

September 27, 2005

Dear Property Owner,

During June you might have noticed some green-clad visitors on your shoreline on Lake Sinissippi. These visitors were employees from Hey and Associates, Inc. hired by the Lake Sinissippi Association to inventory your property's shoreline. The purposes of this survey were to evaluate the amount of shoreline erosion occurring on Lake Sinissippi and inform lake residents about their options to manage erosion problems on their property. Each parcel around the lake was surveyed according to guidelines in a new Wisconsin Administrative Code – NR 328. Under NR 328 the type of shoreline erosion protection structures are regulated through permits issued by the Wisconsin Department of Natural Resources (WDNR).

Lakeshores bear the brunt of breaking waves, currents, and ice. Even though these are largely natural processes, these forces attack your shoreline and dislodge sediment particles and transport them into your lake bottom. Naturally occurring erosion is a slow process that allows plants to adjust to changing conditions and soil loss is usually at a minimum. Natural disturbances (floods and windstorms) and human disturbances (construction in near shore areas and removing vegetation) usually accelerate erosion processes. You might have a problem on your shoreline if you see large areas of bare soil, experience rapid shoreline recession, or find muddy water near the shoreline after a rainstorm. The storm wave height and shoreline erosion intensity (EI) index included in NR 328 are designed to measure properties of your shoreline known to accelerate erosion.

The characteristics of your property determine which type of *new* structures you are eligible to install and changes you are allowed to make to *existing* structures. The following letter describes calculation of storm wave height, the shoreline erosion intensity survey, how to determine your permitting requirements, and how to apply for a permit.

Storm Wave Height

Storm wave height is one WDNR approved method to determine the amount of erosion occurring on your property. It is calculated with a mathematical equation developed by researchers that takes into account storm wind speeds, the unobstructed distance from your property across the lake or the fetch, and the average depth along the fetch. Based on the calculated storm wave height, your property can be classified as a low, moderate, or high energy site.

Shoreline Erosion Index Scores

Each developed property on Lake Sinissippi's shoreline received an EI index score. The EI score estimates the amount of potential wave energy attacking your shoreline and its susceptibility to erode. Hey and Associates, Inc. staff members completed the survey inventory in July-August 2005. The inventory occurred in two phases. The first phase evaluated characteristics of your property using digitized lake maps and computer mapping software. The second phase occurred at Lake Sinissippi along each property's shoreline on foot or from a boat.

Phase one of the survey calculated the average fetch, depth 20 feet from shore, depth 100 feet from shore, shoreline geometry, and shore orientation. An explanation of some of the phase one index categories are listed below:

- *Average fetch* is the distance across open water to opposite shore at 45° from the perpendicular of your shoreline. Average fetch estimates the amount of potential wave energy affecting your shoreline (Figure 1).
- *Shoreline geometry* is the general shape of the shoreline on your property and 200 yards on either side. Shoreline is classified as coves or bays, irregular or straight shoreline, and headland or point or island.
- *Shore orientation* is the geographic direction the shoreline faces (Figure 2). Shorelines facing the west to northwest experience heavy winds and increased wave energy due to predominant weather patterns.

