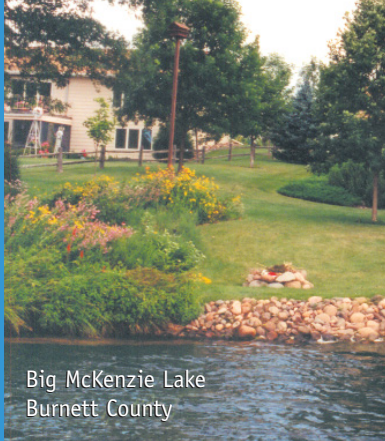


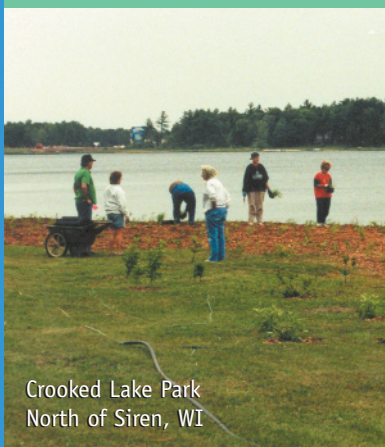
# natural shorelines



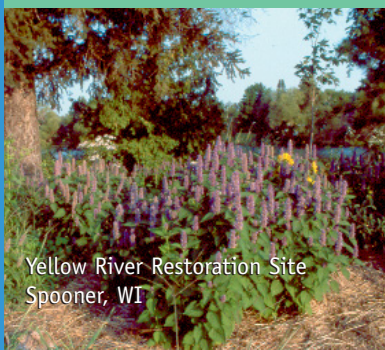
Big McKenzie Lake  
Burnett County



Yellow River Restoration Site  
Spooner, WI



Crooked Lake Park  
North of Siren, WI



Yellow River Restoration Site  
Spooner, WI

## Restoration Stories

Many waterfront property owners in Wisconsin are restoring the buffer of native vegetation along the shoreline. These stories and pictures describe the experience and results of a few. Two of the sites are demonstration areas at public parks.

**Property owners choose to restore their shorelines for a variety of reasons.**

**Concern for water quality.** The thick vegetative cover of natural shorelines serves to slow water flow allowing runoff to soak into the soil. Deeply rooted native vegetation helps to hold soil in place.

**Sharing the land with wildlife.** Diverse mixtures of native trees, shrubs, and groundcovers are critical for the many creatures that make their homes near the water. Trees and shrubs along the water's edge provide shade for fish and places for birds to nest and find food. Butterflies and hummingbirds are attracted to the colorful native flowers.

**Enhancing natural beauty.** Many of us come to the water to enjoy a quiet, natural setting. Consider how these plantings enhance that experience.



# Seeded Prairie

Lake Wissota State Park, Chippewa County  
County Highway O, about 5 miles North of  
US Highway 29. Park signs at interchange  
of Highway 29 and County Highway X.

## Design/Site Comments

The prairie was seeded in the spring of 2000. Site preparation consisted of two herbicide treatments of glyphosate five weeks apart (Rodeo is a common trade name for the herbicide approved for use near water), with shallow rototilling following the first herbicide treatment. Grass and flower seeds were seeded by hand five days following the second herbicide treatment. A few trees and shrubs were scattered in the prairie planting.

Wet soils were overlain with about 12 inches of sandy loam fill in the early 1970's to create the park picnic area.

This site serves as a comprehensive demonstration for shoreland restoration. In addition to this seeded prairie, there is a prairie planted with seedlings, a no-mow area planted with shrubs, and fallen trees in the water. Signs at the site describe the project in detail.



Summer 1999

## PLANT LIST

### Tall/Wet Seed Mix from Prairie Restorations, Inc.

Height 3'-7' for wetland  
and riparian zones.

