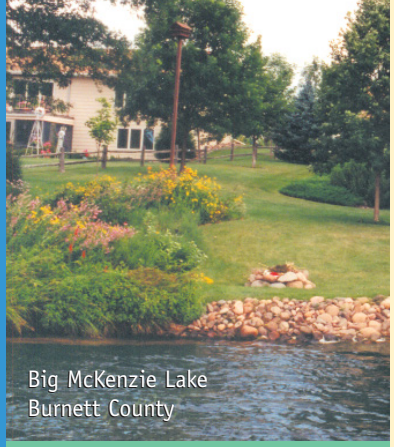
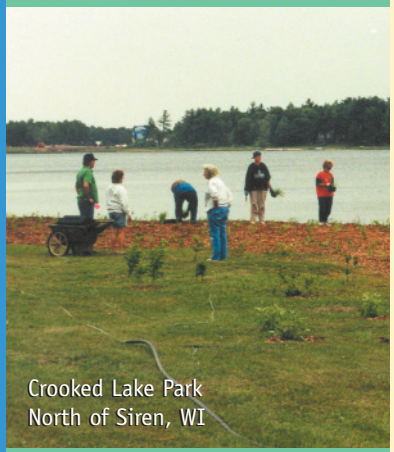
natural shorelines


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% Panicled 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

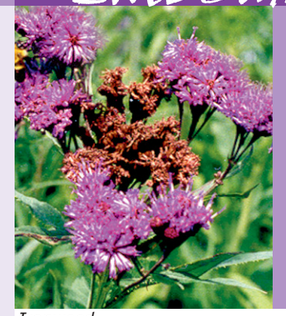
American Hornbeam
Carpinus caroliniana
Bur Oak
Quercus macrocarpa
Downy Hawthorn
Crataegus mollis
Green Ash
Fraxinus pennsylvanica
Northern Pin Oak
Quercus ellipsoidalis
River Birch
Betula nigra
White Ash
Fraxinus americana

Shrubs

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

Area: 7000 ft^2
Seeds: $279
Volunteer hours:
Site preparation - 8
Seeding - 5

Late Summer 2002



Ironweed

Canada Anemone

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

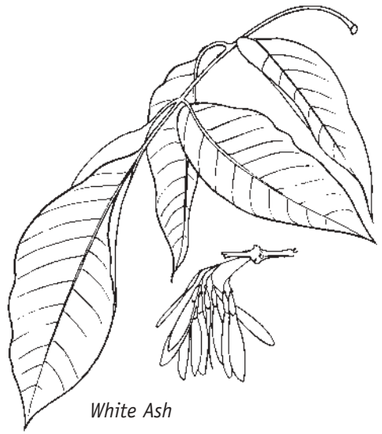
American Hornbeam
Carpinus caroliniana
Bur Oak
Quercus macrocarpa
Downy Hawthorn
Crataegus mollis
Green Ash
Fraxinus pennsylvanica
Northern Pin Oak
Quercus ellipsoidalis
River Birch
Betula nigra
White Ash
Fraxinus americana

Area: 9000 ft^2
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.

Spring 1999

June 2000

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^2
Plants and materials: $3707
Professional labor: $2000
Volunteer hours: 128

Summer 2001

Cardinal Flower

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.

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).

Before

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

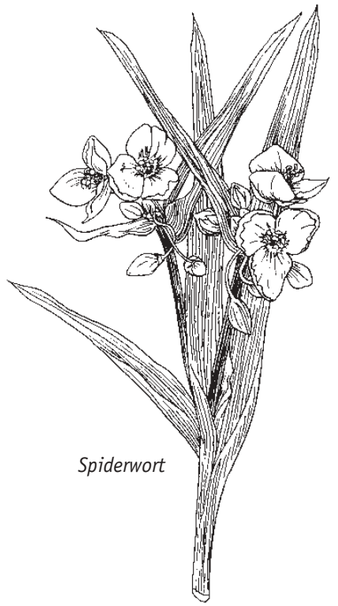
Shrubs

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



Spiderwort

Area: 2450 ft^2
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^2
Planting 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.

1998-2001-2002

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^2
Plants and materials: $375
Professional labor: $300*

*Costs are estimates for professional installation as of 2003.

Spring 1998

Summer 2002

Columbine

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

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^2
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

6/03 NSRS $2.50