A User's Guide to Natural Resource Efforts in the Red River Basin

A publication of Minnesota's
Red River Basin Flood Damage Reduction Working Group

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Introduction

This *Guide* is about the Red River of the North watershed, a vast and beautiful region on the eastern edge of the Great Plains. For many years, this area has been plagued by flooding and a range of natural resource problems that threaten the long-term health and vitality of its people, communities, and farms. This booklet, focused on natural resources, and a companion volume, focused on flood reduction, are part of a new cooperative effort by people throughout the Red River Basin to address these problems.

The commitment to work cooperatively rose from a 1998 mediation of long-standing flood control disputes sponsored by the Red River Watershed Management Board and Minnesota Department of Natural Resources. (See sidebar for mediation mission statement.)

DNR

Red River Basin, Spring 1997

At the conclusion of the mediation process, representatives from government, private conservation organizations, academia, and landowners agreed to work together to better protect the region's people, communities, and farmlands as well as its rivers, wetlands, prairies, and wildlife. The *Red River Basin Flood Damage Reduction Working Group Agreement* is essentially a framework for a new, collaborative approach to implementing both flood damage reduction and natural resource protection and enhancement in the Basin in ways that will benefit all Minnesota's citizens. The keys to this approach are clearly identified goals, comprehensive watershed planning, early consultation and collaboration on flood reduction projects among stakeholders, and a cooperative approach to building those projects.

During the mediation process, watershed officials and others expressed frustration at the lack of specific information about natural resources in the Basin, including priority concerns, objectives, measures of success, and financial assistance. This *Guide* was assembled to provide practical, pertinent information about:

- priority natural resource concerns in the Basin;
- specific goals of agencies and organizations to address concerns;
- the design and siting of multi-objective projects to reduce flood damages and improve natural resources; and
- organizations, programs, and individuals that currently provide related technical and financial assistance.

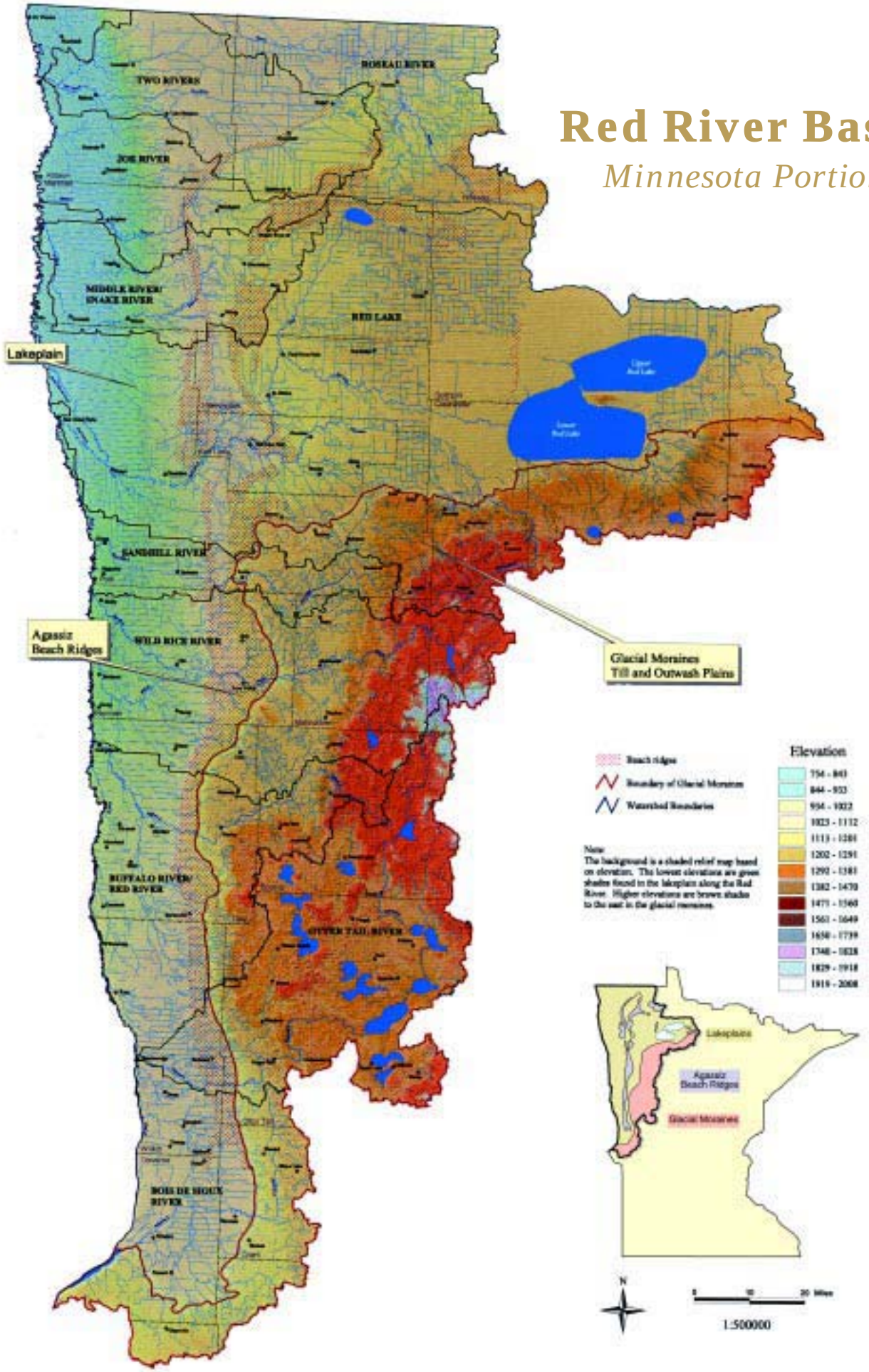
Although the concepts and information contained here may have application outside the Basin, the primary audience is participants in the Red River mediation effort: watershed district administrators and managers; local officials; landowners and other citizens; local, state, and federal agency personnel; conservationists; sports and recreation interests; and other interested parties.