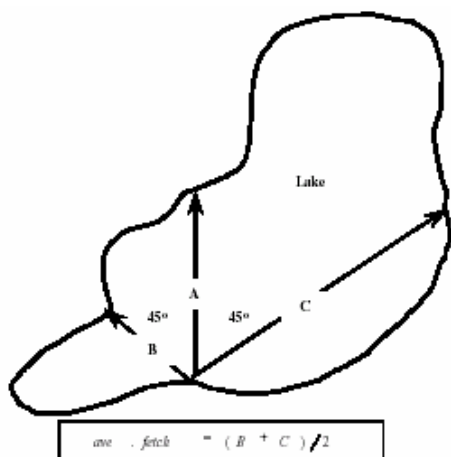


Figure 1 - Average Fetch¹

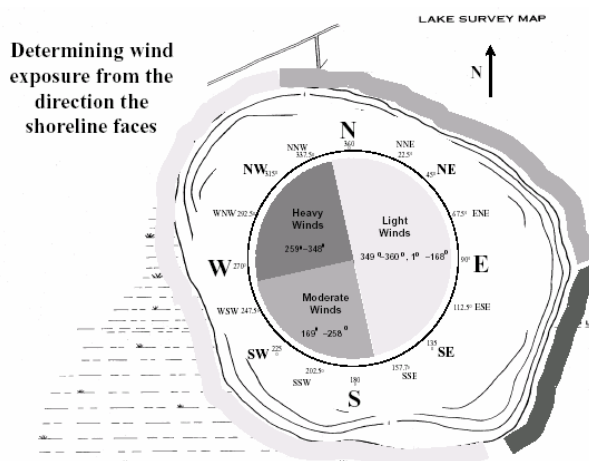


Figure 2 - Shore Orientation¹

The second phase of the project was to visit each developed property and inventory the remaining characteristics important to calculate your index score. This occurred over June 21st – 23rd and August 23rd, 2005. Bank height, bank composition, influence of adjacent structures, amount of aquatic vegetation, bank vegetation, bank stability, and proximity to boat wakes were measured following the EI Score Worksheet as per NR 328.08(2).

- *Bank height* – measure from the bank-toe to the bank-lip (Figure 3).
- *Bank composition* – sediment composition of bank. If your seawall or riprap forms the bank lip, the sediment is considered rock for the purposes of the EI index.
- *Influence of adjacent structures* – nearby structures that may cause flank erosion.
- *Aquatic vegetation* – amount of offshore submergent, floating leaf, or emergent vegetation.
- *Bank vegetation* – type and abundance of vegetation occurring on the bank and near bank lip.
- *Bank stability* – degree the bank and area within 10 feet of bank are stabilized by vegetation.
- *Proximity to boat wakes* – degree a property is affected by boating channels.

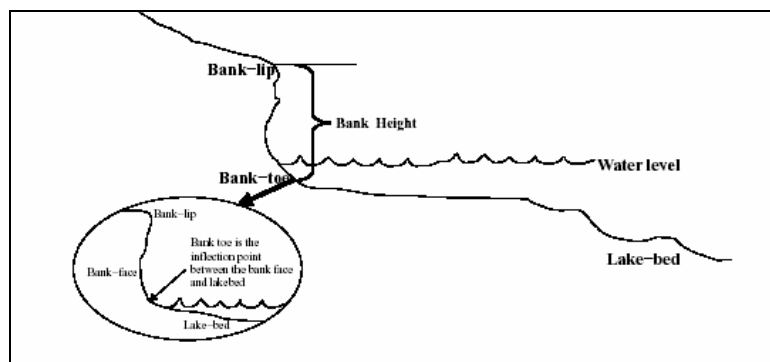


Figure 3 - Bank Height Measurement¹

NR 328 defines three categories of erosion energy:

- High energy (EI greater than 67)
- Moderate energy (EI between 48 and 67)
- Low energy (EI 47 or lower)

All properties on Lake Sinissippi fall into the low and moderate energy categories.

¹ Source: WDNR

Shoreline Structures and Eligibility

Your shoreline energy category is important because it determines which shoreline protection structures you are eligible to install on your property (Table 1). For some properties, you will receive more than one type of energy category rating. One is based on your storm wave height and the second is based on your EI index score. If you would like to install riprap and your report contains both a low and medium score, report the moderate energy category or your permit application will likely be denied.

	Shoreline Energy Category		
	Low	Medium	High
Biological Controls	U	U	U
Vegetated Armoring		U	U
Riprap		U	U
Seawall			U

Table 1 - Shoreline Control Methods by Shoreline Energy Category

A biological shoreline stabilization design might include a coconut fiber roll staked to the lake bottom with emergent macrophyte plantings in the eroded shoreline area (Figure 4). The coconut fiber roll is a temporary structure that absorbs wave energy allowing for the permanent establishment of emergent plants. The plants will absorb wave energy and decrease bank erosion. Coconut fiber rolls may also be used directly on the shoreline. Some other biological stabilization techniques are brush mattresses, live stake plantings, or brush layering. Each of these techniques relies on establishing vegetation on your bank to minimize erosion as water flows over the bank or waves impact the shoreline.