#### Grass Mix

- 38% Big Bluestem
- 10% Canada Wild Rye
- 10% Switch Grass
- 6% Indian Grass
- by PLS weight
- 20% Blue Joint Grass
- 2% Wild Rye
- 1% Green Bulrush
- 2% Wool Grass
- 1% Giant Bur-reed
- 10% Cord Grass
- by bulk weight

#### Wildflower Mix

- 1% Fragrant Giant Hyssop
- 3% Water Plantain
- 1% Meadow Garlic
- 2% Canada Anemone
- 1% Swamp Milkweed
- 4% Panicked Aster
- 2% New England Aster
- 3% Red-stalked Aster
- 2% Flat-topped Aster
- 2% Canada Tick Trefoil
- 16% Joe-Pye Weed
- 8% Boneset
- 2% Grassleaf Goldenrod
- 2% Giant Sunflower
- 2% False Sunflower
- 2% Great St. John's Wort
- 10% Tall Blazing Star
- 1% Wild Bergamot
- 1% White Prairie Clover
- 2% Purple Prairie Clover
- 2% Mountain Mint
- 6% Black-eyed Susan

- 1% Arrowhead
- 2% Stiff Goldenrod
- 2% Tall Meadow Rue
- 16% Blue Vervain
- 1% Ironweed
- 2% Culver's Root
- 1% Golden Alexander
- all by bulk weights

#### Trees

- American Hornbeam
- Carpinus caroliniana*
- Bur Oak
- Quercus macrocarpa*
- Downy Hawthorn
- Crataegus mollis*
- Green Ash
- Fraxinus pennsylvanica*
- Northern Pin Oak
- Quercus ellipsoidalis*
- River Birch
- Betula nigra*
- White Ash
- Fraxinus americana*

#### Shrubs

- Hackberry
- Celtis occidentalis*
- Hazelnut
- Corylus americana*
- Ninebark
- Physocarpus opulifolius*
- Red Osier Dogwood
- Cornus stolonifera*

Area: 7000 ft<sup>2</sup>

Seeds: \$279

Volunteer hours:

Site preparation - 8

Seeding - 5



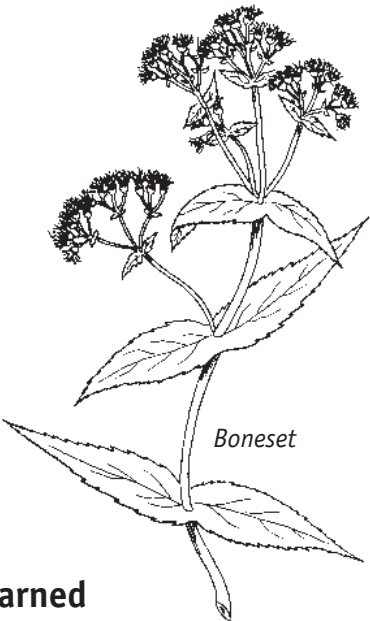
## Late Summer 2002



Ironweed



Canada Anemone



Boneset



Purple Prairie Clover

## Lessons Learned

**Site preparation:** This seeded prairie buffer was a great success because of careful removal of preexisting vegetation. Rototilling between the herbicide treatments which were several weeks apart, favored germination and subsequent killing of the non-native seedbed.

**Variety of species:** The large number of species in the seed mix assured a successful "take" for a range of wetness conditions. Wetter areas have different species than drier areas.



# No-Mow Area with Shrubs

Lake Wissota State Park, Chippewa County  
County Highway O, about 5 miles North of  
US Highway 29. Park signs at interchange  
of Highway 29 and County Highway X.

## Design/Site Comments

Bare-root trees and shrubs were planted in April 2000 into a previously mown lawn.

Wet soils were overlain with about 12 inches of sandy loam fill in the early 1970’s to create the park picnic area.

This site serves as a comprehensive demonstration for shoreland restoration. In addition to this no-mow area, there is a prairie planted with seedlings, a seeded prairie, and fallen trees in the water. Signs at the site describe the project in detail.

