INLAND LAKE FACT SHEET SERIES

Biotechnical Erosion Control (Higher-Energy)

Biotechnical Erosion Control is a best management practice in which both structural and vegetative measures are used to protect high-energy shorelines from erosion. This type of higher-energy bioengineering design is used in areas where erosive energy from waves and ice are relatively high, and vegetation alone would be inadequate in protecting the shoreline. Deep rooting, native plants in combination with coir logs and field stone protect against erosion and pollution, and provide habitat for fish and wildlife.

ADVANTAGES
of installing shoreline bioengineering

Erosion Control
Coir logs and shallow-sloped (4 horizontal:1 vertical) fieldstone provide a gentle runup for waves and ice. This provides immediate erosion protection. As vegetation becomes established, the roots grow through the coir, rock and soil, creating a strong form of shoreline protection that also provides habitat and water quality protection.

Improved Water Quality
Biotechnical erosion control uses native plants to intercept nutrients and pollutants before they enter the lake, leading to clearer water and decreased algal blooms.

Fish and Wildlife Habitat
The shallow-sloped fieldstone provides easy access to and from the water for frogs and turtles. Biotechnical erosion control also provides feeding habitat for fish, birds, butterflies, and other wildlife. This practice also deters property damaging geese!

The pictures above compare the shoreline of a Michigan inland lake in 1938 (top) to the same shoreline in 2014 (bottom). Over-engineered shoreline stabilization (seawalls) are not only costly, they lead to poor lakeshore habitat.

This bioengineering design protects the shoreline on this high energy lake by dissipating wave energy from wind and boats while still providing lake access and not impeding lake views. Photo courtesy of Jennifer Buchanan, Tip of the Mitt Watershed Council.

DISADVANTAGES
of hardened shorelines and lawn to water's edge

Wave Reflection
Seawalls and hardened shorelines don't allow for the absorption and dispersal of wave energy, they reflect wave energy. The reflection of waves can make erosion worse in other areas through wave flanking and scour.

Weak Roots
Turf-grass (lawns) are not naturally found at the lake edge, and the shallow roots of turf-grass do not have enough strength to withstand waves and ice in high energy areas. Turf-grass also attracts property damaging geese.

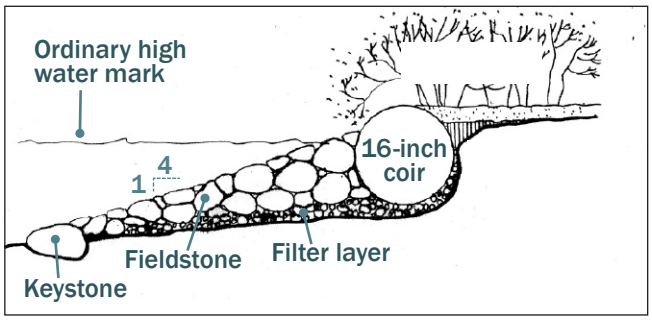
Poor Water Quality
Seawalls degrade your lake by promoting runoff of nutrients and pollutants that lower water quality. Waves reflecting off seawalls suspend sediment in the water column, reducing water quality. Seawalls fragment the land and water interface and eliminate habitat required by fish and wildlife.

EGLE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

Protect natural shoreline areas by using selective control techniques for invasive species. Maintain natural areas containing native shoreline plants, shrubs, and trees on your riparian property.

Minimize shoreline development and impacts. Design shoreline projects to minimize native vegetation removal and shading of native aquatic plants. Utilizing EGLE's Minor Project and General Permit Categories can assist in project minimization.

Restore native aquatic and wetland plants to shoreline areas. There is a continuum of options for erosion control for shorelines with increasing energy potential. The pictures to the right show examples of strategies for a relatively high-energy area. These examples show a coir log used in conjunction with fieldstone placed on a a 4:1 slope. Shallow-sloped fieldstone is important for erosion protection and lake health. Your property does not necessarily have to be restored to predevelopment conditions, but it should provide many of the same benefits to a lake, such as habitat and shoreline stabilization. There is more than one right way to develop a bioengineered shoreline, so create a shoreline that incorporates your goals as well as changes that will benefit the lake. More information on recommended installation methods and procedures, and a list of Certified Natural Shoreline Professionals can be found at MiShorelinePartnership.org.



Biotechnical erosion control project being installed at a higher energy inland lake shoreline. Photos courtesy of Jennifer Buchanan, Tip of the Mitt Watershed Council.

This higher-energy bioengineering project is protecting this shoreline from ice-push. Photo courtesy of Jennifer Buchanan, Tip of the Mitt Watershed Council.

Apply for a Permit

If you would like to install bioengineering on your shoreline, a permit from EGLE is required. If your project meets the criteria in EGLE's Minor Project Categories or General Permit Categories it can be processed on a faster timeline and at a reduced fee. For more information, and to submit a permit application visit Michigan.gov/JointPermit.

For More Information

EGLE Inland Lakes: Michigan.gov/LakesAndStreams
Michigan Natural Shoreline Partnership: MiShorelinePartnership.org
Michigan Inland Lakes Partnership: Canr.msu.edu/MichiganLakes
Michigan Shoreland Stewards: Michigan Shoreland Stewards

EGLE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

800-662-9278 | Michigan.gov/EGLE

The Michigan Department of Environment, Great Lakes, and Energy does not discriminate on the basis of race, sex, religion, age, national origin, color, marital status, disability, political beliefs, height, weight, genetic information, or sexual orientation in the administration of any of its programs or activities, and prohibits intimidation and retaliation, as required by applicable laws and regulations.

09/2021