What is mitigation?

To mitigate is to lessen the effects of potentially damaging processes. Within the scope of the environmental field, mitigation refers to the ability to reduce the harmful problems facing the environment affected by natural processes and human activity. By using thorough environmental management and well-tailored ecological design, even small scale changes to current land use practices have the potential to mitigate many of the problems facing land use development.

Why is mitigation so important for Becker County?

ecosystems of Minnesota

Three major ecological systems stretch their way diagonally across the state of Minnesota: the northern coniferous forest in the northeastern section of the state, made up of red, white, and jack pine stands mixed with aspen, birch, spruce, and fir; the northern deciduous forest is found in a strip running from northwest to southeast, and includes stands of maple, basswood, aspen, birch, oak, and elm; and the tallgrass prairie to the southwest, once a sweeping landscape dominated by over 200 species of tall grasses and wildflowers that is now predominantly agricultural land.

Becker County lies along the narrowest section of this transition in North America, and includes a significant land area of all three ecosystems.

The unique setting of Becker County contains immense diversity of these three ecosystems, and should be protected and preserved as a part of our natural heritage: Our primary motivation should be to make sure that all future generations can enjoy the lake country of Becker County as we do!

Best Management Practices

Best Management Practices (BMPs) are a continually updated set of environmental protection practices applied to help ensure that human development is conducted in an environmentally responsible manner. BMPs protect landscapes, ecosystems, and watersheds while allowing human development to progress in an environmentally sustainable way.

Four Best Management Practices have been selected by the Becker County Planning and Zoning Department that can make a significant local impact on erosion control and water quality. Implementing these practices will improve ecological value, wildlife habitat and the overall visual quality of your lakefront property in Becker County.

stormwater containment

vegetative berm

shoreline vegetative buffer

sources:

Henderson, C.L., C.J. Dindorf, and F.J. Rozumalski. 1999. Lakescaping for wildlife and water quality. Minnesota Department of Natural Resources, Saint Paul, MN.

Shaw, D and R. Schmidt. 2003. Plants for stormwater design - species selection for the upper Midwest. Minnesota Pollution Control Agency, Saint Paul, MN.

Tester, J.R. 1995. Minnesota's Natural Heritage. University of Minnesota Press, Minneapolis.

www.historyoftheland.org/maps/interactivemap221

additional resources:

Becker County resources: www.co.becker.state.mn.us

Planning and Zoning Department
Coalition of Lake Associations (COLA)
Soil and Water Conservation District
Environmental Services

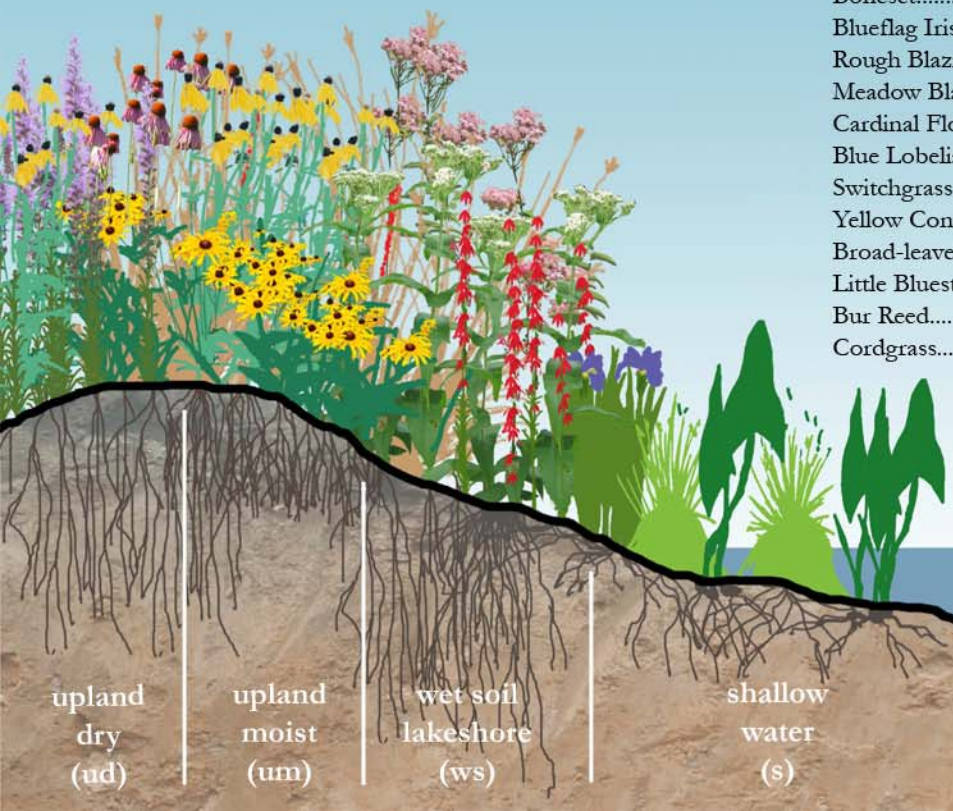
Minnesota Pollution Control Agency.....www.pca.state.mn.us
Minnesota Department of Natural Resources.....www.dnr.state.mn.us
Minnesota Association of Soil Conservation Districts.....www.maswcd.org