Summer 1999



## PLANT LIST

### Shrubs

- Hackberry  
*Celtis occidentalis*
- Hazelnut  
*Corylus americana*
- Highbush Cranberry  
*Viburnum trilobum*
- Ninebark  
*Physocarpus opulifolius*
- Red Osier Dogwood  
*Cornus stolonifera*
- Silky Dogwood  
*Cornus amomum*

### Trees

- American Hornbeam  
*Carpinus caroliniana*
- Bur Oak  
*Quercus macrocarpa*
- Downy Hawthorn  
*Crataegus mollis*
- Green Ash  
*Fraxinus pennsylvanica*
- Northern Pin Oak  
*Quercus ellipsoidalis*
- River Birch  
*Betula nigra*
- White Ash  
*Fraxinus americana*

**Area: 9000 ft<sup>2</sup>**  
**Shrubs and trees: \$210**  
**Volunteer labor: 5 hours**  
**for planting 50 bare-root trees and shrubs**



## Summer 2002



Hazelnut



Highbush Cranberry



White Ash

## Lessons Learned

**Site preparation:** While “no-mow” approaches are typically confined to sites where lawns are not well established, at this site it proved to be very successful even starting with a well-tended lawn. Surprisingly, visitors perceived the unmown grasses as quite visually appealing. With “no-mow” however, property owners need to keep a cautious eye open for non-native invasive plants such as reed canary grass and purple loosestrife.

**Progress:** The trees and shrubs planted into the no-mow area are doing well, and create more variety on the site. Native plants moving in along moist edges of the no-mow area may have been growing within the grasses all along.

During the second year of establishment, patches of sod about 3-feet square were scalped off, and the bare soil was planted with prairie flower and grass seedlings.

Due to very wet conditions in the first season, blue vervain and swamp milkweed survived while other species did not. However, additional species are doing well in their second year, and it remains to be seen whether they will spread.

**Maintenance:** Weeding and mulching around the tree and shrub seedlings for the first two years is recommended. The scalped sod, turned upside down, acted as a mulch around the prairie plants.

**Cost:** Where cost is an important factor, simply putting away the lawn mower can have acceptable results. The “no-mow” area can be enhanced with small patches of planted native seedlings.



# Wet Meadow

Crooked Lake Park  
Village of Siren, Burnett County  
WI State Highway 35, north side of Siren

## Design/Site Comments

This is a demonstration site designed for public viewing. There are also beds planted with prairie and woodland flowers common to dry sites in Burnett County.

## PLANT LIST

### Wet Meadow Flowers

Blue Vervain  
*Verbena hastata*  
Cardinal Flower  
*Lobelia cardinalis*  
Culver's Root  
*Veronicastrum virginianum*  
Cup Plant  
*Silphium perfoliatum*  
Giant Hyssop  
*Agastache scrophulariaefolia*  
Grassleaf Goldenrod  
*Solidago graminifolia*  
Great Blue Lobelia  
*Lobelia siphilitica*  
Ironweed  
*Vernonia fasciculata*  
Joe-Pye Weed  
*Eupatorium maculatum*  
Maxmillian Sunflower  
*Helianthus maxmillianii*  
Monkey Flower  
*Mimulus ringens*  
Sawtooth Sunflower  
*Helianthus grosseserratus*  
Swamp Aster  
*Aster puniceus*  
Sweet Flag  
*Acorus calamus*



### Grasses, Sedges, and Rushes

Blue Joint Grass  
*Calamagrostis canadensis*  
Bottlebrush Sedge  
*Carex comosa*  
Caterpillar Sedge  
*Carex crinita*  
Fox Sedge  
*Carex vulpinoidea*  
Rattlesnake Manna Grass  
*Glyceria canadensis*  
Soft Rush  
*Juncus effusus*  
Tall Manna Grass  
*Glyceria maxima*

### Shrubs

Chokeberry  
*Aronia melanocarpa*  
Highbush Cranberry  
*Viburnum trilobum*  
Meadowsweet  
*Spiraea alba*  
Red Osier Dogwood  
*Cornus stolonifera*  
Steeplebush  
*Spiraea tomentosa*  
Winterberry Holly  
*Ilex verticillata*

