for permit issuance for measures to protect single-family residences occupied prior to January 1, 1992 ... (with measures) designed to minimize harm to the shoreline natural environment.*"

With the above facts in mind, the Planning Commission recognized the benefits of rip rap armoring versus vertical faced, concrete bulkheads or other stabilization techniques. A 1:1 slope (45 degree angle) design was selected by the Commission as the most effective in balancing the competing needs of Bellevue lake shorelines. In addition, they have recommended that a qualified professional engineer be involved in stabilization selection and design.

WSSA supports the Commission's recommendations and urges Council's support.

Martin Nizlek, Board Member
For WSSA

