



BULKHEAD VS. BIOENGINEERED SEAWALLS

A common and seemingly harmless practice such as the removal of native shoreline vegetation and installing seawalls (bulkheads) is the destruction or altering of shoreline and nearshore habitat. Generally, when implemented on a small scale, this type of activity has negligible impacts on lake resources as a whole. However, as residential development increases along shorelines and more and more natural shoreline is altered, the cumulative effect is the degradation of natural scenic beauty, shoreline floral and faunal communities, and water quality.

Lakefront property owners wanting a view or access to the lake have often chosen installation of hard-armor seawalls (bulkheads) rather than considering shoreline landscaping, soft armor practices, or bioengineered practices. Lakefront property owners have often chosen seawalls rather than the more friendly hard armor practice; rock rip-rap.

Loss of shoreline vegetation is an increasing concern around Michigan lakes. This is true around Maple Lake as well. Converting shoreline to high-maintenance, shallow-rooted turf grass, in conjunction with increased boat traffic and wave action, contributes to: 1) Shoreline erosion, 2) Pollutant run-off, and 3) Loss of wildlife habitat

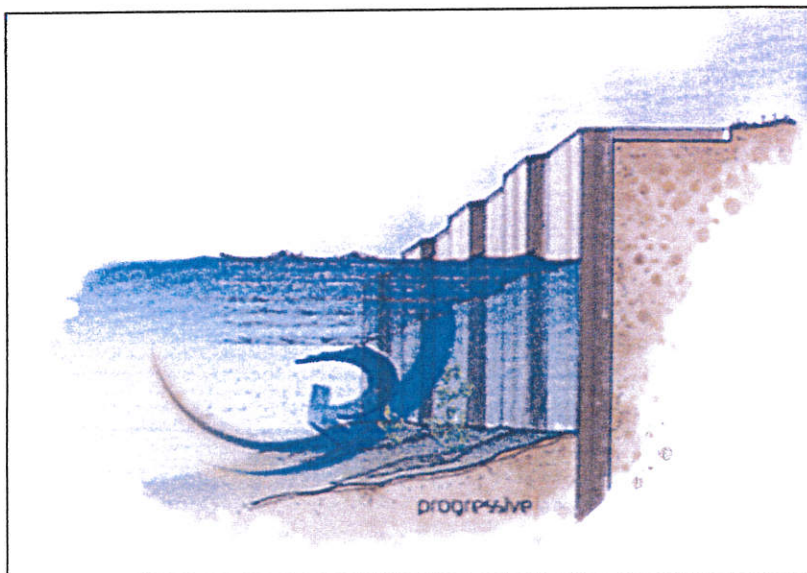
Seawalls deflect wave energy downward which scours the bottom of the lake. The scouring action re-suspends sediments and results in a loss of habitat for aquatic life that lives in the lake bottom.

When one property owner has a seawall and another doesn't, wave flanking can cause erosion on the other property; leading to more seawalls.

**There are
alternatives
to bulkhead
seawalls.**

**The choices
are not as
limited as they
once were.**

**Inside is more
information.**



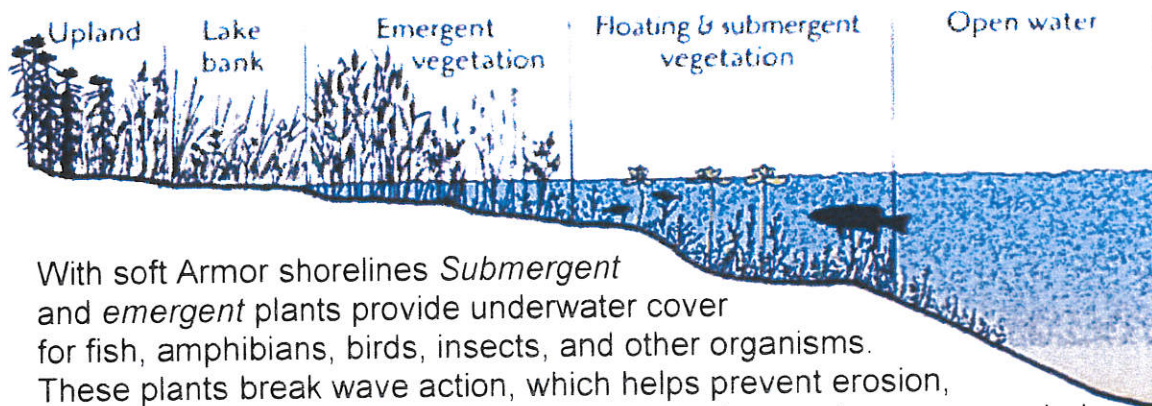
...continued from page 1...