make a difference in your local water quality!

benefits of creating a buffer zone:

- Reduces shoreline erosion caused by wind and boat traffic
- Acts as a filter for chemicals like fertilizers or pesticides before reaching the lake
- Reduces lawn acreage, therefore decreasing lawn maintenance
- Increases water quality by filtering impurities and allowing sediment to settle
- Improves wildlife habitat for birds, fish, mammals, and amphibians
- Improves the aesthetic value of your property from the house and the waterfront!

lakeshore plant communities and habitat



examples of native plants used to create shoreline buffers

common name	scientific name	habitat	exposure
Canada Blue Joint Grass	*Calamagrostis canadensis*	w/um	○
Tussock Sedge	*Carex stricta*	s/w	○
Purple Coneflower	*Echinacea purpurea*	ud	○
Fireweed	*Epilobium angustifolium*	w/um	◑
Joe Pye Weed	*Eupatorium maculatum*	w/um	◑
Boneset	*Eupatorium perfoliatum*	w/um	◑
Blueflag Iris	*Iris versicolor*	s/w	◑
Rough Blazingstar	*Liatris aspera*	um/ud	◑
Meadow Blazingstar	*Liatris ligulistylus*	w/um	◑
Cardinal Flower	*Lobelia cardinalis*	w/um	●
Blue Lobelia	*Lobelia siphilitica*	w/um	◑
Switchgrass	*Panicum virgatum*	w/um/ud	◑
Yellow Coneflower	*Ratibida pinnata*	um/ud	◑
Broad-leaved Arrowhead	*Sagittaria latifolia*	s	◑
Little Bluestem	*Schizachyrium scarparium*	um/ud	○
Bur Reed	*Sparganium chlorocarpum*	s/w	○
Cordgrass	*Spartina pectinata*	s/w/um	○

resources:

Henderson, C.L., C. J. Dindorf, and F.J. Rozumalski. 1999. *Lakescaping for wildlife and water quality.* Minnesota Department of Natural Resources, Saint Paul, MN.

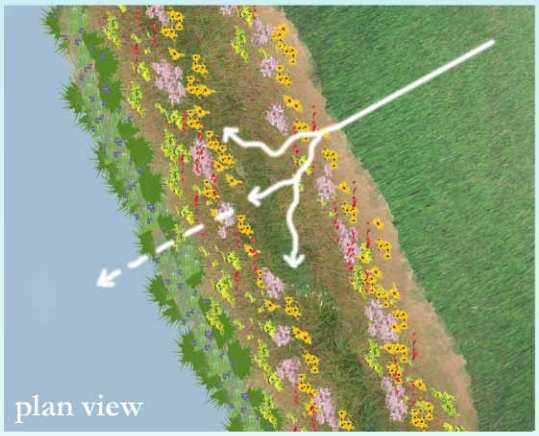
Shaw, D. and R. Schmidt. 2003. *Plants for stormwater design – species selection for the upper Midwest.* Minnesota Pollution Control Agency, Saint Paul, MN.

sediment control basin construction saves your soil and improves water quality!

