CARLTON COUNTY
ZONING AND ENVIRONMENTAL SERVICES
301 Walnut Avenue, Room 103
P.O. Box 220
Carlton, MN 55718-0220
218-384-9176
www.co.carlton.mn.us

Permit number _____

Township _____

SHORELAND MITIGATION PLAN – SCORE SHEET

Are you requesting a variance from the setback from the ordinary high water level (OHWL) of a classified lake, river or stream? If yes, you **MUST** complete a Shoreland Mitigation Plan (SCORE SHEET and REVEGETATION – SITE DIAGRAM) and have it approved prior to Variance Application submittal. A conforming lot is assigned a score of 100. A lot is deemed conforming when the structure meets the required setbacks to the protected water as specified in Carlton County Zoning Ordinance #27. A structure that fails to meet this definition is considered nonconforming. To bring a nonconforming structure to a score of 100, the landowner shall conduct and maintain one or more mitigating activities, which have been assigned points. You **MUST** achieve a score of 100 points or more.

STEP 1: The structure's level of nonconformance is based on a Pre-Mitigation LOT SCORE.

To determine the LOT SCORE, follow the steps below.

A	Determine the DNR classification of the protected water on the lot. See **COLUMN 1** in reference table below.	
B	Determine the required structure setback to that classification of water. See **COLUMN 2** in reference table below.	
C	Determine the actual setback of the structure on your property: measure the closest part of the structure to the closest part of the ordinary high water level of the protected water or bluff from which the setback is in question.	
D	Enter the corresponding score multiplier from **COLUMN 3** in the following reference table. If a bluff is present use **COLUMN 4**.	
E	Calculate the pre-mitigation lot score by multiplying the actual setback determined above **(LETTER C)** by the score multiplier determined above **(LETTER D)**, then round to the nearest whole number. This is your pre-mitigation lot score. You **MUST** add mitigating activities with assigned values to achieve a score of 100 points or more.	**LOT SCORE:**

Reference Table

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Public Waters Type (DNR Classification)	**Required Structure Setback**	**Score Multiplier Structures**	**Score Multiplier Bluff**
General Development Lake	75 feet	1.333	(30 foot setback)
Recreational Development Lake	100 feet	1.000	
Natural Environment Lake	150 feet	0.667	4.000
Tributary Stream	100 feet	1.000	
Forested Stream	150 feet	0.667	
Remote Stream	200 feet	0.500	

STEP 2: To bring a nonconforming structure to a score of 100, the landowner shall conduct and maintain one or more of the mitigating activities listed below. Property owners must start with Zone A to achieve lot score of 100. Zones referenced in the attached "*Shoreland Restoration Plan Requirements and Standards.*"

a) Zone A: Maintain, restore and maintain, or plant and maintain, a 25 feet wide natural vegetated buffer zone adjacent to the OHWL.	30 points	_____
b) Zone B: Maintain, restore and maintain, or plant and maintain, an additional 12.5 feet wide natural vegetated buffer zone between Zone A landward.	20 points	_____
c) Zone C: Maintain, restore and maintain, or plant and maintain, an additional 12.5 feet wide natural vegetated buffer zone between Zone B landward.	10 points	_____
d) Removal of other structures that do not meet the standard structure setbacks, including water-oriented structures.	10 pts/ structure	_____
e) Removal of impervious surfaces (excluding bedrock) to half of the applicable ordinance maximum, which is 12.5% impervious.	10 points	_____
f) Removal of fill placed in historic wetlands and no future wetland fill recorded on deed.	10 points	_____
g) Revegetate bluff or steep slopes and provide screening of structures from the lake.	10 points	_____
h) Diversion of all water runoff from impervious surfaces (excluding bedrock) away from the water body into retention ponds, subsurface drains, wetlands, etc. with no outlet to the lake or tributary.	10 points	_____
i) Maintain, restore and maintain, or plant and maintain aquatic vegetation 50 feet shoreward of the OHWL.	10 points	_____
j) Restore ice berms adjacent to the OHWL.	10 points	_____
k) Stabilize eroding shoreline following the DNR Division of Water's Guidelines.	10 points	_____

Pre-Mitigation Lot Score (*Step 1, Letter D)*		
plus* Mitigation Credits Total (*Step 2, add items a through k)	+	
Grand Total (minimum 100 points)		

Alternatives proposed: _____

_____

_____

_____

STEP 3: Complete Carlton County Shoreland Revegetation Plan – Site Diagram illustrating the mitigation activities selected above. The above stated activities shall follow the recommendations in the "Shoreline Restoration and Preservation Standards Guidance Document" approved by the Carlton County Board of Commissioners and "Shoreland Restoration Plan Requirements and Standards" to obtain the mitigation credit points.

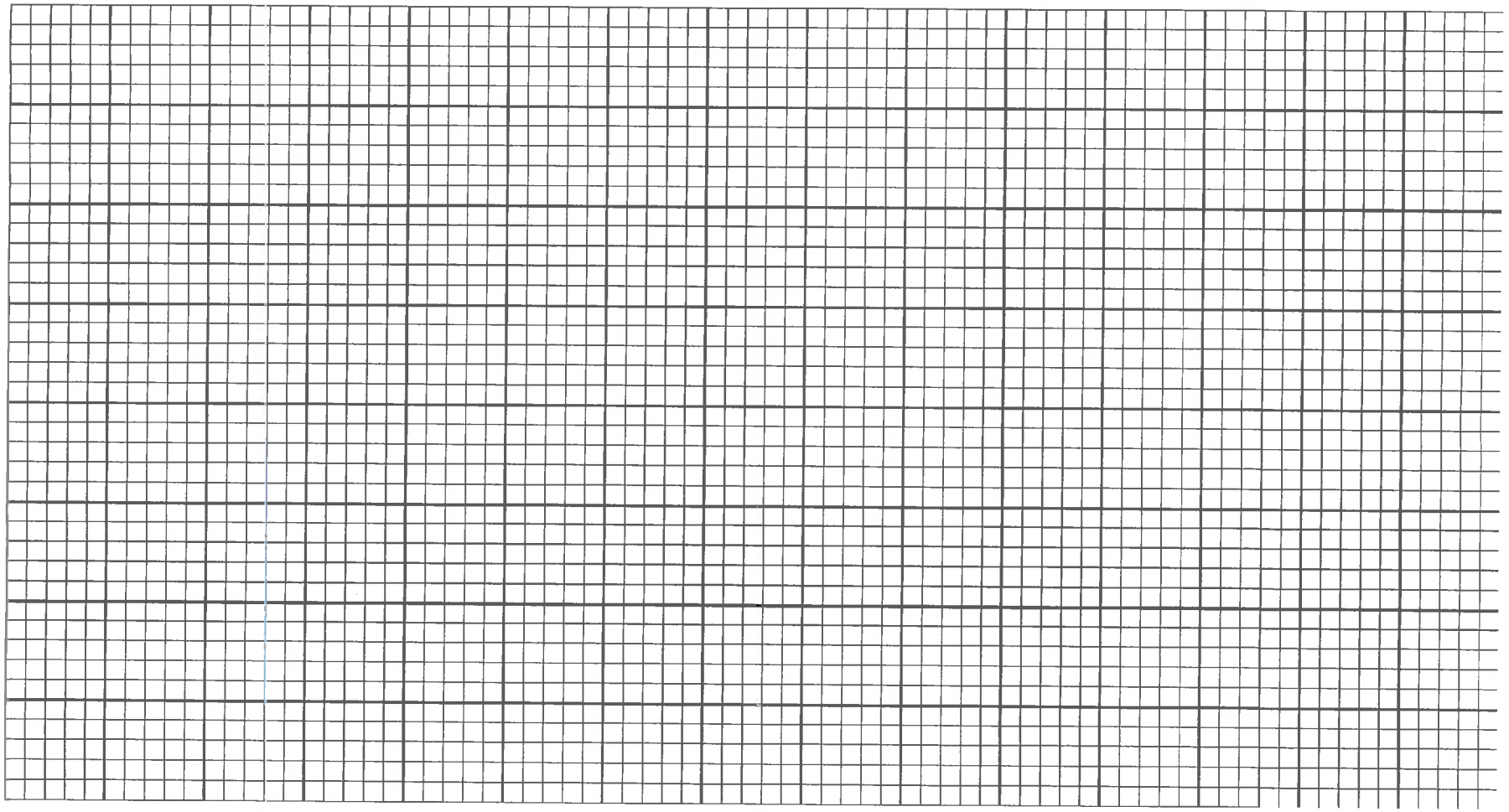
Carlton County Shoreland Revegetation Plan—Site Diagram