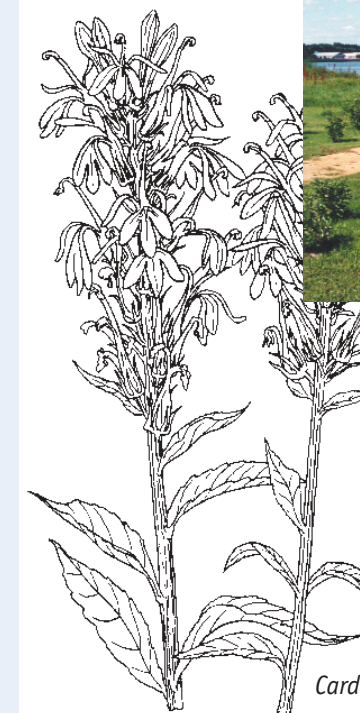
**Area: 12,000 ft<sup>2</sup>**  
**Plants and materials: \$3707**  
**Professional labor: \$2000**  
**Volunteer hours: 128**

## Summer 2001



## Lessons Learned

**Maintenance:** Like many seepage lakes, the water level fluctuates greatly on Crooked Lake. Some of the plants near the water's edge were flooded out in 2002, a year of high water. There is an area of reed canary grass on the south end of the planting that will need to be watched and controlled.



Cardinal Flower

Spring 1999



June 2000





# Prairie/Shrub Planting

Big McKenzie Lake  
Burnett County

## Design/Site Comments

Prairie flowers native to Burnett County currently dominate this sunny, south facing planting. As the trees eventually grow tall and create more shade, groundcovers more suited to the shade found in forests along the lake are expected to thrive and spread.

This site was used to demonstrate planting techniques in the video *Shoreland Restoration. A Growing Solution*. The video is available from University of Wisconsin Extension Publications by calling 1.877.947.7827.

The soil is sand with just a bit of organic matter. Two methods were used to remove thick lawn vegetation. One side was covered with black plastic for 6 weeks, and the other side was sprayed with Round Up® (a glyphosate herbicide).



## PLANT LIST

### Grasses

June Grass  
*Koeleria macrantha*  
Little Bluestem  
*Schizachyrium scorparium*  
Side Oats Grama  
*Bouteloua curtipendula*

### Flowers

#### Dry and shady

Big-leaf Aster  
*Aster macrophyllus*  
Columbine  
*Aquilegia canadensis*  
Harebell  
*Campanula rotundifolia*  
Spiderwort  
*Tradescantia ohiensis*  
Prairie Alum Root  
*Heuchera richardsonii*  
Zigzag Goldenrod  
*Solidago flexicaulis*

### Flowers

#### Sun and semi-shade

Anise Hyssop  
*Agastache foeniculum*  
Bergamot  
*Monarda fistulosa*  
Black-Eyed Susan  
*Rudbeckia hirta*  
Butterfly Weed  
*Asclepias tuberosa*  
False Sunflower  
*Heliopsis helianthoides*  
Pearly Everlasting  
*Anaphalis margaritacea*  
Prairie Sage  
*Artemesia ludoviciana*  
Prairie Smoke  
*Geum triflorum*

Purple Prairie Clover  
*Dalea purpureum*  
Rough Blazing Star  
*Liatris aspera*  
Showy Goldenrod  
*Solidago speciosa*



### Wet edge

Boneset  
*Eupatorium perfoliatum*  
Cardinal Flower  
*Lobelia cardinalis*  
Culver's Root  
*Veronicastrum virginianum*  
Ironweed  
*Vernonia fasciculata*

### Shrubs

Chokecherry  
*Prunus virginiana*  
Grey Dogwood  
*Cornus racemosa*  
Hazelnut  
*Corylus americana*  
Highbush Cranberry  
*Viburnum trilobum*  
Serviceberry  
*Amelanchier laevis*  
Snowberry  
*Symphoricarpus albus*  
Steeplebush (wet)  
*Spiraea tomentosa*  
Winterberry Holly (wet)  
*Ilex verticillata*