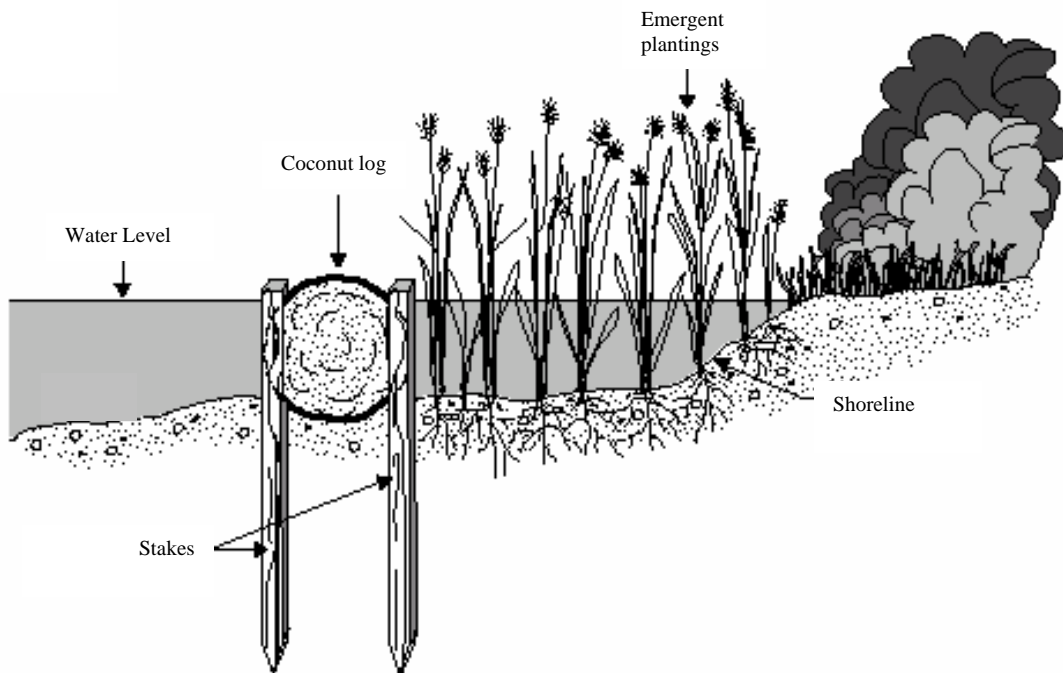


Figure 4 - Coconut Roll and Emergent Plant Establishment Design²

Installing biological control structures to reduce erosion have the added benefit of providing beneficial wildlife habitat. Incorporating a variety of native shoreline plants will attract a variety of birds, butterflies, and insects to your property (Table 2). A successful planting strategy will take into account the soil requirements of potential plants and suggested spacing.

² Source: NRCS Engineering Field Handbook

Shrubs	Forbs and Grasses (Upland)
Red-twig dogwood	Pale purple coneflower
Silky dogwood	Yellow coneflower
Nannyberry	Butterflyweed
Hazelnut	Blazingstar
Black Willow	Wild bergamont
Pussy Willow	New England aster
Wetland	Stiff goldenrod
Joe-pye weed	Compass plant
Boneset	Black-eyed Susan
Cupplant	Indian grass
Turtlehead	Big Bluestem grass
Common arrowhead	Prairie cordgrass

Table 2 - Potential Shoreline Plants to Attract Wildlife and Reduce Erosion

Property owners with a moderate energy rating may decide to install more aggressive erosion control structures such as vegetated armoring or traditional riprap. Traditional riprap is a blanket of stones applied over an existing shoreline to provide more resistance to erosion. An alternate to traditional riprap that offers comparable erosion control is vegetated armoring. Vegetated armoring is nearly as durable as riprap, but offers the distinct advantage of providing cover for fish and habitat for wildlife. Vegetated armoring uses riprap or other material combined with vegetative plantings in drilled holes or in the cracks between riprap (Figure 5).