Use the symbols and directions found on the back of this page to complete diagram
Please complete all information on this form

Scale: 1 inch = _____ feet

Name _____ Phone #_____

Variance # _____



Project Location:

Lake:_____

Address_____

Township _____ Range:_____ Section:_____

Worksheet completed by:

Name: _____

Address: _____

Phone : _____

Indicate north by completing arrows

Specifications and Plant Materials List

List all plant materials present on the site and all new materials to be planted. Number should correspond to the number on site plan. Seed mix labels may be attached

Trees

	Name	spacing	number of trees
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Shrubs

	Name	spacing	number of shrubs
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			

Groundcover

	Name	spacing	number of plants
21.			
22.			
23.			
24.			
25.			
26.			
27.			
28.			
29.			
30.			

Lot Dimensions

Width at shore: _____

Depth of buffer: _____

Erosion Control Materials

_____

_____

_____

Irrigation supplies

_____

_____

Revegetation plan legend

- Property line
- Ordinary High Water line
- View corridor
- Buffer boundary
- Existing trees (include ID #)
- Existing shrubs (include ID #)
- New trees (include ID #)
- New shrubs (include ID #)
- Existing groundcover
- New groundcover
- Structures

What to include in your plan

Check off as you add to plan

- ❑ Property lines
- ❑ Ordinary High water level
- ❑ Existing vegetation (trees, shrubs, and groundcover)
- ❑ Buffer location
- ❑ Location and dimensions of View Corridor
- ❑ Location and dimensions of Lake Access
- ❑ Locations of new trees and shrubs
- ❑ Locations of native groundcover establishment
- ❑ New no mow zone (if applicable)
- ❑ Erosion control practices to be installed during buffer establishment
- ❑ Location of structures within the shore impact zone

FOR OFFICE USE ONLY:

Date approved: _____

By whom: _____

Square feet of new buffer: _____

Linear feet of new buffer: _____

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SHORELAND RESTORATION PLAN REQUIREMENTS AND STANDARDS

WHY RESTORE YOUR SHORE?

Natural vegetative buffer is a zone of native vegetation that extends from the ordinary high water level (OHWL) inland. Shoreline buffers provide habitat, hold soil in place, intercept and purify runoff water and provide natural beauty.

Did you know:

- When there is precipitation, water will evaporate, run off the land, or soak (infiltration) into the ground. The amount of vegetative cover on the ground will significantly impact the amount of runoff and infiltration.
- Natural Shoreline: 40% evaporation, 50% infiltration and 10% runoff.
- Disturbed/Mowed Shoreline: 30% evaporation, 15% infiltration and 55% runoff.
- Runoff can erode shorelines and carry nutrients, like phosphorus, to the lake. A lawn up to the water's edge can cause 7 times the amount of phosphorus and 18 times the amount of sediment to enter the water compared to natural shorelines.
- Phosphorus is the key nutrient needed for aquatic plant and algae growth. When excessive phosphorus reaches the lake, it fuels the overgrowth of aquatic plants and algae. Excessive plant and algae growth decreases water clarity, interferes with recreational use of the lake, and diminishes oxygen for fish.

REQUIREMENTS

There are four reasons why shoreland property owners revegetate their shoreline with native vegetation and need to complete a revegetation plan: it's required as part of a variance; a landowner requests to replace existing plants in the buffer with something else; a property owner violates Carlton County Zoning Ordinance #27; or they realize it's the right thing to do!

The *Carlton County Shoreland Revegetation Plan – Site Diagram* shall be completed for Shoreland Variance Mitigation Plans and all other shoreland revegetation activities. All plans must be submitted to, and approved by, the Carlton County Zoning and Environmental Services Administrator. All Shoreland Mitigation Plans for variances must also include a completed Shoreland Mitigation Plan - Score Sheet and must be approved prior to submitting a variance application.

Natural vegetative buffers extend the entire length of the parcel along the shoreline except where a single Access Corridor is allowed. Buffers extend from the OHWL to a defined length landward. See Figure 1.

In order to provide the functional values of a vegetative buffer, three layers of native vegetation should be present: groundcover, shrub layer and tree canopy. The entire buffer zone area, including Viewing and Access Corridors, must be vegetated. No bare soil may remain exposed.

Plants must be selected from a list of plants that are native to Carlton County. This list is available from the Carlton County Zoning and Environmental Services Office. Additional species may be proposed in

writing to the Carlton County Zoning and Environmental Services Administrator, who will approve or deny the requested addition. Some exceptions to the list will be allowed except invasive species or state-listed noxious weeds.

According to Carlton County Zoning Ordinance #27, both the Access and Viewing Corridors must be vegetated with ***native*** vegetative groundcover. There are very few native grasses that will tolerate both mowing and foot traffic. For that reason, Viewing and Access Corridors can be revegetated with a seed mixture of at least 30% native grasses (including all varieties of fescue). Contact the Carlton County Zoning and Environmental Services Office for mowed lawn suggestions in the Access and Viewing Corridor.

RESTORATION OPTIONS

Natural recovery: Native vegetation will recover naturally where the site is protected from disturbance, adequate seed and/or root sources are available and where appropriate conditions are present. Natural recovery is encouraged where feasible. Wet shoreline margins, where turf grasses are not well established, are particularly suited to natural recovery. Results may be slower than for planted buffers, but there is virtually no cost and the end result may appear more natural.

An area where a dense growth of turf grasses has been maintained for several years is not usually well suited for natural recovery. Turf grasses frequently out-compete native vegetation, and the area may lack seed sources. Areas with extensive stands of invasive plants will not be allowed to recover naturally.

Accelerated recovery (planted buffers): Native vegetation must be seeded or planted in areas not well suited for natural recovery. Accelerated recovery can include planting trees and shrubs, planting native grasses and wildflower seedlings (plugs), or seeding with native grasses and wildflowers.

On many sites, natural and accelerated recovery techniques can be combined. For example, natural recovery might be used along the shoreline where there are native plants and accelerated recovery used for the remainder of the restoration where turf grasses dominate.

Trees, shrubs and groundcover may also be transplanted from adjacent woodland or open areas outside of the buffer area, so long as the species are native to Carlton County.

Planted shoreland buffers should include at least 2 varieties of trees, 3 varieties of shrubs and 3 varieties of groundcover. Consult the provided native plant list for spacing requirements.

EROSION CONTROL REQUIREMENTS

Newly seeded areas can be mulched. Take care that the mulch you apply is free of weed seeds. Apply mulch to achieve 90% ground coverage, which will require approximately 2 bales per 1000 square feet. In areas subject to wind exposure, the mulch and seed may need to be held in place with biodegradable netting. On long or steep slopes, you may need to install an erosion control blanket. If the mulch or the erosion control blanket isn't anchored properly, the soil and seed will wash away. Always follow the manufacturer instructions for installation of erosion control blankets. This is not a place to cut corners as loss of soil, seed and mulch will cost you more in the end. Contact the Carlton County Zoning and Environmental Services Office for a list of erosion control blanket retailers.

