CHAPTER 4
SHORELAND MITIGATION

4.1 SHORELAND MITIGATION

Understanding Shoreland Mitigation

Shoreland mitigation is a process established by the State of Wisconsin that aids in the preservation and restoration of critical natural riparian or shoreland habitat and reduces direct flows of stormwater into the State's lakes and streams. Dane County has developed a shoreland mitigation program to meet state requirements. All living creatures need food, clean water, clean air, and tolerable climates. Shorelands are the only place where all four needs can be found. Over the past 100 plus years, much of the critical shoreline habitat found in Dane County has been lost. As this habitat is absolutely critical to the health and wellbeing of wildlife, lakes, fisheries, and the enjoyment of the County's lakes and streams by County residents and visitors, it is very important to begin the process of re-establishing that habitat and protecting water quality to prevent further degradation. The abundance of riches found in the shoreland zone benefits the aforementioned. Therefore, this accumulation of ecosystems needs protection, improvement and understanding. Shoreland zoning and mitigation is designed to aid in the protection, recovery, and understanding of these cumulative ecosystems and the positive attributes of shorelines which are so attractive to us all. The strength and health of the shoreland zone is built through the cumulative effect of sound ecosystems.

Shoreland Mitigation

The requirement to provide Shoreland Mitigation is triggered by standards set forth in Chapter 11 of the Dane County Code of Ordinances. All triggers and standards associated with maintaining compliance with Shoreland Mitigation area found in Chapter 11 and associated supporting documents.

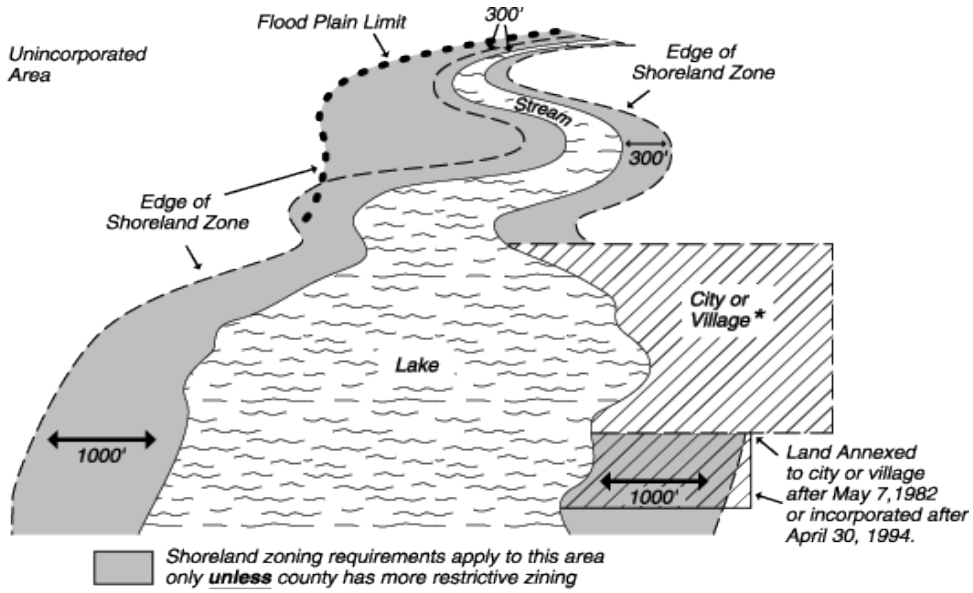
If criteria described in Chapter 11 deem it necessary to perform Shoreland Mitigation, the first, and most important, steps in the process are: 1 - determining what the characteristics of your shoreline are prior to mitigation, and 2- developing a conceptual plan to meet mitigation requirements. The mitigation plan may require the establishment of a 35' vegetative buffer along the shoreline and may require Stormwater volume reduction and sediment reduction which are often achieved with rain gardens or bioretention basins.

There are two primary methods for meeting Shoreland Mitigation standards. These include **Shoreland Vegetative Buffer Restoration**, the re-establishment or preservation of shoreland

buffers to improve or preserve shoreland habitat and **Raingardens or Bioretention Basins**, which are human-made devices utilized to slow down and reduce overland flow of stormwater directly into lakes and streams to improve water quality and reduce shoreline erosion.