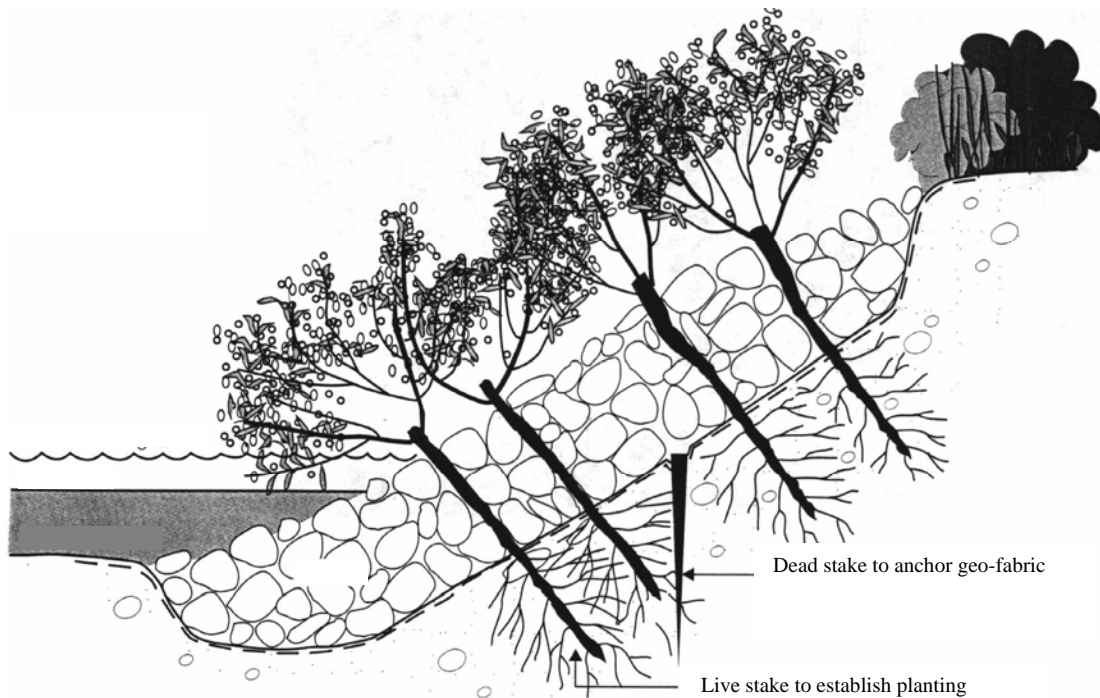


Figure 5 - Vegetated Armoring Design³

Permitting

Wisconsin Administrative Code NR 328 subchapter I fulfills the purpose of establishing procedures to determine a shore erosion control project’s eligibility for a permit exemption, a general permit, or an individual permit under s. 30.12 (Table 3). Repairs are the only activity that will *potentially* be exempt from the permitting process because Lake Sinissippi is listed on the Natural Heritage Inventory as an “Area of Special Natural Resource Interest”. As a result, all new projects will require general or individual permits.

³ Source: NRCS Engineering Field Handbook

The first question to answer is whether you are repairing an existing structure or building from scratch. As a general rule, if a structure is *greater than 50%* in tact, no permit is needed for repairs as long as the bank is not extended lakeward. If you are unsure whether an activity requires a permit, contact your local WDNR Water Resource Management Specialist. If a structure is *less than 50%* in tact, any repairs will be considered new construction for permitting purposes. If you have an existing rip-rap shoreline or a seawall in an area of low energy it is important that you keep it maintained, if it falls into a condition with more that 50% in disrepair you will likely not be able to replace it with a similar structure under the new state rules.