Always install a filter barrier on the downslope side of the construction area when exposing bare ground. This barrier should include a silt fence at a minimum and when working in a critical area, (next to lakes, rivers and streams) use both a silt fence and embedded hay bales. Trench silt fencing in about 6 inches. Trench and stake hay bales (4 inch trench, 2 stakes per bale).

For additional information on erosion control, please consult the brochure *Erosion Control for Homeowners* which is available at the Carlton County Zoning and Environmental Services Office.

OTHER CONSIDERATIONS

Topsoil and other soil amendments should generally not be used. Instead, native plants should be selected to suit the existing soil conditions. If soil amendments are used, they must be included on the restoration plan for approval.

The best time to seed is late summer (mid-August to mid-September) due to favorable conditions for germination and growth. Seeding can be done in the spring from mid-May to mid-June; however, weeds and high summer temperatures can reduce the chance of success.

Shrubs and trees may be planted any time of the year when soil is not frozen and adequate soil moisture is available. The best time to transplant is when the plant is dormant, right after snow melt.

Native grasses and wildflowers can take longer to establish and should be seeded with an annual nurse crop consisting of annual rye, oats or wheat.

BUFFER MAINTENANCE

The easiest and most ideal buffer maintenance is to simply leave the buffer zone alone. Do not fertilize, do not mow, do not rake and do not weed whip. Allow natural vegetation to grow.

In areas not suited for natural recovery, some initial maintenance of planted buffers may be required. Pulling invasive weeds around native shrubs and groundcover during the first year or two eliminates competition.

Regular watering the first two years is very important to successfully establish native plants. Plantings that do not survive must be replaced for all buffers required by variances or violations.

Once the buffer is established, vegetation removal and land disturbing activities are prohibited in this area. The duff layer, made up of fallen leaves and needles, should be left in place. This layer covers the soil, thereby conserving moisture and preventing erosion. The buffer area should not be used to store docks or lifts.

Invasive plants and state-listed noxious weeds should be controlled during establishment of the buffer.

Tree thinning or removal of dead or diseased trees is allowed with permit approval from the Carlton County Zoning and Environmental Services Administrator.

RESOURCES

Department of Natural Resources Landscaping for Wildlife and Water Quality
Available to check out at the Carlton County Zoning and Environmental Services Office

Department of Natural Resources Restore Your Shore CD
Available to check out at the Carlton County Zoning and Environmental Services Office

Shoreland Buffer Restoration Guidebook
Available at the Carlton County Zoning and Environmental Services Office

List of Vegetation Native to Carlton County
Available at the Carlton County Zoning and Environmental Services Office

List of Vegetation Suggestions: Upland Meadow, Wet Meadow, Moist Woodland Edge, Maple Forest, Pine or Oak Forest, Woodland Edge and Lawn Seed Mix
Available at the Carlton County Zoning and Environmental Services Office

The Carlton County Soil and Water Conservation District (SWCD) is available to design and complete shoreland restoration plans, including tree planting. Call the SWCD office at 218-384-3891 for additional details.

NATIVE PLANT NURSERIES

Supplier	Plants and Seeds	Trees and Shrubs	Aquatics/ Wetland	Landscape Design (locally)	Other Comments	Website
Anoka Conservation District 1318 McKay Drive NE Suite 300 Ham Lake, MN 55304 763-434-2030		★			Annual tree and shrub sale; orders due by early April and ready for pickup in end of April	http://www.anokaswcd.org/index.php?option=com_content&view=article&id=143:tree-shrub-sale&catid=83:products&Itemid=544
Boreal Natives 3943 Munger Shaw Road Cloquet, MN 55720 218-729-7001	★		★	Yes	Installation and management services; retail nursery	www.prairieresto.com
Gilby's Nursery & Orchard 30069 State Hwy 210 Aitkin, MN 56431 218-768-4347	★	★	★		Carries a selection of plants most succesfully used in shoreline restorations	www.gilbysnursery.com
Hammerlund Nursery P.O. Box 247 159 North Cloquet Road Esko, MN 55733 218-879-3600		★		Yes	Native and non-native trees and shrubs	www.hammarlundnursery.com
Hayland Woods 6549 Keystone Road Milaca, MN 56353 320-983-6354	★		★	Yes	Native ferns, grasses, and flowering plants	www.haylandwoods.com
Itasca Greenhouse P.O. Box 414 26385 Blackwater Road Cohasset, MN 55721 800-538-TREE		★			Trees and shrubs are containerized, will ship	www.itascagreenhouse.com
Landscape Alternatives 25316 St. Croix Trail (Hwy 95) Shafer, MN 55074 651-257-4460	★				Seed source collected within 100 miles of St. Paul/Minneapolis	www.landscapealternatives.com
North Central Reforestation 10466 405th Avenue Evansville, MN 56326 218-747-2622		★			Trees and shrubs are containerized, will ship	www.ncrtrees.com
Prairie Nursery W 5875 Dyke Avenue Westfield, WI 53964 800-476-9453	★		★		Catalog has great photos of native grasses and forbs	www.prairienursery.com
Shooting Star Native Seeds 20740 County Road 33 Spring Grove, MN 55974 507-498-3944	★		★		Shooting Star has the State contract for wetland restoration	www.shootingstarnativeseed.com
Spring Fresh Garden Center 203 Arrowhead Lane Moose Lake, MN 55767 218-485-8828	★	★	★	Yes	Spring Fresh has completed State classes for native lakescape design	
South St. Louis SWCD 215 North First Avenue East Room 301 Duluth, MN 55802 218-723-4867		★		Yes	Annual tree and shrub sale; orders due by April 15 and ready for pickup in early May	www.southstlouisswcd.org/treeshrub.html

MN DNR Native Plant Encyclopedia
https://webapps8.dnr.state.mn.us/restoreyourshore

Minnesota Wildflowers
https://www.minnesotawildflowers.info/

FIGURE 1

SHORE IMPACT ZONE: The shore impact zone is the land located between the ordinary high water level (OHWL) of a public water and a line parallel to it at a setback of 50% of the structure setback.

AREA A - LAKE ACCESS AREA: The lake access area is an area no wider than 33% of the lot width, or 40 feet, whichever is less, and no deeper than 25 feet from the OWHL. This area may be cleared to access the lake. This area must include water-oriented accessory structures (such as a boathouse). Docks, lifts and landings are located within this area, at the water's edge. All cleared areas must be stabilized with native vegetative ground cover (except exposed bedrock areas).