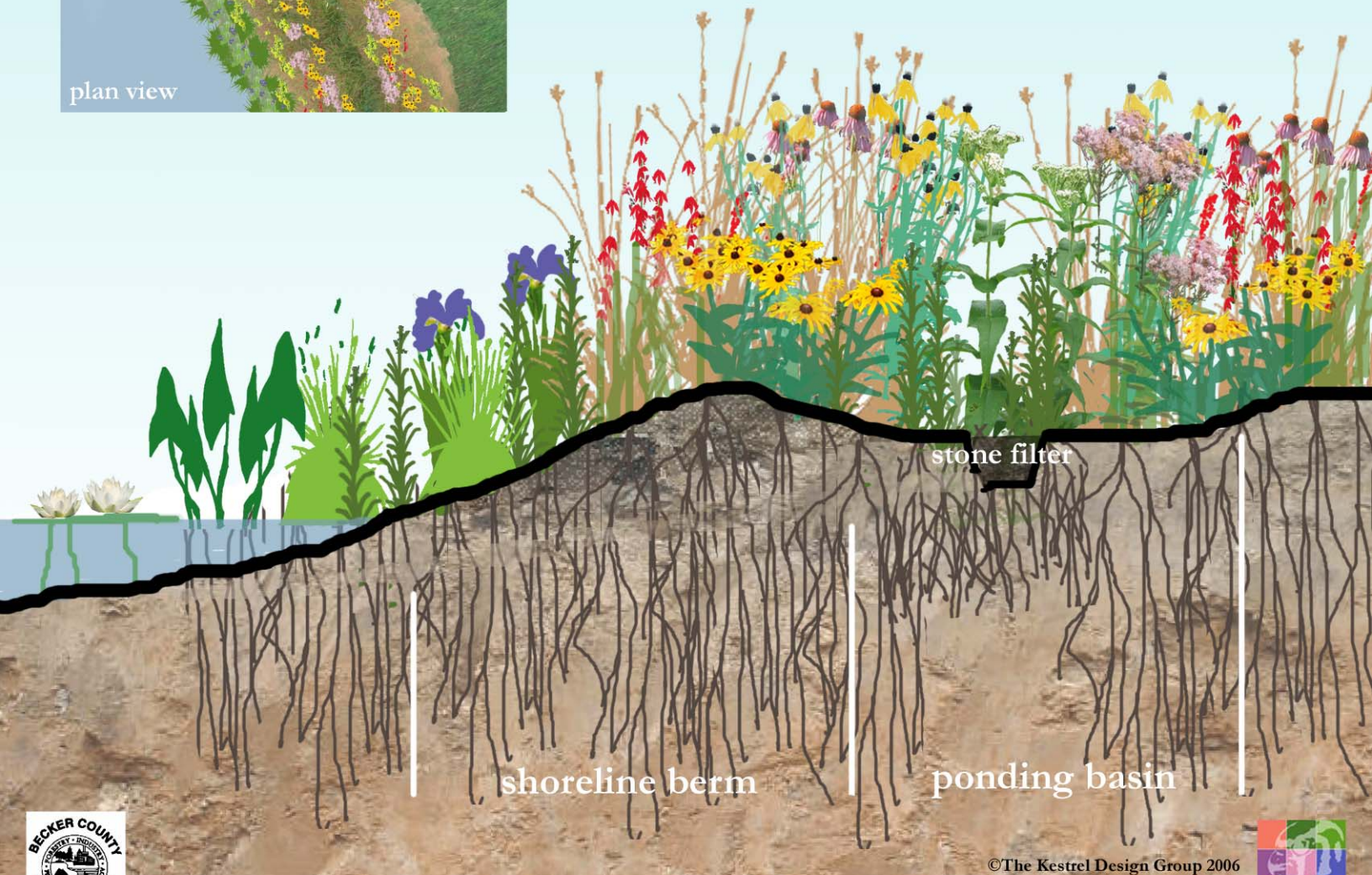
Sediment control basins are used as a Best Management Practice (BMP) in minimizing soil erosion. The basins prevent shoreline erosion by collecting and storing sediment and reduce pollution by collecting silt, fine sand, wastes and other debris from the water. Sediment control basins also slow down, filter, and clean the water before it reaches the lake, greatly improving lake water quality.