	Shoreline Energy Category		
	Low	Medium	High
Repair riprap < 50% of total structure	None	None	None
Repair Riprap > 50%	Not Allowed	General or Individual	General Permit
Repair Seawall < 50%	None	None	None
Repair Seawall > 50%	Not Allowed	Not Allowed or Individual	Individual Permit
Biological Controls	General Permit	General Permit	General Permit
Vegetated Armoring	Not Allowed	General Permit	General Permit
Traditional Riprap	Not Allowed	Individual Permit	General Permit
Seawall	Not Allowed	Not Allowed	Individual Permit

Table 3 - Permit Requirements for Repairing or Installing Shoreline Erosion Control Structures

The second step in the permitting process is to determine the energy category of the shoreline. NR 328 specifies the shoreline energy may be calculated using the storm wave height or the shoreline erosion index method. The storm wave height method is a general estimate of shoreline energy while the shoreline EI method takes into account site-specific factors such as bank height and soil type. Storm wave height was estimated using the WDNR website storm wave height calculator⁴. The EI index score was computed using the Erosion Intensity Score Worksheet included in NR 328⁵. Both your estimated storm wave height and erosion intensity shoreline energy categories are included at the end of this report.

The third steps in the permitting process is to select an appropriate control method based on the energy category (refer back to Table 1) and determine if you are eligible for a General Permit. Usually a General Permits will be issued if an erosion control structure is appropriate for a property’s energy category. Eligibility can be determined using WDNR worksheets available online⁶. If a property owner wishes to build a shoreline erosion control structure that is not generally allowed, such as vegetated riprap in a low energy area, they will need to apply for an individual permit. It is important to note that a General Permit is considered a right of the property owner while an Individual Permit is a privilege. Individual Permits will be granted by WDNR only if it is in the best interest of the public and does not harm the resource. Unless very compelling reasons exist to support an Individual Permit, property owners are encouraged to pursue activities requiring a General Permit. Individual Permit applications are also available online⁶.

To expedite a General Permit, property owners are encouraged to determine whether or not their project will affect wetlands, endangered or threatened resources, or cultural resources⁷. The Wisconsin Wetland Inventory lists wetlands that would affect a permit application. For information about wetlands on your property, contact Lois Simon, Wetlands Inventory Coordinator at (608) 266-8852. Maps are available for purchase. To check for endangered or threatened species in the proximity to their project, property owners should call the Bureau of Endangered Resources at the WDNR at (608) 266-7012 to request a Wisconsin Natural Heritage Inventory Endangered Resources Review Request Form 1700-047. Contact the State Historical Society at (608) 264-6579 and ask for a Natural Heritage Inventory Information Request Form to determine whether significant cultural resources are located near your property.

Dodge County also has a number of local ordinances that may apply to your property so it is recommended that you contact your regional Water Quality Management Specialist and Dodge County Zoning and Planning Department to find out all permit application requirements. The WDNR contact is Dan Hunt who is located in Horicon at (920) 387-7878. David Carpenter may be reached in the Dodge County Planning and Development Office at (920) 386-3700 for local zoning requirements.

⁴ <http://dnr.wi.gov/org/water/fhp/waterway/erosioncalculator.shtml>

⁵ <http://www.dnr.state.wi.us/org/water/fhp/fish/nr328/>

⁶ <http://dnr.wi.gov/org/water/fhp/waterway/erosioncontrol.shtml>

⁷ Form 3500-108 Waterway General Permit Application and Approval bottom of page 1 of 4

Field Information for home owners report. Individual property owners data can be obtained from LSA

«OWNER_1»
«OWN_AD1»
«OWN_CITY», «OWN_ST» «OWN_ZIP»

Storm Wave Height Category: = «SWH_CAT»

Shoreline EI Index Scores:

Map Derived Scores:

Average Fetch = «M_FET_SC»
Depth 20' from Shore = «D_20_SC»
Depth 100' from Shore = «D_100_SC»
Shoreline Geometry = «SG_SC»
Shore Orientation = «SO_SC»

Field Inventory Scores:

Bank Height = «BH_S»
Bank Composition = «BC_S»
Influence of Adjacent Structures = «AS_S»
Aquatic Vegetation = «AV_S»
Bank Vegetation = «BV_S»
Bank Stability = «BS_S»
Boat Wakes = «BW_S»

Total Score = «EIS»

Shoreline Erosion Index Category = «CAT»