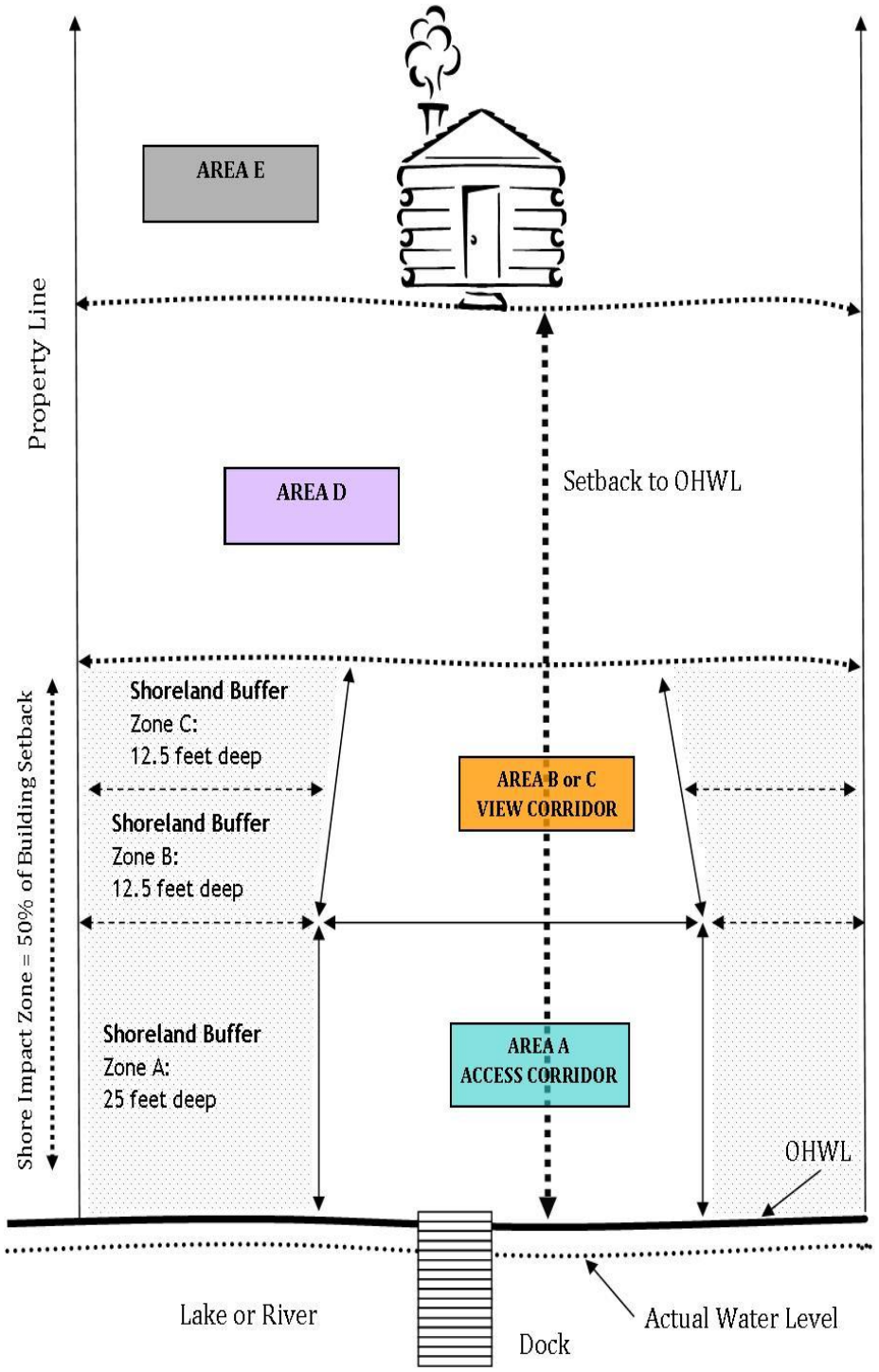
AREA B - VIEWING CORRIDOR (Red Clay or Bluff Zone): The viewing corridor in a red clay or bluff zone is an area that may not exceed 15% of the lot width, or 25 feet, whichever is less. The area must include facilities (such as stairways and landings) and clearings for lake access. Within this corridor, 1/4 of the trees greater than 5 inches in diameter at breast height (DBH) and 1/3 of the trees and shrubs less than 5 inches in DBH may be removed. All cleared areas must be stabilized with native vegetative ground cover (except exposed bedrock areas). On properties where the lake access area has been cleared, the number of trees and shrubs removed from the lake access area shall count toward the allowable tree/shrub removal in the viewing corridor.

OR

AREA C - VIEWING CORRIDOR (outside Red Clay or Bluff Zone): The viewing corridor outside a red clay or bluff zone is an area that may not exceed 25% of the lot width, or 40 feet, whichever is less. The area must include facilities (such as stairways and landings) and clearings for lake access. Within this corridor, 1/4 of the trees greater than 5 inches in diameter at breast height (DBH) and 1/3 of the trees and shrubs less than 5 inches in DBH may be removed. All cleared areas must be stabilized with native vegetative ground cover (except exposed bedrock areas). On properties where the lake access area has been cleared, the number of trees and shrubs removed from the lake access area shall count toward the allowable tree/shrub removal in the viewing corridor.

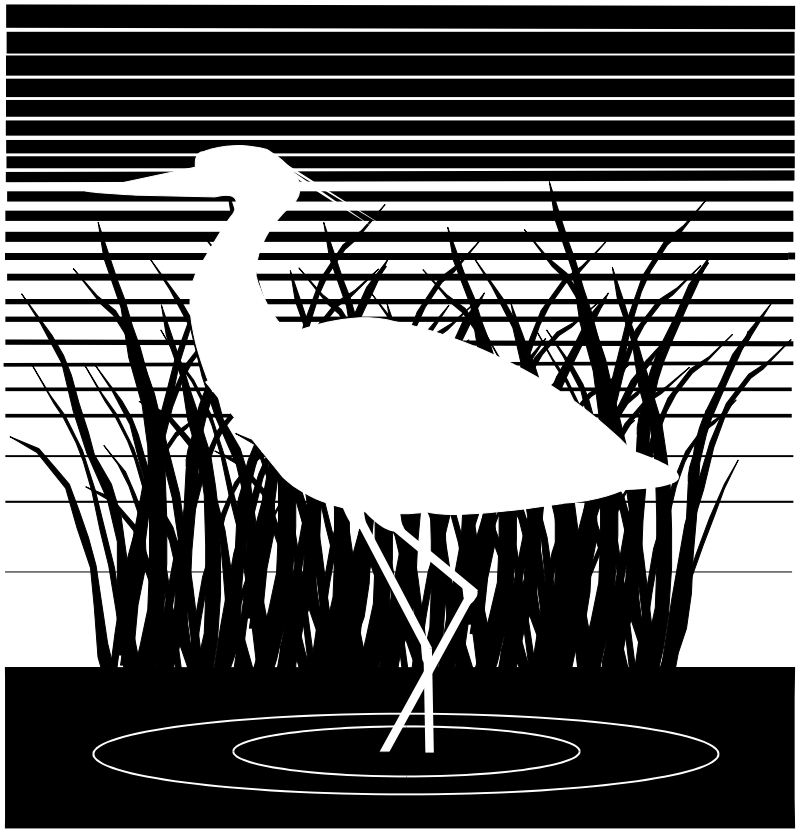
AREA D: Between the shore impact zone and the building setback line, 50% of the trees greater than 5 inches in DBH and 100% of the trees or shrubs less than 5 inches in DBH may be removed.

AREA E: No restriction on vegetation removal.



Shoreline Buffer Restoration

A Guide for Landowners



Carlton County Planning and Zoning Office

Carlton, Minnesota

2004

This document was adapted with permission form Burnett County Land and Water Conservation Department, Siren, Wisconsin.

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Table of Contents

Additional information is available by contacting the Carlton County Planning and Zoning Office
Phone: 218/ 384-9178 or 1-800-862-3760

Web address: http://co.carlton.mn.us/

Carlton County

Restore Your Shore

With shoreline development at an all time high, natural shorelines are becoming a scarce resource in northern Minnesota. As development pressure increases, it is evident that many of the county's shoreline parcels have an inadequate natural buffer. There are many compelling reasons to reverse this trend:

Keep the Water Clean

A thick cover of vegetation and an intact duff layer of leaves and pine needles serve to slow water flow allowing runoff water to soak into the soil or be filtered by the vegetation. The deep roots of native grasses and shrubs help to hold soil in place. Soil carries nutrients, which are better kept on your shore than in the lake, where they can fuel algae growth.

Provide a Home

Diverse mixtures of native trees, shrubs, and groundcovers are important for the creatures that make their homes near the water. Trees and shrubs along the water's edge provide shade for fish and places for shoreline birds to nest and find food. Plants in the water and near the shore provide cover for fish, frogs, salamanders, turtles, and the aquatic insects that feed them.

