Lake Sinissippi Improvement District

2010 County Conservation Aids Program – Fish and Wildlife

Lake Shoreline and River Bank Stabilization and Habitat Diversity –
A Pilot Project for Lake Sinissippi and the Rock River

Summary

This proposal is for funding to evaluate shoreline stabilization methods that have the capability of improving fish and wildlife habitat diversity, while protecting Lake Sinissippi shoreline and Rock River streambank in areas of moderate to high erosion energy conditions. The amount of grant funding requested is $2,000.

Background

Eroding shoreline and river bank and loss of islands are major resource problems in Lake Sinissippi and the upper reach of the Rock River. In 1939, a concrete dam replaced the original wooden dam in Hustisford and raised the water level 1.4 feet to its present elevation. The marshy shoreline of the lake was subject to rapid erosion due to the continuous high water level. Over the past six decades, water erosion has caused four of the original twelve main islands and shoreland wetlands to disappear.

Unprotected lake shoreline, river bank and islands continue to experience recession and soil loss due to exposure to erosive forces from wind-driven wave energy, current flow, waves created by recreational boating and ice action. Soil loss from erosion contributes to sediment loading and deposition in the lake, loss of shore vegetation and aquatic plant communities and degraded fish and wildlife habitat.

In 2007, a grant from the County Conservation Aids Program was awarded to Lake Sinissippi Improvement District to investigate methods of using aquatic vegetation to establish near-shore and off-shore barriers for natural shoreline protection in areas of low erosion energy conditions.

The current proposal is for funding to evaluate shoreline stabilization and protection methods in shore areas of moderate to high erosion energy conditions that also have the capability of improving fish and wildlife habitat diversity.

Wisconsin Chapter NR 328

The Wisconsin Department of Natural Resources (WDNR) has developed evaluative criteria to determine the types of shore protection methods that can be utilized on existing shorelines and streambanks. These criteria are codified in Chapter NR 328 Shore Erosion Control Structures in Navigable Waterways, Subchapter I Shore Erosion Control Structures, Wisconsin Administrative Code. The use of shoreline erosion protection structures is regulated through a permitting process.

A 2006 study was initiated under a WDNR lake protection grant to calculate the erosion potential for Lake Sinissippi and Rock River shoreline properties. Most of the shoreline of lake and river is in the low to moderate erosion energy categories; several islands that experience severe edge recession are considered to be in the high erosion energy category. The majority of the unprotected shoreline is located on islands, northern and western undeveloped land and the river bank.

Wisconsin Shoreline Stabilization Categories (Chapter NR 328)

	Low	Moderate	High
Biological Controls	GP	GP	GP
Vegetated Armoring	NA	GP	GP
Riprap	NA	IP	GP
Seawall	NA	NA	IP

GP-- General Permit Required
IP -- Individual Permit Required
NA -- Permit Not Available

Stabilization and Protection Methods

Shoreline and streambank stabilization and protection include vegetative stabilization, biotechnical methods and structural riprap. These techniques comprise a number of different designs, materials and installation methods and can be used on their own or in combination to protect shoreline and add habitat diversity to the waterway system. Native plantings generally are more aesthetically pleasing than traditional bank stabilization with rock riprap, although such methods are limited to shorelines with quite low erosive energy. Stabilization techniques can improve habitat condition and diversity. For example, more gradual side slopes and sand or mud soils can be beneficial to turtles and waterbirds that nest, feed and loaf on the shorelines. Larger rock and mixed-grade rock can create greater fish and invertebrate habitat diversity by providing larger crevices for shelter and flow diversity.

Design Considerations, Plans and Specifications

Consideration of the design and specification of methods for shoreline and river bank protection is multi-faceted. Generally, hydraulic considerations assess methods for protection from erosion due to flow, while geotechniques evaluate methods for erosion stability from wave and ice action. Surveys of potential stabilization areas are conducted to evaluate various factors including current velocity, wind fetch, navigation effects, ice action, shoreline geometry, near-shore depth, shore vegetation and bank composition. Cost of materials and ease of access to the prospective work sites are other important considerations.

The WDNR, US Army Corps of Engineers (USACE) and USDA Natural Resources Conservation Service (NRCS) have comprehensive guideline references and handbooks for shoreline protection design and implementation.

Fish and Wildlife Grant Proposal

Lake Sinissippi Improvement District proposes to establish a pilot project to evaluate various designs, types of material and installation costs for stabilization and protection of shoreline and river bank in the moderate and high erosion energy zones. The stabilization designs will be evaluated for suitability in developing diverse fish and wildlife shore habitat. The objective of the project is to specify the most cost-effective method(s) of shoreline stabilization in higher energy areas of lake and river. This information will be used by the Lake District in future shoreline stabilization projects and also shared with riparian

owners who may wish to install protection methods and with other lake and river organizations for potential use in their waterways.

At least two test sites in areas of higher erosion energy will be selected for the evaluation project, one site on lake shoreline and a second site on river bank. Environmental management handbooks of WDNR, USACE and NRCS will be consulted to design at least two test plots of different shoreline and bank stabilization methods for each site, a total of at least four different test plot methods in all. The design criteria will meet engineering and permit requirements for shoreline stabilization, while maximizing the potential for development of aquatic and terrestrial habitat.

USACE cost guidelines for biotechnical and structural riprap protection of shoreline vary from $20-$40 per linear foot, depending upon near-shore water depth, bank height, type of materials and thickness of protective cover. The Lake District envisions that each test method per site will be about 10 – 20 feet in length, with a total length of testing methods at the two sites being 40 – 80 linear feet (two sites x two methods per site x 10 – 20 feet per method). The actual design plans to be implemented will depend on material specifications, material costs and availability of funding.

On-site evaluations of the demonstration test plots will be made during the year following installation. Evaluation will assess: (1) the functionality and effectiveness of the various test methods to protect lake shoreline and river bank and minimize erosion and, (2) the capability of test plots to provide suitable substrate for growth of vegetative plantings and native volunteer vegetation and to develop diverse aquatic and shoreline habitat.

Grant funds will be used for purchase of materials, transportation, equipment rental and miscellaneous supplies; labor for installation will be volunteer time; the Lake District will plan and supervise the installation.

The grant request is for $2,000.

References

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