Shoreland Vegetative Buffers are only required for activities in the primary shoreland zone (300 feet from a lake, pond or river) and only if the parcel is riparian to the water body. A shoreland Vegetative Buffer is an area adjacent to a water body in agricultural and non-agricultural settings intended to protect water quality, habitat and aesthetic functions. The Dane County Shoreland Zoning Ordinance (Chapter 11Dane County Code) establishes a Vegetative Buffer Zone, within 35 feet of the OHM of navigable water, where removal of vegetation is restricted. The ordinance also requires Vegetative Buffer Zone restoration, as a mitigation practice, for certain types of shoreland development. Vegetative Buffer vegetation will consist of native, local ecotype vegetation and must meet planting densities found in the Acceptable Species List. If a natural buffer already exists, that buffer must be reviewed and actions must be taken to insure that any invasive species or non-desirable species be eradicated in effort to return the buffer zone back to native local ecotype vegetation. This situation will also require the addition of native local ecotype vegetation to replace the eradicated invasive species.

Raingardens and Bioretention Basins are a component of Shoreland Mitigation that can be added to the Shoreland Mitigation requirement in effort to insure that the site provides 40% TSS (Total Suspended Solids) removal and 75% of predevelopment infiltration. Raingardens and Bioretention basins are two practices that can be used to meet these requirements; sediment traps can also be used. Determination of whether a Raingarden or a Bioretention basin will be utilized is based upon site conditions and the ability of the site to support the functionality of the practice. Raingardens are shallow depressions that are designed to collect stormwater and promote infiltration, which minimizes the amount of runoff from site. Both of these infiltration practices are planted with native vegetation, which act as a natural sieve, absorbs excess nutrients, and filters pollution.



*Cities and villages are required to zone **wetlands** within the shoreland. Contact your zoning administrator.
Wisconsin Department of Natural Resources

The above diagram depicts shoreland zones as they pertain to Lakes, Streams, and Flood Plains in both unincorporated areas as well as City's or Villages.

Table 4.1-1

4.2 DANE COUNTY SHORELAND MITIGATION PLAN REQUIREMENTS

Shoreland Mitigation Standards are in place to minimize shoreland structural and habitat degradation and protect the County's lakes and streams from degradation caused by development. The Shoreland Mitigation Ordinance requires that plans for all shoreland development sites include practices that meet the standards in *Table 4.2-1*.

	Standard	Purpose	Applicability
Vegetative Buffer Restoration	Buffer consisting of native vegetation extending from OHM inland 35'	the re-establishment or preservation of shoreland buffers to improve or preserve shoreland habitat	All riparian sites requiring a Shoreland Mitigation plan
Raingarden or Bioretention	Design to retain soil particles greater than 20 microns on the entire site (40% reduction) from a 1 year 24 hour storm event, and infiltrate 75% of predevelopment infiltration volume	man-made devices utilized to slow down and reduce overland flow of stormwater directly into lakes and streams	Mitigation sites which do not meet TSS and infiltration minimums

Table 4.2-1

In addition, submitted Shoreland Mitigation plans must address the following required elements.

1. **Contact Information for all parties associated with any and all components of the property**
    a. Location of the property
    b. Entity submitting the request for development or property improvements
    c. Entity submitting the erosion control plan
    d. Entity submitting the mitigation plan
    e. Entity responsible for implementing the mitigation plan
    f. Entity responsible for maintaining the mitigation plan
    g. Confirmation that all parties are aware of their responsibilities

2. **Existing Conditions / Initial Site Written Review**
    a. This site review will contain the following items:
        i. Photo log of existing site
        ii. Written review of site conditions including:
            1. Description of the health of existing vegetation
            2. Comprehensive listing of all vegetation species on site including genus and species
            3. Description of existing soil conditions
            4. Description of existing shoreline protection if applicable
            5. Description of any existing hard surface areas located within the mitigation boundary
            6. Description of access corridor if applicable
        iii. Name and contact information of person or persons conducting the review
        iv. Date of the review