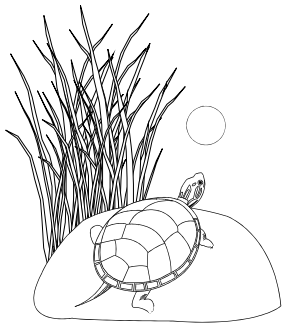
Think about how your waterfront experience is enhanced by the sight of a loon or heron on the water, a turtle sunning itself on a log, or the call of a frog at dusk. All of these creatures depend on vegetation near the shore.

Create Natural Beauty

Buffers of natural vegetation screen views to and from the lake and create a wonderful sense of privacy. Take a look at your property from the water. Does it create the northwoods atmosphere you were looking for when you bought property here?

What is a Shoreline Buffer

A shoreline buffer is a zone of native vegetation that extends from the ordinary high water mark inland. A buffer restoration seeks to restore functions originally provided by the natural vegetation.



Do Your Part

Many landowners are deciding to voluntarily restore shoreline buffers. These landowners and their human and animal neighbors will be reaping the benefits for years to come. Financial incentives may be available to help pay for plants, materials, and labor for shoreline buffers.

Using This Guidebook

The landowner guidebook is designed to help you restore your shoreline buffer. It includes a summary of county buffer standards; instructions for preparing the site, planting and maintaining the buffer; and information to help you make plant selection and find sources of plants, seeds, and supplies.

Carlton County Shoreline Buffer Restoration

Carlton County requires that the shore impact zone (½ of the required setback) be left intact next to the water. However, on many shoreline parcels, the protective zone of vegetation has been removed or greatly altered. To help mitigate the impacts that occur when structures closer than the allowed setbacks are enlarged or altered, the buffer zone must be reestablished.

Shoreline Buffer Restoration Standards are available from the Carlton County Zoning

Shoreline Buffer Restoration and Preservation Standards

Standards have been developed to ensure that adequate natural buffers are planted and preserved. The standards apply to both voluntary sites where cost sharing and/or incentives are provided and to sites where a buffer restoration is required for permitting modifications to a nonconforming structure. The standards are summarized below. Copies of the complete standards are available from the Carlton County Planning and Zoning Office.

The vegetation protection area (the buffer) must consist of a mix of native trees, shrubs, and groundcovers. Carlton County has clarified these requirements in recent revisions to the Shoreland Zoning Ordinance.

Once the buffer is established, vegetation removal and land disturbing activities are prohibited in this area that begins at the ordinary high water mark and extends to half of the required setback inland. Since mowing, raking, and cutting trees are not allowed; minimal labor is needed to maintain the shore buffer. Removal of dead trees or limbs is allowed only if there is a significant safety hazard.

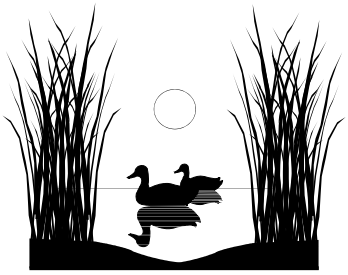
Red Clay Areas within Shoreland

The red clay areas of the St. Louis and Nemadji River Basins have been identified as having significant potential for erosion. Such erosion would severely impact the streams in those areas. These areas have been defined and included in the zoning ordinance as overlay districts.

Extent of Buffer

The buffer must extend the entire length of the lot along the shoreline except that a single viewing/access corridor may be established.

The Depth of the buffer is established in relation to the Shore Impact Zone. Shore Impact Zone is defined as " the area adjacent to the water for a distance equal to one half of the requires structure setback." Activities within the shore impact zone are regulated by the Minnesota DNR's Shoreland Management Program, and the Carlton County Zoning Ordinance. Shoreland alterations are defined as any alterations of vegetation and topography. Included are removal of vegetation other than trees, limbs, or branches that are dead, diseased, or pose safety hazards. Shoreland grading and filling activities are also considered shoreland alterations.



Viewing/Access Corridor

The viewing/access corridor extends from the lake inland, more or less perpendicular to the shore. In bluff and red clay overlay areas the area may not exceed 15% of the lot width or 25 feet whichever is less. In general shore areas, it may be up 25% of the lot width, or 40 feet whichever is less. Clear-cutting, filling, grading, and other land disturbing activities are not recommended in the corridor. Limited tree removal, pruning, and mowing are allowed. All cleared areas must be stabilized with permanent vegetative cover to prevent erosion and sedimentation. Walkways, pathways, and stairs must be located in the corridor; and piers, wharfs, and lifts must be placed in water immediately in front of the corridor. Viewing corridors on adjacent properties must have a minimum 30 foot separation of buffer area between them.

Re-establishing Native Vegetation

Selecting the appropriate technique for establishing native vegetation depends on an assessment of the existing vegetative cover and site conditions. There are two general techniques to choose from.

It is important to identify what plants are present to determine if Natural Recovery will be an option.

Natural Recovery

Native vegetation will recover naturally when the site is protected from disturbance and where adequate seed and/or root sources and appropriate site conditions are present. Natural recovery, or "no-mow" zones are encouraged to save time, effort, and money. Wet shoreline margins, where turf grasses are not well established, are particularly suited to natural recovery. Results may be slower than for planted buffers, but there is virtually no cost, and the end result may appear more natural.

An area where a dense growth of turf grasses has been maintained for several years is usually not well suited to natural recovery. Turf grasses frequently out-compete native vegetation, and the area may lack native seed sources. Areas with extensive stands of invasive weeds should also not be left to recover naturally.

Accelerated Recovery - (Planted Buffers)

Native vegetation must be seeded or planted in areas not well suited to natural recovery or where quick results are desired. Planting standards are established for native tree, shrub, and groundcover layers in the buffer restoration standards. The focus of this guidebook is to provide instruction for planted buffers.

On many sites, natural and accelerated recovery techniques can be combined. For example, natural recovery might be used along the shoreline where there are native plants, and accelerated recovery used for the remainder of the restoration, where turf grasses dominate.

Why Choose Native Plants?

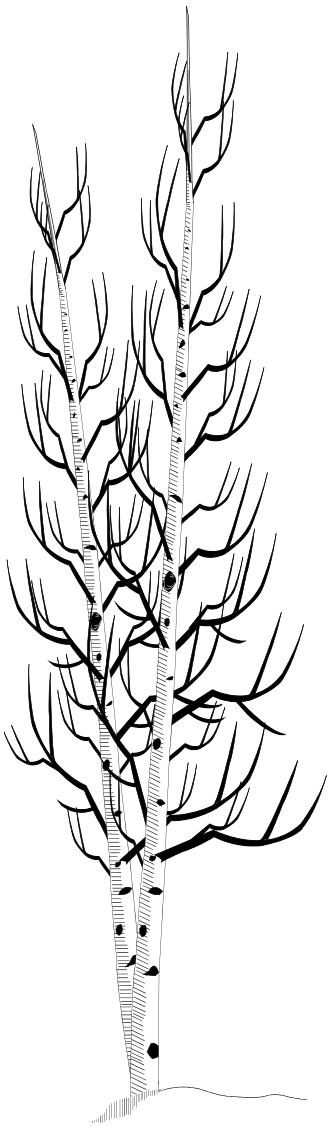
Today, natural areas exist mainly as scattered remnants. Selecting native plants for shoreline restoration projects helps to reverse this trend of disappearing habitats.

Native plants have evolved for thousands of years with the local soils, climate, and shoreline environment. They provide the essential elements of food, shelter, and space for wildlife and fish species. Stands of native plants also act as an efficient sponge, soaking up rain and snowmelt runoff and maximizing groundwater recharge. There are many beautiful native plants to choose from to enhance the aesthetic value of your property. Once established, native plants will require little or no maintenance.