Riparian owners commonly choose to alter the shoreline. Seawalls have long been used to protect shorelines, from the smallest inland lakes to the most battered coastal shores. Riparian owners on Michigan inland lakes can select one of three general types of seawalls: 1) bulkhead, 2) glacial stone, or 3) bioengineered seawalls. Each, when properly designed, can be very effective in controlling the erosion by wave action. Each method has strengths and weaknesses that must be weighed when determining which to use on a particular shoreline.

Examples of soft and hard bioengineered seawalls are below and on the opposite page (pg. 3) and below.

A great reference and resource for options to constructing seawalls can be found at www.mishorelinepartnership.org.

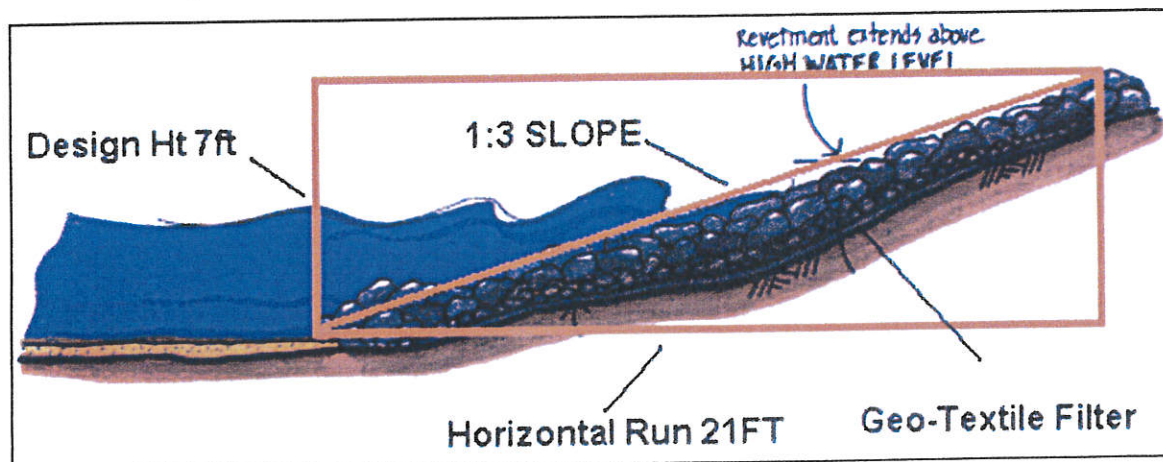
Soft Armor Shoreline



With soft Armor shorelines *Submergent* and *emergent* plants provide underwater cover for fish, amphibians, birds, insects, and other organisms. These plants break wave action, which helps prevent erosion, and stabilize bottom sediments, which otherwise can be re-suspended by currents and wave action. Plants growing on *upland* slopes and lake banks help keep the lake water clean by holding sediments in place against the eroding forces of water runoff and by absorbing excess nutrients like phosphorous and nitrogen.

Hard Armor Shoreline

Protects against shoreline erosion and is more habitat friendly. Hard armor



shorelines use glacial stone in the design. This design breaks wave action and allows aquatic life access to shoreline. Other life thrive in the stone and provide food for fish and birds.



There are two types of bioengineering techniques available in lakescaping: soft-armor and hard-armor. Soft-armor bioengineering implies the use of live vegetation, whereas hard-armor requires the use of rocks, concrete or metal.