3. **Description of Expected Disturbance During Construction Process**
    a. The description will include the following items:
        i. Expected soil disturbance to include type of disturbance such as:
            1. Rutting from construction equipment
            2. Change of grade to accommodate construction elevations
            3. Potential compaction from construction activities
        ii. Expected disturbance to existing vegetation
        iii. Expected disturbance or changes to shoreline protection
        iv. Expected addition or removal of any impervious surface areas within the mitigation boundary
        v. Date and anticipated schedule of expected soil disturbance

4. **Post Construction Mitigation Plan**
    a. This plan will include the following items:
        i. Soil restoration plan to address soil disturbances created during the construction process
            1. Method or methods of soil restoration
            2. Description of fill soils if applicable

3. Description of newly exposed soils should grading operations remove surface soils from the site
4. Timeline of soil restoration

ii. Shoreline Protection and Restoration Plan (if applicable)
1. Method
2. Materials
3. Timeline

iii. Vegetation Restoration Plan to include:
1. Comprehensive species list
2. Erosion control products list (if applicable)
3. Planting guidelines
4. Implementation methods
    a. Seeding method
    b. Planting method
    c. Erosion Control product installation
    d. Mulching type and depth
5. Establishment methods
6. Timelines for all restoration processes
7. Anticipated methods for establishment implementation

iv. Three Year Maintenance Plan to include:
1. Method and timeline for monitoring the site
2. Method for repairing any damage or failures within the restoration area
3. Methods for controlling weed species within the planting
4. Methods for maintaining restoration plantings such as:
    a. Mowing
    b. Burning
    c. Fertilizing
    d. Supplemental watering
5. Timeline for Maintenance Activities
    a. Seasons or months are adequate for maintenance timelines

v. Name and contact information of person or persons responsible for the development of the plan

vi. Name and contact Information of person or persons responsible maintaining the property.

A sample mitigation plan is provided in the Appendices

4.3 NATIVE VEGETATION SPECIES AND PLANTING STANDARDS

Shoreland habitat shall be established by planting a diverse mix of native species that are adapted to site conditions and are representative of the area plant communities, or those plant communities that were present in the area prior to manipulation. In order to restore the functional values of a shoreland habitat, vegetation shall be vigorous, diverse and structurally complex and shall include herbaceous cover, a shrub layer, and a tree canopy. The only exception to this requirement shall be where natural conditions in the region lack these habitat components. Raingardens and bioretention devices will be planted with herbaceous vegetation only, the tree and shrub component described above is not conducive to the functionality of these devices. ***See table 4.3-1 for vegetation standards and the appendices for a complete species list.***

Native species have the most dynamic impact in the re-establishment of shoreland habitat. The relationship between native species and the wildlife, fish, insects and birds found in the riparian zone is critical. Thousands of years of evolution have occurred between this group of flora and fauna and that relationship cannot be adequately replaced by species lying outside of the local ecotype grouping of native species. Also important to the shoreland zone are the soil stabilizing capabilities of the vegetation. Native species have different types of root systems that can be fibrous (wide spreading creating a matt like root mass) or deep / tap (root very deep, some up to 15 feet deep)., both types of root systems play a role in holding soil in place.

Refer to Wisconsin Biology Technical Note1 and NRCS Practice Standard 643A for further details.

Shoreland Vegetation Standards

	Standard	Purpose	Applicability
Trees - Woodland	**Minimum** of 2 species **Density** 0.5-5 per 100 square feet	Provide habitat (nesting, shelter, food), shade	Shoreland Buffers in wooded regions
Trees - Prairie	**Minimum** of 0 species **Density** 0-0.2 per 100 square feet	Provide habitat (nesting, shelter, food), shade	Shoreland Buffers in prairie regions
Shrubs - Woodland	**Minimum** of 3 species **Density** 1-4 per 100 square feet	Provide habitat (nesting, shelter, food, winter cover)	Shoreland Buffers in wooded regions
Shrubs - Prairie	**Minimum** of 2 species **Density** 0.2-0.5 per 100 square feet	Provide habitat (nesting, shelter, food, winter cover)	Shoreland Buffers in prairie regions
Herbaceous Plant Plugs Woodland	**Minimum** of 3 species **Density** 100 plugs per 100 square feet	Provide habitat, stabilize shoreland, provide nesting, food source, diversity, improve water quality	Shoreland Buffers in wooded regions