Addressing Your Concerns

You are likely to have a variety of questions and concerns about restoring a shoreline buffer. Will there be a place to swim? How will the restoration affect my view? Will mosquitoes increase? How soon can I expect results?

These and other similar questions are addressed when you receive assistance with a shoreline restoration design. Answers to the common questions listed above follow: It is possible to leave a place for swimming and to allow a clear line of sight to see children that are near the water. Restoration plantings can be arranged to frame rather than block desirable views. Mosquitoes increase with added standing water, not increased vegetation. The time it takes to see results varies with soil moisture, nutrients, and sunlight. Planting seedlings rather than seeding an area generally speeds up results. And, of course, planting larger trees and shrubs results in a more finished project, sooner.



Fire Prevention

Conifer (evergreen) trees are especially susceptible to fire. To reduce fire danger, avoid planting conifers close to structures - especially when planting on the landward side of the house.

Runoff Control

Runoff from impervious surfaces and roof gutter downspouts should be directed to maximize infiltration. Runoff should be maintained in sheet flow (not channels) to the greatest extent possible. In soils where adequate infiltration cannot be achieved, outletting through a tile may be an option.

Information & Assistance is available from:

County Planning & Zoning Office

Carlton County Master Gardeners

Carlton SWCD Office

Minnesota DNR

Cost of Buffer Installation

Costs for planting a shoreline buffer vary greatly. Establishing natural recovery or no-mow zones to encourage native plant growth in all or part of the buffer greatly reduces costs. Seeding groundcovers is generally cheaper than planting seedlings, but results will take longer to see. Do-it-yourself installation costs for buffers have ranged from nothing for establishing no-mow zones and transplanting shrubs to over one dollar per square foot. Costs of native plants and planting supplies only can generally be kept below 50 cents per square foot. Professional landscapers charge more, but using an experienced contractor may result in a more successful project.

Planting shrubs or trees as bare-root stock greatly saves on the cost. The Soil and Water Conservation District sponsors a shrub and tree sale annually in April. Shrubs and trees purchased through the sale are usually about one dollar each. Order forms are available beginning in January. Additional sources of native plants and seeds are found in the native plant list available at the Planning and Zoning office.

Site Preparation

Proper site preparation is one of the most important steps in establishing a native plant landscape. Native plantings can survive on poor, sandy or clay soils and eventually will require little maintenance. However, you might need to lessen the competition on the site by first removing the existing vegetation. Turf grasses can quickly out-compete newly planted native grasses and wildflowers if left in place.

Smothering weeds with black plastic removes vegetation without using chemicals.

Sometimes removing existing vegetation is not necessary, and it is possible to plant among existing scattered native plants or to leave zones of vegetation intact. The moist zone near the water's edge often consists mostly of native plants because turf grasses are flooded out. Seeds and underground stems may quickly revegetate the area is allowed to grow. Selected native flowers, grasses, and shrubs can usually be planted among existing native vegetation to fill in bare spots or to add color and variety. Stands of invasive plants like reed canary grass or purple loosestrife should be removed from wet areas.

Ask for assistance with site evaluation if you are unsure if removing existing vegetation will be necessary.

Removing Existing Vegetation

You can remove existing vegetation by smothering, applying herbicide, or a combination of the two.

Smothering - Use Black Plastic

Black plastic spread over vegetation eliminates light and creates heat that kills existing plants. This method is suitable for almost any site. In areas with high exposure to wind, extra care must be taken to anchor the plastic in place. Explain the purpose of the plastic to your neighbors; they might wonder!

1. You will need

    * 3.5 mil or thicker black plastic to adequately cover the area, plus extra to overlap sheets at least 6 inches.
    * 4 inch or longer, 11 gauge or heavier U-shaped metal staples (enough to space 1 foot apart where plastic overlaps and at the edges).
    * Heavy objects like logs, cement blocks, boards, or tires to hold the plastic in place.

2. Prepare the site by mowing, week whacking, or trimming vegetation to be removed.

3. If the soil is dry, water thoroughly.

4. Lay down the plastic. Get some help and choose a calm day. Overlap the plastic at least 6 inches if using more than one piece. Go around or cut holes for any existing plants you wish to preserve.

5. Anchor the plastic firmly in place using long U-shaped staples and heavy objects to be sure it stays there. All seams and edges must be firmly anchored to exclude light.

6. Leave plastic in place 4 to 6 weeks during spring or summer. Make certain there is no sign of living vegetation before removing it.

7. Remove plastic and plant directly into dead vegetation without tilling.

Check with the MnDNR to see if you need a permit to remove vegetation.

Applying Herbicide

Herbicide is a much faster way to remove vegetation, but it must be used carefully and according to label instructions.

1. A glyphosate herbicide like Roundup® is recommended. These herbicides only affect plants directly sprayed, and will break down into harmless substances rapidly. Vegetation must be actively

growing for this herbicide to be effective. To encourage growth, mow grass and allow it to regrow several inches.

2. When applying an herbicide, shield and spray around existing native plants. Avoid drift of herbicide to water. If herbicide is to be applied in or over the water, an aquatic glyphosate formulation such as *Rodeo®* must be used **and a Minnesota Department of Natural Resources permit is required**.

3. Timing of herbicide application is crucial. Do not apply when rain is forecast within the next 24 hours or on a windy day.

4. Wait at least 7 to 10 days before planting native plants. Be certain that vegetation is dead before planting. If turf is still green or yellow-green, a repeated application of herbicide is recommended.

5. Leave dead plant material in place. It will serve as mulch for the new plants by holding moisture, anchoring soil, reducing weed growth, and contributing organic matter to the soil.

Soil Preparation

In most cases soil preparation is not required to plant native plants as long as they are chosen to match the soil, moisture, and light conditions at the site. Adding black dirt or manure can be detrimental to shoreline plantings. These soil amendments many favor weed growth, and the native plants may grow more quickly and be less sturdy.

Chose plants based on soil and sun exposure conditions that exist on the site.

Occasionally, soil amendments are necessary. It is wise to have the soil tested if you have any questions concerning its type, pH, or fertility. Contact the University of Minnesota Extension Office for a soil test kit. In highly acidic soils (less than 5.5 pH), adding lime may encourage plant growth. Fertilizers may also be required for soils having low nutrients.

Fertilizer use is recommended where mulches are used because they demand nitrogen as they decompose. Fertilizer should never be broadcast due to the potential for runoff into the lake. Instead, apply a very small amount of organic fertilizer in each planting hole. Use phosphorus-free fertilizer. Phosphorus levels are adequate in most soils, and phosphorus can increase algae growth in the lake. Phosphorus is the middle number of the three given on the fertilizer bag. For a 6-0-6 NPK(Nitrogen: Phosphorus: Potassium) ration, use one teaspoon of organic fertilizer per grass or wildflower plant and 1/4 cup per shrub or tree. Up to one cup can be added to larger shrub or tree planting holes. An organic rather than a chemical fertilizer will release nutrients more slowly and is less likely to burn plant roots or run off into the lake.

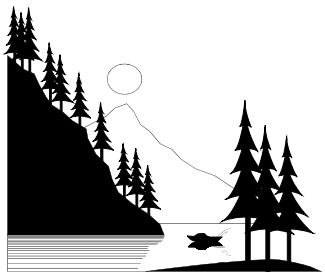
Avoid Soil Erosion - Leave Dead Vegetation in Place

Dead vegetation left in place after smothering or an herbicide application does not need to be removed. Leave the dead material to serve as mulch to capture

moisture, reduce weed growth, and add organic material to the soil. If planting seedlings, you can plant directly through the dead material. Be sure that the roots are buried in soil and not in the thatch of dead lawn, where the plant would quickly dry out and die. If seeding, additional soil preparation will be necessary.