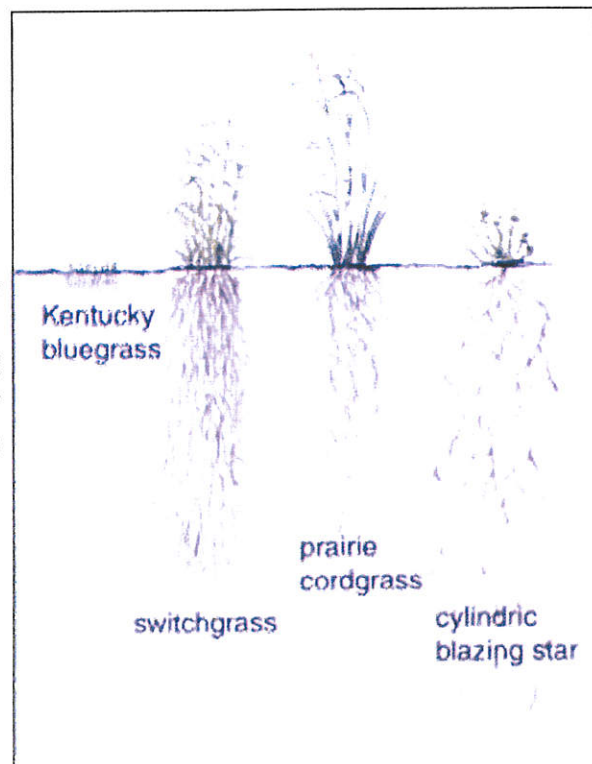
Rock Riprap – A very common hard-armor technique which consists of large rocks placed in the water and up the slope along the shoreline. Riprap should be lined with geotextile fabric to prevent

wave action from sucking soils from behind rocks, causing slumpage. Glacial stone seawalls provide shoreline armoring while causing less damage to habitat and natural aesthetics.



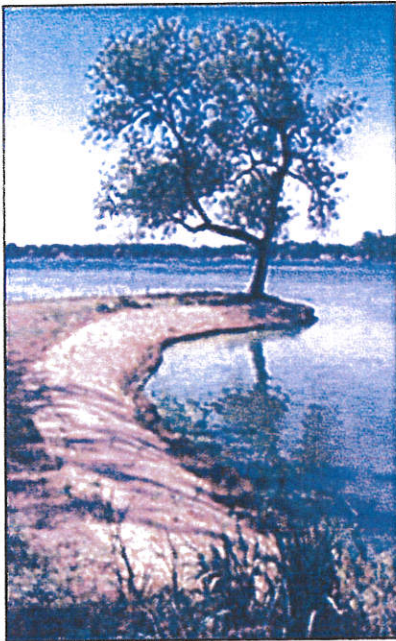
Soft-armor bioengineering – The placement of plant materials into structures that are designed to withstand wave and ice action. Soft-armor bioengineering is ap-

propriate anywhere there are suitable conditions for plants to grow. This means adequate soil, sunlight and water. As the plants grow, their root structures naturally stabilize the shoreline.



The need for seawalls is often overstated. In most Michigan inland lakes, the wind speed lake depth and 'fetch' (the longest straight-line distance from your property to another side of the lake) are not great enough to warrant a seawall as protection from the destructive forces of waves and ice. Maple Lake is no exception. Selecting lakefront properties and using the Erosion calculator (used by Wisconsin and Michigan DNRs) indicates soft armor or rock rip-rap hard armor is more than sufficient on Maple Lake. The online Erosion Calculator can be used to find what the wave energy at any site. It requires knowing the average depth of a lake. For Maple Lake, depending upon the location the average depth is currently between 2 and 6 feet. The Michigan DNR has determined the Wisconsin calculator is valid for Michigan inland lakes. The calculator can be found online at:

http://dnr.wi.gov/waterways/shoreline_habitat/erosioncalculator.html



A bioengineered seawall (erosion control fabric and plantings) such as the one pictured left can also control erosion while appearing natural and providing habitat.

The bottom left photo shows a bulkhead style seawall that is not friendly to wildlife and, if built improperly, causes scouring of the lake bottom and may cause erosion at neighboring properties. The manicured lawn is also ideal habitat for geese! Bulkhead seawalls also eliminate habitat for birds, butterflies, turtles, frogs and fish.

The bottom right photo shows a natural shoreline which is great for water quality and all sorts of wildlife. This natural shoreline is bad news for geese and swans. However, other birds, butterflies, turtles, frogs and fish can thrive in a such a shoreline. This natural shore is installed on Maple Island. Geese stay away and grassy side is free of goose poop!