Sediment control basins consist of a berm, a ponding area and a pipe outlet into the groundwater or lake. The berm is constructed across the slope of the land to provide a temporary storage area for the rainwater surface runoff.

After significant rain storms, water is slowed down by the vegetation and collects in the ponding basin, allowing sediment and debris to settle out before it reaches the underground pipe outlet. This eliminates erosion along the water's edge and improves the water quality of the lake.



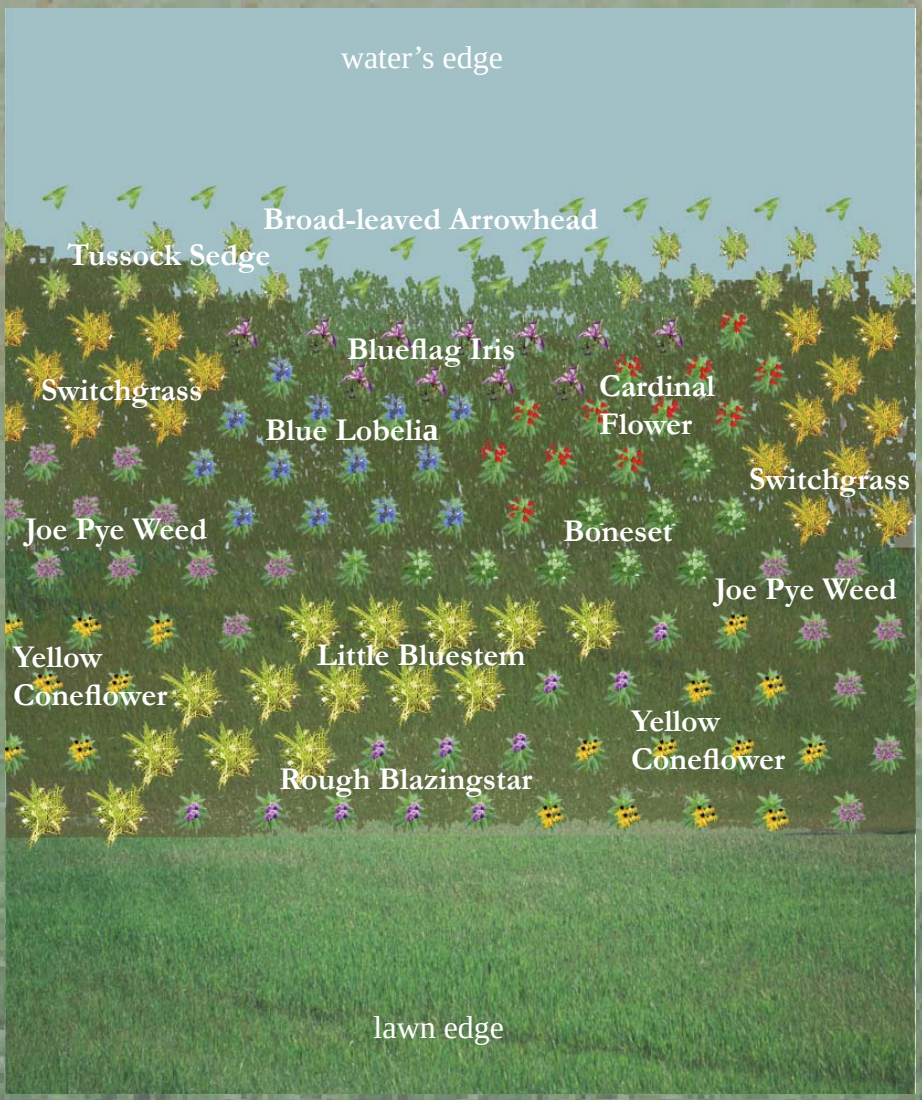
By constructing a berm along your shoreline property and planting it with native vegetation, you will minimize erosion, control runoff, improve water quality, and reestablish habitat for water-loving birds, mammals, and amphibians as well as improve the visual quality of your lakefront property!