Preventing Erosion of Exposed Soils

Bare soils must be stabilized to avoid serious erosion problems. They may be present because of erosion from runoff, bank instability, heavy use, or construction activities. Eliminate or minimize the cause of the bare soil and then stabilize the area following the guidelines below. Any bare sand or soil should be planted with seeds or seedlings and mulched. Additional stabilization methods are necessary on sloped areas.



Planting guidelines:

All sites	Seed or plant permanent vegetation and mulch.
After Sept, 15	Temporary seeding of annual rye grass. Permanent seeding next growing season.
Slopes > 12%	Companion seeding of oats or annual rye grass.
Slopes > 20%	Companion seeding of oats or annual rye grass. Mulch, net, and plant.

Additional Erosion Control

1. Divert channelized water from above (such as from a rain gutter downspout) to help establish vegetation and minimize erosion.

2. Bring in <u>small</u> amounts of topsoil or fill to even the slope where it has eroded. Check with the Planning and Zoning Office before adding fill or topsoil. Filling is regulated in the shoreland zone.

3. Seed a temporary cover of oats or annual rye grass. Complete permanent seeding in this step unless seedlings are to be planted in step 6. Seeding instructions are included on page 13.

4. Cover with an excelsior (wood fiber) erosion control mat. For best stabilization, unroll the netting parallel with the slope. Overlap netting 4 to 6 inches.

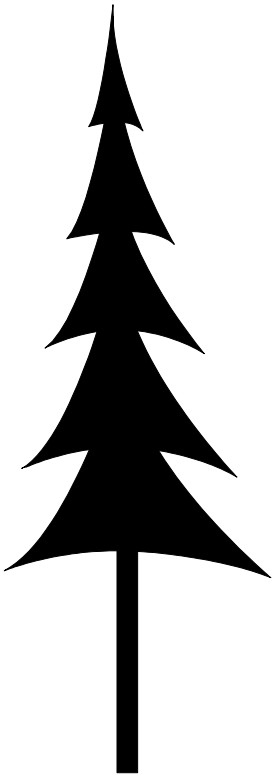
5. Stake mat or netting in place using 6 inch or longer no. 8 gauge or heavier wire staples to hold it in place. Staples should be spaced every 3 feet along the edge and where the nets or mats overlap.

6. Plant plugs of seedlings of native grasses and flowers through mulch. Choose plants from the appropriate list in the landowner guide. Space seedlings 1 foot apart. Use at least 50 percent native grasses such as little bluestem, side oats grama, and Indian grass. The deep roots of the grasses will help to stabilize the slope.

Permits are required before any filling or grading occurs

7. You may need to replace mulches, mats, and nets after periods of prolonged rainfall. Replace mulch, netting, or matting as soon as possible to maintain suitable coverage and prevent erosion until permanent vegetation is established.

Installation of filter fabric fences may be necessary to capture sediment below exposed slopes. Instructions are available from the Carlton County Soil and Water Conservation District.



Shrub and Tree Planting Steps

1. *Keep bare-root stock moist and cool before planting.* Dormant bare-root shrubs can be ordered in the fall or winter for delivery in the spring. Plant bare-root stock as soon as it arrives. If you must wait to plant, store bare-root stock close to 34 degrees Fahrenheit to avoid breaking dormancy. Keep roots moist by periodically sprinkling with water. Do not soak roots in water because this will deprive them of oxygen.

2. *Dig the hole deeply enough* so that the roots won't curl or bunch up. The trees and shrubs should be planted about one-half inch deeper than they were in the nursery. Paler colored bark and a slight swelling on the stem mark the old soil line.

3. *Pack soil firmly around the roots.* Air pockets left around the roots will dry them out. Pack soil firmly but gently around the roots with your foot.

4. *Water regularly* to keep soil moist but not saturated.

5. *Mulch* a two-foot diameter circle around each plant 2 to 3 inches deep with wood chips, straw, or tree mats. This will reduce competition with other plants. Keep this area free of other growth by weed-wacking or hand-pulling weeds for the first couple of years.

Transplanting Trees and Shrubs

It is best when trees and shrubs are dormant in the early spring or late fall. Identify and label trees and shrubs when leaves are on the plant. Dig up as much of the root as possible. Replace the duff layer of leaves and stems to reduce erosion at the site. Only dig up trees and shrubs if they are part of a large stand or if the seedlings are numerous.

The best time to plant trees and shrubs is in the spring before they leaf out

Steps for Planting Seedlings

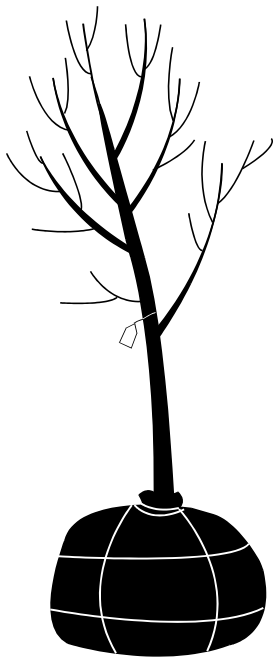
1. *Assess existing vegetation.* It might be possible to plant among existing native vegetation or into a poorly established lawn. Ask for

assistance from the Soil and Water Conservation District if you are unsure.

2. *Remove non-native competing vegetation* such as turf grasses and invasive weeds through smothering or applying herbicide as described earlier.

3. *Plan your planting scheme.* Spacing plants 8 to 12 inches apart is recommended for very sandy soils. Spacing of 12 to 18 inches is adequate for moist soils.

4. *Lay mulch down prior to planting.* Spread 2 to 3 inches of straw, wood chips, leaves, or pine needles to conserve moisture and reduce weed growth. Avoid using field hay because it generally contains weed seeds.



5. *Be ready to water.* Watering plant plugs is critical to their success. Be ready with hoses and sprinklers before you begin to plant.

6. *Dig holes for plants.* This will speed up planting. A bulb planter or bulb auger drill bit attached to an electric drill work well for planting. Make sure the holes for the plants penetrate the dead grass.

7. *Fertilize.* A small amount of organic, phosphorus-free fertilizer is recommended. Phosphorus is represented by the second number on the fertilizer label. For a 6-0-6 NPK ration, place a teaspoon in each plant hole. Excess fertilizer will encourage weed growth.

8. *Place live plants in the ground soon after they are brought to the site.* If you must keep them a few days before planting, keep them in an area with partial sun such as on the east side of a building or under a deciduous tree. Do not leave them in a dark area for long periods; this will weaken plants. Water to keep packs moist once or twice a day.

9. *Plant in the cool hours of the day.* Plants will have a greater survival rate if planted on a cool day or during the morning or evening hours. To plant, separate the mulch, dig a hole, sprinkle organic fertilizer, place the plug in the hole, press the soil gently around the plug, and replace the mulch, being careful to keep mulch ½ inch from the stem of plants.

10. *Water*. Don't forget this important step to give your plants a good start! Water immediately after planting. Plan to water daily for the first few weeks or until plants are well established. If plants wilt or droop, a repeated watering during the day may be necessary. Once plants are established, water only if prolonged dry periods occur.

Steps for Planting Seeds

1. *Remove non-native competing vegetation* by smothering or applying herbicide as described in the site preparation section on Page 9. Rake or till only enough to expose soil for planting seed - no more than 1 to 2 inches deep.

2. *Select seed.* Use 3 to 8 ounces of seed for every 1,000 square feet. Greater amounts of seed will result in denser growth and better chances for success. Include 1 ounce of Canada wild rye per 1,000 square feet as a companion seeding or cover crop if desired. This seed will germinate readily to indicate areas where seeding is successful and help to hold the soil in place. Canada wild rye is a short-lived native perennial grass.

Seed groundcovers from May 20th to August 10th. The best time to plant is in June.