### Trees

River Birch  
*Betula nigra*  
Sugar Maple  
*Acer saccharum*  
Balsam Fir  
*Abies balsamea*

After



Area: 2450 ft<sup>2</sup>  
Plants and materials: \$1325  
Landowner labor: 82 hours

## Lessons Learned

**Site Preparation:** Spraying killed existing vegetation more effectively than covering with black plastic.

**Planting Techniques:** Use of a bulb auger drill bit made the planting an easy task.





# Prairie

Warner Lake  
Burnett County

## Design/Site Comments

This project was completed as mitigation required for a land use permit. Prairie vegetation was chosen because the area was sunny and sandy. Shrubs were added to the understory of the wooded area. The landowner completed the planting himself with help from the Burnett County Land and Water Conservation Department's consultant. Guidance included Burnett County's 30 page instructional booklet: *Shoreline Buffer Restoration. A Guide for Landowners.*

June 1999



## PLANT LIST

### Grasses (50%)

June Grass  
*Koeleria macrantha*  
Little Bluestem  
*Schizachyrium scorparium*  
Side Oats Grama  
*Bouteloua curtipendula*

### Flowers (50%)

Anise Hyssop  
*Agastache foeniculum*  
Bergamot  
*Monarda fistulosa*  
Black-Eyed Susan  
*Rudbeckia hirta*  
False Sunflower  
*Heliopsis helianthoides*

**NOTE:** Seedlings were planted at one per square foot. An organic soybean meal fertilizer with an N-P-K ratio of 6-0-6 was used. Native shrubs (Serviceberry, Hazelnut, Grey Dogwood, and Bush Honeysuckle) were also planted in the understory of the wooded area.

**Area: 1000 ft<sup>2</sup>**  
**Plants and materials: \$250**



## Planting-Late Summer 1999



## Summer 2002



Black-Eyed Susan

## Lessons Learned

**Planting techniques:** Mulch was not initially used in the planting. When it was added, it greatly helped to conserve moisture and reduce weed germination.



# Pine Forest Understory

St. Croix River  
Douglas County

## Design/Site Comments

Disturbance from in-ground stair construction on a rather steep slope was causing erosion and increased runoff to the lake. This planting reestablished native groundcovers found in the surrounding forest understory and stabilized the slope along the 30-foot long stairs.

Compacted subsoil was covered with peat moss, then manually tilled to replicate the thin layer of acidic organic topsoil present in these forests. Excelsior erosion control mat installed on each side of the stairs prevented erosion.

## PLANT LIST

### Nursery plants

Columbine  
*Aquilegia canadense*  
False Solomon Seal  
*Smilacina racemosa*  
Partridgeberry  
*Mitchella repens*

### Transplanted plants

Bunchberry  
*Cornus canadensis*  
Blue-Bead Lily  
*Clintonia borealis*  
Pipsissewa  
*Chimaphila umbellata*  
Wintergreen  
*Gaultheria procumbens*

**Area: 250 ft<sup>2</sup>**

**Plants and materials: \$375**

**Professional labor: \$300\***

\*Costs are estimates for professional installation as of 2003.

Spring 1998



Summer 2002



## Lessons Learned

**Site preparation:** Loosening of the very compacted soil was believed to be important for establishment of plants.

**Planting techniques:** Transplanting from nearby woods helped to reduce planting costs. However, each square that was dug up was still empty after two growing seasons. This demonstrates the lengthy period required for natural regeneration of woodland plants.

PHOTOS: Paul Hlina, Leaning Pine Native Landscapes  
Jerry Boucher, Schoolhouse Productions



Columbine

1998-1999-2002





# Pine Barrens

Crooked Lake  
Burnett County

## Design/Site Comments

Grasses and flowers native to the pine barrens of Northwest Wisconsin were planted on this sunny, sandy hillside rimmed by red pine. Shrub plantings were added along the upper and side margins of the property. The area near the water's edge was allowed to grow. The water level is considerably higher in this picture in 2002 than when the site was planted in 2000.

