Shoreline Stabilization

Applicability

This section primarily applies to new or expanding marinas where site changes may result in shoreline erosion. However, this section may also apply to existing marinas where shoreline erosion may be occurring.

Background

Vegetation, beaches, and preservation of natural shorelines, where feasible, can be the most effective means of shoreline stabilization.

Shoreline and streambank erosion is a natural process. However, erosion can be accelerated by a variety of land use disturbances. Induced erosion often occurs where the shoreline has been disturbed by removing natural vegetation or where the current has been altered. When this happens, erosion can be a major contributor of nonpoint source pollution. Excess sediment delivery to a waterway can result in decreased water clarity, nuisance algal blooms and plant growth, and smothering of fish habitat. Excess sediment loads also can lead to increased maintenance dredging to allow boats enough draught to access the waterway.

By design, marinas are often fairly calm, nonerosive environments. However erosion still may occur due to poorly designed structures or from boat activity (wakes and prop wash) within the marina basin. In severe cases, shoreline erosion can result in sediment deposition within the marina, requiring maintenance dredging. Stabilizing eroding shorelines can protect marina shorelines and reduce the need or frequency of maintenance dredging (U.S. EPA, 2001).

Existing Federal and State Laws

Shoreline stabilization is often addressed in the permitting process for newly proposed or expanding marinas. Permits may also be required by existing marinas that are looking to address erosion occurring within the marina basin. Installation of erosion control measures typically requires a permit from the U.S. Army Corps of Engineers pursuant to the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act, a Section 401 Water Quality Certification from IDEM, and a permit under the Navigable Waterways Act from the Indiana Department of Natural Resources. Additionally, the upland disposal of dredged material requires sampling and analysis to determine whether the sediment is a solid waste requiring off-site disposal in a landfill.

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Best Management Practices

U.S. EPA has provided several best management practices that can be applied successfully to protect shorelines and streambanks from erosion. The following best management practices are described for illustrative purposes and to provide guidance for marinas that are in the planning stage, for marinas that will be expanding, or for marinas wanting to correct current erosion problems.

A bulkhead holds the shoreline together at Millenium Park, Michigan City.

- Use vegetative plantings, wetlands, beaches, and natural shorelines where space allows. Vegetative planting is a relatively low cost option. It can add a natural look to the marina and may assist in keeping invasive species at bay. The preservation or restoration of natural wetlands can help protect shorelines and dissipate wave energy. Both the planting of vegetation and preservation of wetlands provide habitat and may assist in filtering pollutants to improve water quality.
- Where shorelines need structural stabilization and where space and use allows, a riprap revetment is preferable to a solid vertical bulkhead. Riprap is an economical way to help stabilize embankments. Riprap can help decrease the energy of waves because of its irregular design.
- Vertical bulkheads made from concrete, treated timbers, steel, aluminum, or vinyl can be used to stabilize an embankment. These should only be used in areas where reflected waves will not endanger shorelines or habitats and where space is limited. Vertical bulkheads are more expensive and are not a good option for areas where waves or surges occur in the marina basin.
- At boat ramps, retain natural shoreline features to the extent feasible and protect disturbed areas from erosion. The construction and run-off water from the ramp can cause erosion and can increase maintenance costs. By leaving the natural shoreline, invasive species are less likely to take over and the marina has a more aesthetically pleasing look.