shoreline vegetation buffer planting plan

native plants used to filter and cleanse stormwater

common name	scientific name
Tussock Sedge	Carex stricta
Joe Pye Weed	Eupatorium maculatum
Boneset	Eupatorium perfoliatum
Blueflag Iris	Iris versicolor
Rough Blazingstar	Liatris aspera
Cardinal Flower	Lobelia cardinalis
Blue Lobelia	Lobelia siphilitica
Switchgrass	Panicum virgatum
Yellow Coneflower	Ratibida pinnata
Broad-leaved Arrowhead	Sagittaria latifolia
Little Bluestem	Schizachyrium scarparium



specifications

Best Management Practices required by Becker County Planning and Zoning Department:

shoreline vegetation buffer:

- 15 feet from water to lawn
- 20 feet along shoreline
- Plants 18" apart on center

shoreline berm:

- Parallel to the shoreline
- Within the shore impact zone
- Must not divert water to adjacent properties
- At least 12 inches above the grade level
- Slope of 4:1 is recommended

stormwater containment:

- Capacity to accept, contain, and infiltrate on-site a 2-year, 24 hour (2.5 inches) rain event
- At least 2 feet above the water table
- Setback 20 feet from septic system drainfields
- Setback 5 feet from property lines

stormwater management

Stormwater management is an active process that is necessary to mitigate the effects of human development. Human activity has not only changed the landscape: it has noticeably changed the balance of earth's hydrologic cycle. We have increasingly cleared forests and cut through native prairie lands, replacing them with farms, roads, buildings, and cities. We have continually decreased the percentage of land that can infiltrate rainwater through the soil by paving over the soil.

Stormwater is defined as water that originates from precipitation events. If stormwater does not soak into the soil, it becomes surface runoff. Surface runoff over paved, bare, or lawn surfaces can cause erosion, loss of soil nutrients, and flooding. These processes increase sediment input and decrease water quality of lakes and streams. The impact of human development combined with the drastic changes in land use has incerased its susceptibility to stormwater problems that not only interfere with our designed human systems, but are critical for the health of our ecosystems and watersheds.

In the example illustrated above, native vegetation is used in vegetation buffers along paved surfaces and shorelines that collect stormwater and slow it down: it lengthens the time of water travelling across the land surface so that the stormwater can soak into the soil over a longer period of time. The use of native vegetation combined with proper design for stormwater containment decreases potential erosion, improves water quality, helps prevent flooding, and increases aesthetic value while restoring part of the ecosystem in which we live.