3. *Mix seeds with slightly moist sand.* Fill an ice cream pail or similar one gallon bucket 2/3 full with moist, but not wet, sand. Add up to 4 ounces of seed and mix well. The seeds will adhere to the sand, so they can be spread more thinly and evenly.

4. *Broadcast the seed/sand mixture.* Use half of the seed/sand mixture to cover the entire area. Sow the remaining half by walking perpendicular to the line of the first pass to assure good seed distribution throughout the area you wish to plant. The sand will make it easier to see places that have not been seeded.

5. *Press seed in* by tapping down the soil with a rake or lightly raking the seeds in. You may also roll the site with a water-filled roller to insure good soil/seed contact. Never roll when soil is wet, this will compact the soil, decrease oxygen levels in the soil, and reduce seed germination.

6. *Mulch lightly* with ½ inch of weed-free straw. Do not use field hay, as it contains numerous weed seeds. Soil must be visible between the straw stems, or the mulch is too thick to allow seedlings to grow.

7. *On steep slopes,* hold the mulch in place by staking down a jute or plastic net. An excelsior erosion control blanket up to ½ inch thick may be used as an alternative to mulching and netting.

8. *Water* immediately following seedling. Don't forget this important step to give your plants a good start! Watering seeds and small seedlings after sprouting is critical for sandy soils. Plan to water daily, preferably in the morning, for the first few weeks or until plants are well established. Check to see that soil is moist beneath the mulch. Very sandy sites may require watering more than one daily for

the first few weeks. Once plants are established, water only if prolonged dry periods occur.

Care and Maintenance

The easiest, and most ideal, buffer maintenance is to simply leave the buffer zone alone. Do not fertilize, do not mow, do not rake, do not "clean up" fallen limbs or trees. Allow natural vegetation to regrow.

In areas not well suited for natural recovery, some initial maintenance of planted buffers may be required. Pulling invasive weeds around native shrubs, trees, and groundcovers the first year or two eliminates competition and will help to give them a good start. Buffers must be maintained over the long-term according to the shoreland ordinance requirements described below.

For the greatest benefit to wildlife and water quality, extend the 'no-touch' zone into the lake. Aquatic vegetation provides food and habitat and breaks the force of waves.

Buffer Zone

Once the buffer is established, vegetation removal and land disturbing activities are prohibited in this area except for noxious or problem weed removal. The duff layer, made up of fallen leaves and pine needles, must be left intact. This layer covers the soil, thereby conserving moisture, preventing erosion, and allowing water to infiltrate into the soil.

Shore Impact Zone

Limited pruning and mowing are allowed in this area.

Initial Maintenance of Planted Groundcovers

Weeding and watering the first two years will insure long-term success. In time, your maintenance duties will ease and you will have time to enjoy the scenic beauty you have brought back to the shoreline.

Year One

Watering

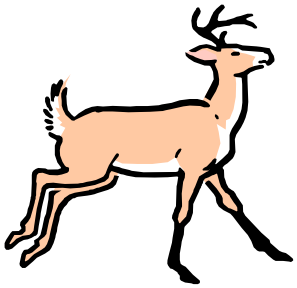
Regular watering in the first two months of a spring or summer planting is one of the most important factors for success. Without supplemental watering, roots may not reach the soil moisture they need. Watering at least 30 minutes each day allows vigorous root growth for plants to become well established. Timers to turn water on and off automatically are available from hardware and garden supply stores.

If drainage is poor, water less often and only in the morning, not at night when evaporation is reduced. Fungal diseases that start with excess moisture can kill young seedlings. Use lake water if feasible, since this water is often warmer and more nutrient-rich than well water. Pumping water from the lake is allowed in Minnesota as long as no type of structure is left in the lake.

Protection Against Deer Browsing

Whitetail deer and other animals may damage plantings, especially trees and shrubs. Protect against damage by physical or chemical means. Surround newly planted trees and shrubs with 4 to 6 foot high plastic tree guards or tubes, or make tubes from galvanized 1/4" wire mesh supported with wooden stakes or fence posts, or cover plants with bird netting.

Landscape products sprayed on plants deter browsing through strong tastes or odors. Red pepper spray is an example. Use of these products may need to be varied as deer become accustomed to their taste or smell. A few of these products are listed below. This listing does not constitute endorsement by Carlton County. Look for these and similar products at local hardware stores and nurseries. More information about preventing deer damage is found at www.uwex.edu/ces/pubs/pdf/G3083.PDF.

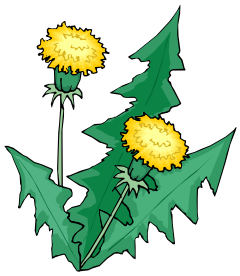


Tree Guard distributed by Becker Underwood (www.treeguard-deer.com)
Hot Pepper Wax distributed by Hot Pepper Wax, Inc. (1-888-667-3785 or www.hotpepperwax.com)
Hinder Deer and Rabbit Repellent distributed by Rockland Corporation. 1-800-424-9300.
Ro-pel Mammal and Bird Repellent available through Forestry Suppliers, Inc. (1-800-647-5368 or www.forestry.suppliers.com) and Ben Meadows Company (1-800-241-6401 or www.benmeadows.com)

Home remedies include mixtures of Tabasco, water, egg, and sometimes soap and even human hair or urine. Protection against deer browsing is particularly important if deer are fed on the site or nearby. Deer feeding should be discouraged near restoration areas.

Weeding

Native plants are typically either slow-growing or warm season plants. Cool season weeds can crowd out natives by getting a quick start in the spring before natives have had a chance to grow. Weeds deprive native plants of water, light, nutrients, and space. Check for weeds once every two weeks. Pull them out immediately being careful to not disturb the native plants. Do not allow non-native invasive species like purple loosestrife, mullein, lamb's quarter, quack grass, reed canary grass, bluegrass and other to take over the planting. Ask the University of Minnesota Extension Office if you need assistance identifying weeds.



Weeding Seeded Groundcovers

Seeded groundcovers are a special challenge because it can be difficult to tell the weeds from the natives. Sprouting a small sample of the native seeds in a plant tray can help to identify their seedlings and make it easier to recognize and pull weeds. Cut off flowering heads of weeds before they go to seed. An alternative is to repeatedly trim weedy vegetation to 6 to 8 inches with a weed-whacker. Remove clippings immediately if they cover the native seedlings. This will discourage weed growth, remove shade, and allow native seedlings to grow. Your investment of time will pay off next year and in following years. Be patient, the perennial natives will eventually out-compete annual weeds, that sprout from seed.

Fertilizing and Applying Insecticides

Fertilizers and insecticides should be avoided. Applying fertilizers may encourage weed growth. If native plants are selected appropriately, supplemental fertilization should not be required. Also avoid applying insecticides since so many are non-specific and can harm or even kill non-target species.

Vegetative Cover

At the end of the first season, allow all dead vegetation to remain in place. It becomes a valuable seed source for next year's growth, provides cover and food for wildlife, and will help to cover the soil and slow spring runoff. The grass and dried flower heads also add appeal to the native landscape in the winter months.

Check soil fertility before using any fertilizer.

Native plants have evolved to grow well in native soil conditions!

Year Two

Watering

Water only during periods of severe drought.

Weeding

Thoroughly weed early in the summer. After this initial weeding, check for weeds and pull them once a month.

Year Three and Beyond

No watering or weeding should be necessary except for extreme drought conditions or stubborn invasive weed problems. Leave vegetation in place in the fall and through the winter months.

Tree thinning or removal of dead or diseased trees requires special approval from the Zoning Administrator.

Vehicles should be excluded from the buffer except for limited use in the viewing access corridor.

Docks should be stored outside the buffer or in the viewing/access corridor, if possible.