INLAND LAKE FACT SHEET SERIES

Encapsulated Soil Lifts

Encapsulated soil lifts are a best management practice that are used as a bioengineered shoreline erosion control strategy. Encapsulated soil lifts create a lake-friendly shoreline that can be used on lakefronts that experience moderate to high wind, wave, and ice action. Encapsulated soil lifts can also be used to replace seawalls. These bioengineered structures are built on a rock base and are used to rebuild eroded shorelines. Layers of soil are "encapsulated" inside biodegradable fabric to form the lift. Each lift is placed on top of the preceding lift, but stepped back, to create the desired slope. Encapsulated soil lifts are planted or seeded with deep-rooted, Michigan-native plants that stabilize the soil layers. Once plants are established, the encapsulated soil lifts will protect lakeshore properties and property values, improve recreational opportunities, and promote lake health. Diverse, natural plant communities and natural shorelines are the foundation of a healthy lake.

ADVANTAGES
of installing encapsulated soil lifts

Erosion Control
Encapsulated soil lifts built on a rock base effectively stabilize the shoreline – even in areas of relatively high wave and ice action.

Improved Water Quality
Encapsulated soil lifts' natural vegetation filters pesticides and pollutants before they enter the lake.

Fish and Wildlife Habitat
Encapsulated soil lifts' natural vegetation provides habitat for wildlife, while acting as a deterrent for geese.

Seawalls cause poor lakeshore habitat. Poor biological health is three times more likely in lakes with poor lakeshore habitat. Forty percent of Michigan's inland lakes have poor lakeshore habitat. Photo courtesy of Michigan Natural Shoreline Partnership.

This encapsulated soil lift and the established native shoreline vegetation stabilize the shoreline – even with moderate to high wave and ice action. Encapsulated soil lifts also slow runoff from upland areas, improve fish and wildlife habitat, improve water quality, and deter geese from damaging property. Photo courtesy of Michigan Natural Shoreline Partnership.

DISADVANTAGES
of hardened shorelines and lawn to water's edge

Habitat Elimination
Seawalls eliminate habitat required for fish and wildlife feeding, nesting, and spawning. Seawalls also act as a wildlife barrier, impeding natural movement.

Degraded Water Quality
Seawalls cause the suspension of sediments, increasing lake turbidity and algae. Seawalls also promote runoff, lowering the water quality of the lake.

Cumulative Impacts
The effects of multiple shoreline developments around a lake accumulate over time, impairing peoples' use of the water.

The figure below shows a cross-section of a typical soil lift design, although soil lifts may be constructed to various heights (up to 8 feet) and at various slopes.

The height of the rock base should be adjusted to accommodate the Ordinary High Water Mark (OHWM) and wave energy at the site. The lower lift should be placed as close to the OHWM as possible to allow for capillary action of water into the lift. For traditional, built-on-site lifts, plywood forms are lined with a layer of woven coir mat and then a layer of light-grade totally biodegradable coir fiber erosion control blanket. Soil is tamped into the forms to create the lift. If the lift is to be seeded, seeds must be added and lightly tamped (to create soil contact) before securing the blanket.

If the lift is to be planted with plants or shrubs (potted stock, bare root stock or dormant live cuttings) position the plant stock between lifts so as to provide as much soil contact as possible for adventitious rooting along the stems. Lifts may be planted and seeded. Long-rooted native plants that have the ability to stabilize the soil layers are recommended.

For the next course of lift, reposition the forms and repeat the process, stepping the forms back to create the desired slope. Seed or plant the lift and repeat until the desired bank height is reached.

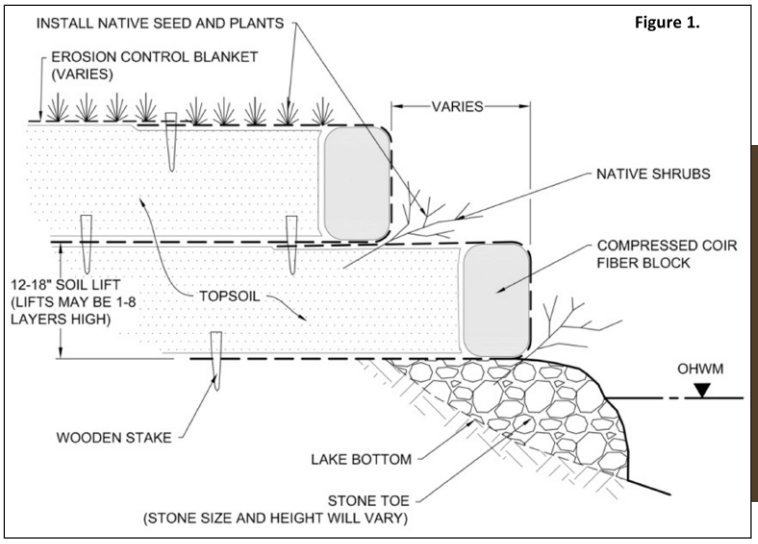

Figure 1.

Stages of encapsulated soil lift establishment from construction through three years of growth. A video of encapsulated soil lift construction is available at Shoreline.msu.edu/shorelinemgt/natural-shoreline-constructing-encapsulated-soil-lifts. Photos courtesy of Michigan Natural Shoreline Partnership.

Apply for a Permit

If you would like to install encapsulated soil lifts 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: ShorelinePartnership.org
Michigan Inland Lakes Partnership: Canr.msu.edu/MichiganLakes
Michigan Shoreland Stewards: Michigan Shoreland Stewards

EGLE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

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