

Fact Sheet 011



Tips for shoreline protection structure construction and maintenance

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Private shoreline property owners experience a high rate of failure in their efforts to abate shoreline erosion along the Great Lakes. A Canadian study at the town of Stoney Brook on Lake Ontario found that 71 percent of all privately constructed shoreline protection structures were destroyed within 10 years.

Primary causes of the high failure rate include the lack of neighborhood coordination in construction of erosion abatement projects, and inadequate design and construction of privately financed projects.

To increase your chances of a successful erosion abatement project *organize and work with your neighbors*, learn as much as possible about the nature and causes of coastal erosion, and consult qualified experts and marine engineers.

The U.S. Army Corps of Engineers provides basic construction and maintenance guidelines for shoreline protection structures in a free pamphlet entitled *Help Yourself*. These guidelines are reproduced below in an effort to help shoreline property owners avoid common errors in the construction and design of structures for shoreline erosion abatement.

1. *Provide adequate protection for the toe (base) of the structure that faces the water so that it will not be undermined.* Most failures of shore protection works result from erosion that occurs under the lowest part of the structure. Check for signs of failure such as the lake-ward movement of the structure and/or erosion behind or at the ends of the structure.
2. *Secure both ends of the shore protection works against erosion.* Erosion will continue adjacent to your structure. Tie the structure directly into the bluff at both ends, and check for signs of failure at the ends.
3. *Check foundation conditions.* Soft foundation material may result in excessive settling of the structure. Check for settling or excessive displacement. Water pressure due to groundwater seepage may cause some types of impermeable walls to move towards the lake.
4. *Use material that is heavy and dense enough that waves will not move individual pieces of the protection.* Waves have tremendous power and can move a great deal of material in a short time. Small stones will be quickly carried away in a storm. Use material and stone large enough to prevent your protective structure from washing away.
5. *Build your protective structure high enough that waves cannot overtop it.* Spray overtopping is all right, but not green water. Many failures have occurred because the

structure was not built high enough and wave erosion continued behind the structure as if it were not there.

6. *Make sure that voids between individual pieces of protection material are small enough that underlying material is not washed out by waves.* A filter material, such as plastic filter cloth, must be placed on a highly erodible embankment to prevent the fine material from washing through the voids in the rock revetment.

Construction of shoreline erosion control structures is a costly but popular alternative to shore erosion. Careful attention to the six rules above will insure that the structure will perform up to its maximum design capabilities.

Once a structure is properly built, it must be properly maintained if it is to serve its intended purpose satisfactorily. Frequent inspection of your structure is necessary to spot signs of failure or damage. Inspect shore-protection structures after every storm, and repair any damage immediately.

Protecting the base of the bluff from wave erosion is only a partial and incomplete solution to the complex problem of shoreline erosion. Bluff drainage and surface erosion problems due to wind and rain must also be properly managed. Dumping rock, broken concrete, old tires, autos or other debris over an eroding bluff violates most of the above rules and will not prevent or halt bluff erosion. Erosion and failure of the bluff may even be increased due to the added weight of the debris.

For more information, contact Frank Lichtkoppler, District Extension Specialist, Sea Grant, Ohio Cooperative Extension Service, 99 East Erie Street, Painesville, OH 44077, 216/357-2582.

Additional readings

Help Yourself - A Discussion of Erosion Problems on the Great Lakes and Alternative Methods of Shore Protection, The Commander, U. S. Army Corps of Engineers, 1776 Niagara Street, Buffalo, NY 14207.

Bluff Slumping and Stability: A consumers guide, MICHU-SG-82-902. Michigan Sea Grant College Program - Publications Office, 2200 Bonisteel Blvd., Ann Arbor MI 48109. Available for \$2.00 per copy.

Vegetation and its role in reducing Great Lakes shoreline erosion: A guide for property owners. MICHU-SG-88-700. Michigan Sea Grant College Program - Publications Office, 2200 Bonisteel Blvd., Ann Arbor MI 48109. Available for \$.50 per copy.

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