Herbaceous Plant Plugs Prairie, Raingardens, Bioretention	**Minimum** of 5 species **Density** 100 plugs per 100 square feet	Provide habitat, stabilize shoreland, provide nesting, food source, diversity, improve water quality	Shoreland Buffers in prairie regions, raingardens, bioretention devices
Herbaceous Seeding Woodland	Minimum of 3 species Grasses/Sedges: 8oz/1000 sq.ft. Forbs: 4oz /1000 sq.ft.	Provide habitat, stabilize shoreland, provide nesting, food source, diversity, improve water quality	Shoreland Buffers in wooded regions
Herbaceous Seeding Prairie	Minimum of 5 species Grasses/Sedges: 8oz/1000 sq.ft. Forbs: 4oz /1000 sq.ft.	Provide habitat, stabilize shoreland, provide nesting, food source, diversity, improve water quality	Shoreland Buffers in prairie regions
Bare Soils	Bare soils are not allowed in shoreland buffer area	Prevents soil erosion and reduces impacts upon water quality	All shoreland buffers, rain gardens and bioretention devices
Heavy Equipment	Excluded from all shoreland habitat areas with exception of special permitted restoration activities	Prevents compaction, unnecessary soil damage and erosion	All shoreland buffers, raingardens and bioretention devices

Table 4.3-1

4.4 Operation and Maintenance

Appropriate installation and maintenance of shoreland buffers, rain gardens, and bioretention devices is critical to maintaining compliance with the Shoreland Mitigation Ordinance. If appropriate installation and or maintenance measures are not planned for and followed, degradation and potential failure of restoration practices may occur.

During all phases of vegetated buffer, raingarden, and bioretention device installation it is very important to prevent disturbance to the existing soil structure. Sound soil structure is imperative to the success of these practices not only from the standpoint of vegetation establishment but also from the water infiltration, and water quality improvement capacity of the practice. Reducing soil manipulation and soil compaction during the establishment of practices prevents disturbance of soil structure. In situations where soils are already poor or compacted restoration of soils must be completed prior to the installation of vegetation.

In order to control erosion on practice areas, erosion control measures must be taken. In situations where erosion control blanket is required, only "net free" or blankets that are not capable of entrapping, snakes, amphibians, reptiles, birds, and mammals should be used.

In most native restorations where native plant plugs are utilized it takes a minimum of two years to establish the installed vegetation and gain control over weeds in the planting. In restorations where native seed is utilized it often takes up to five years to adequately establish the planting and gain control of weeds. During the establishment phase of practices, appropriate maintenance activities must be utilized to insure success. All maintenance activities within vegetated buffers, raingardens, and bioretention devices must be described within the accepted mitigation plan. Any activities not approved in the mitigation plan are prohibited unless approved prior to the activity.

The following activities should be avoided in all practice areas:

- *Removal of dead or windblown trees that do not pose a threat to safety*. These trees provide cover and refuge for wildlife, and should be left in place. Tree trimming or removal of dead or diseased trees requires approval by Dane County Land and Water Resources.

- *Mowing or other removal of ground cover.* Such Removal is prohibited in the practice area expected as part of an approved maintenance plan.

- *Removal of the duff layer.* The duff layer, made up of fallen leaves and or pine needles, must be left intact. This layer covers the soil, thereby conserving moisture and preventing erosion.

- *Introduction or failure to control state listed noxious and invasive weeds.*

- *Application of herbicide.* Herbicides are prohibited except as required for control of invasive plants and as approved by the appropriate administering agency. Avoid damage to shoreland habitat vegetation from herbicide application to nearby areas such as lawns.

- *Regular application of fertilizers*. Fertilizers are prohibited after the establishment year, except as approved by Dane County Land and Water Resources.

- *Disturbance of soil.* Except for an access corridor, areas water ward of the practice shall be undisturbed.

- *Placement or storage of boats, docks, leaves, or- and other equipment and material.* These items shall be excluded from the practice area to prevent soil compaction and damage to practice vegetation.

- *Vehicle Traffic.* Vehicles shall be excluded except as necessary for establishment and maintenance activity

NRCS CODE 643A