This landowner is enrolled in Burnett County's natural shorelines program. The small white sign identifies the site as a "preserved natural shoreline." In addition to cost sharing plantings, the program pays an enrollment bonus and credits property taxes each year in return for a perpetual covenant on the property. The covenant requires that the shoreline buffer remain in place.



Fall 1999

## PLANT LIST

### Grasses

Big Bluestem  
*Andropogon gerardii*  
Little Bluestem  
*Schizachyrium scorparium*

### Flowers

Anise Hyssop  
*Agastache foeniculum*  
Black-Eyed Susan  
*Rudbeckia hirta*  
False Sunflower  
*Heliopsis helianthoides*  
Showy Tick Trefoil  
*Desmodium canadense*

### Shrubs (28)

Black Chokeberry (wet)  
*Aronia melanocarpa*  
Bush Honeysuckle  
*Diervilla lonicera*  
Grey Dogwood  
*Cornus racemosa*  
Snowberry  
*Symphoricarpos albus*

Area: 2200 ft<sup>2</sup>

Plants and materials: \$1072

Landowner labor: 67 hours



Summer 2002



## Lessons Learned

### Planting techniques.

Mulching between seedlings is extremely important to limit weed growth. Heavier mulch was added after battling weeds between native plants.

**Maintenance.** Unusually high lake levels on this seepage lake in 2002 and 2003 flooded out some of the plants.

### Reaction to the restoration.

The landowners enjoy the many flowers, birds, and butterflies.



Showy Tick  
Trefoil



# Related References

***A Fresh Look at Shoreland Restoration.*** UW-Extension Publication # GWQ027.

This 4-page brochure describes options for restoring shoreland habitat.

For a downloadable format, see: <http://clean-water.uwex.edu/pubs/shore/index.html>

Updated version available Summer 2003.

***Protecting Our Living Shores.*** Publication available Summer 2003 from

UW-Extension offices, Extension Publications, or DNR Service Centers.

For a downloadable format, see: <http://clean-water.uwex.edu/pubs/shore/index.html>

***Protecting and Restoring Shorelands.*** Publication available Summer 2003

from UW-Extension offices, Extension Publications, or DNR Service Centers.

For a downloadable format, see: <http://clean-water.uwex.edu/pubs/shore/index.html>

***Shoreland Restoration: A Growing Solution Step-by-Step Guide*** (brochure). Available from Dragonfly Consulting (715.268.4666). Videos with an accompanying *Step-by-Step Guide* brochure are also available from UW-Extension Publications # GWQ032 at \$10.00 each.

***The Water's Edge.*** DNR Publication # FH-428-00. This colorful, comprehensive brochure describes the importance of shoreline habitat and good water quality, as well as things waterfront property owners can do to help fish and wildlife. Available from DNR Service Centers.

To download and print, see: <http://www.dnr.state.wi.us/org/water/wm/dsfm/shore/publications.htm>

***Wisconsin Native Plant Sources.*** Seeds and plants for prairies, woodlands, wetlands and shorelands. March 2001. To download and print visit:

<http://clean-water.uwex.edu/pubs/native/index.htm>

## Plant Identification and Photos

<http://www.botany.wisc.edu/herbarium/>

Vascular Plants of Wisconsin is produced by the Herbarium, Department of Botany, UW-Madison.

This is the best and most complete site for Wisconsin plants. Search by scientific name, habitat type, status, county, family, genera, or common name. The results give a detailed description of the plant and most have a photo and distribution map. Also available is a link to the Atlas of Wisconsin Prairie and Savanna Flora and a key to WI conifers and rare lichens of WI.

## Natural Shorelines Web Contacts

<http://www.uwex.edu/ces/shoreland>

<http://www.dnr.state.wi.us/org/water/fhp/waterfront.htm>