Native plant nurseries and native vegetation consultants for NORTHWEST MINNESOTA

Supplier	Upland perennials	Aquatic perennials	Shrubs and trees	Products	Services
Back to Nature P.O. Box 280 Fergus Falls, MN 56537 (218) 731-8417 maryjanerc@hotmail.com					Design, planting, maintenance.
Badoura Nursery DNR Forestry Akeley, MN 56433 (218) 652-2385 www.dnr.state.mn.us/forestry/nurseries			x	Native shrubs and tree seedlings; minimum order of 500 plants, single species or a mix	
Carlson Prairie Seed Farm, Inc. 13071 260th St. NW New Folden, MN 56738 (218) 523-5072 (218) 523-5073 fax 1-877-733-3087	x			Local ecotype grass and wildflower seed; native grass mulch	MCIA(Minnesota Crop Improvement Association) -Certified Vendor (yellow- tag)
Deep Woods Nursery 35805 Dinner Lake Loop Park Rapids, MN 56470 218-732-1265	x	x	x	Large selection of native wildflowers and grasses, some aquatic plants, trees and shrubs;	Consulting, design and installation; Lakeshore restoration;
Mark E. Gullickson Route 2, Box 150A Fertile, MN 56540 (218) 945-6894 Phone mgulic@hotmail.com	x			Local ecotype grass and wildflower seed, North Dakota and Minnesota	
Helmstetter Farm 5082 Rocky Point Road NW Roosevelt, MN 56673-9212 (218) 442-7285 stevenh@wiktel.com	x			Local ecotype wildflower and grass seeds, northern Minnesota.	
Kaste Inc. R.R. 2 Box 153 Fertile, MN 56540 (218) 945-6738 Phone (218) 945-6303 Fax kasteinc@gvtel.com	x			Local ecotype grass and wildflower seed, Minnesota South and North Dakota; native grass mulch	MCIA-certified vendor (yellow-tag)
L&E Greenhouse Karen Endol 25343 260th Ave Badger, MN 56714 218-528-3171	x			Local ecotype wildflower and grass seedlings; other perennials	
Lee Nursery, Inc. RR 2, Box 207 Fertile, MN 56540 (218) 574-2237 Phone (218) 574-2238			x	Some native shrubs and trees,	Wholesale nursery
Morning Sky Greenery 440804 East Highway 28 Morris, MN 56267 (320) 795-6234 Phone/Fax natives@info-link.net www.morningskygreenery.com	x	x		Local ecotype grass and wildflower seedlings; some woodland flowers and ferns;	Retail nursery

Native plant nurseries and native vegetation consultants for NORTHWEST MINNESOTA

Supplier	Upland perennials	Aquatic perennials	Shrubs and trees	Products	Services
Natural Scapes 3844 Englund Road SW Alexandria, MN 56308 (320) 762-1601 phone naturalscapes@gobiobuilder.com					Design, installation and maintenance; specializing in lakescaping
Natural Solutions Landscaping 6597 Co. Rd. 125 NE Longville, MN 56655 (866) 36-5849 www.naturalsolutionslandscaping.com					Design and installation of native plantings.
Ox Cart Seed Company 28117 60th Avenue South Hawley, MN 56549 (218) 937-5639 Phone	x			Local ecotype switch grass and big bluestem	Custom combining; MCIA-certified vendor (yellow-tag)
Prairie Land Management, Inc. 10 Marsh St. Glenwood, MN 56334 320-268-3396 888-479-1760 www.habitatNOW.com kylethompson@habitatNOW.com	x		x	Local ecotype wildflower and grass seed, MN; bare-root shrubs and trees;	Retail and wholesale nursery, mail order, consulting, contract growing. Site prep and installation of seeds and trees; prescribed burning; Wildlife enhancement.
Sunshine Gardens & KAXE Radio 1286 Shadywood Shores Dr. NW Pine River, MN 56474-9349 (218) 947-3154 phone/fax sgardens@uslink.com http://sunshinegardens.tripod.com www.kaxe.org	x		x	Native trees, shrubs and perennials for prairie, transitional, and woodland. Local ecotype seed.Carry also a variety of non-native plants.	Design and installation services. Retail nursery, open from May 1 thru September 30
Swedberg Nursery Box 418 Battle Lake, MN 56515 (218) 864-5526 Phone (218) 864-8212 Fax			x	Some native shrubs and trees	Retail and wholesale nursery
Wood Spirit Gardens Superior Lake Home Services 162 State 371 NW Backus, MN 56435 (218) 947-3663 1-888-947-2414 www.woodspiritgardens.com	x	x		small amount of plants	Consulting, design, shoreline and wetland restoration, watergardens.