Mission of the Red River Mediation

To reach consensus agreements on long-term solutions for reducing flood damage and for protection and enhancement of natural resources. Such agreements should balance important economic, environmental, and social considerations. Such agreements must provide for fair and effective procedures to resolve future conflicts related to flood damage reduction.

Red River Basin

Minnesota Portion



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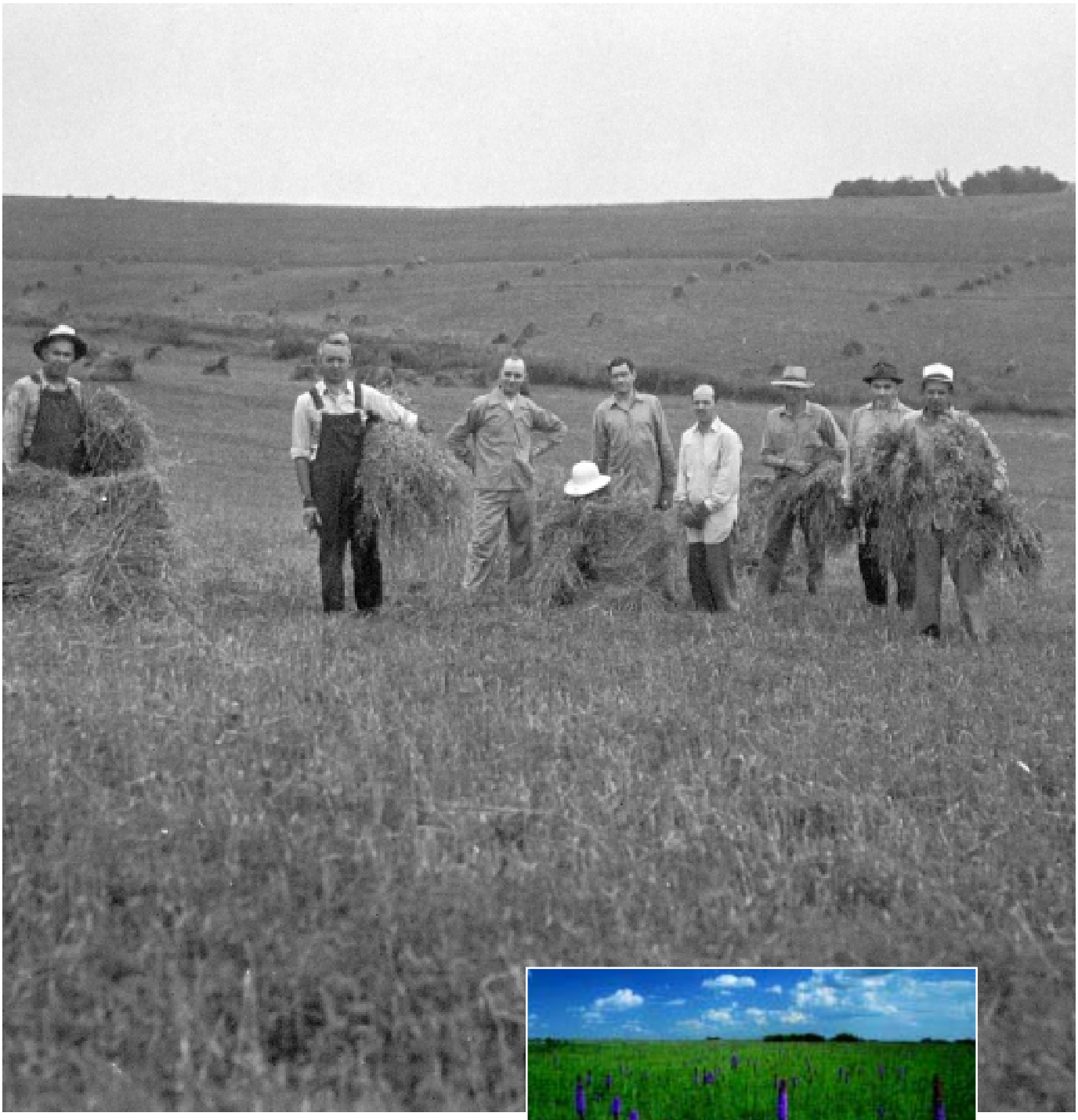
This *Guide* touches on large and complex topics only briefly. It does not take the place of detailed assessment of the highly specific conditions, needs, and opportunities at a particular site. Rather, its primary usefulness will be in prompting discussion about alternative approaches to achieving goals identified in the *Red River Basin Flood Damage Reduction Agreement,* and the availability of financial and technical assistance for applying them.

Priorities

Ecological priorities in four subregions of the Basin

Strategies

Projects and practices to address priorities



DNR

ColdSnap, John Gregor

Over the past century, the Red River Basin has been transformed into one of the nation's prime agricultural regions.

Natural Resources in the Red River Valley

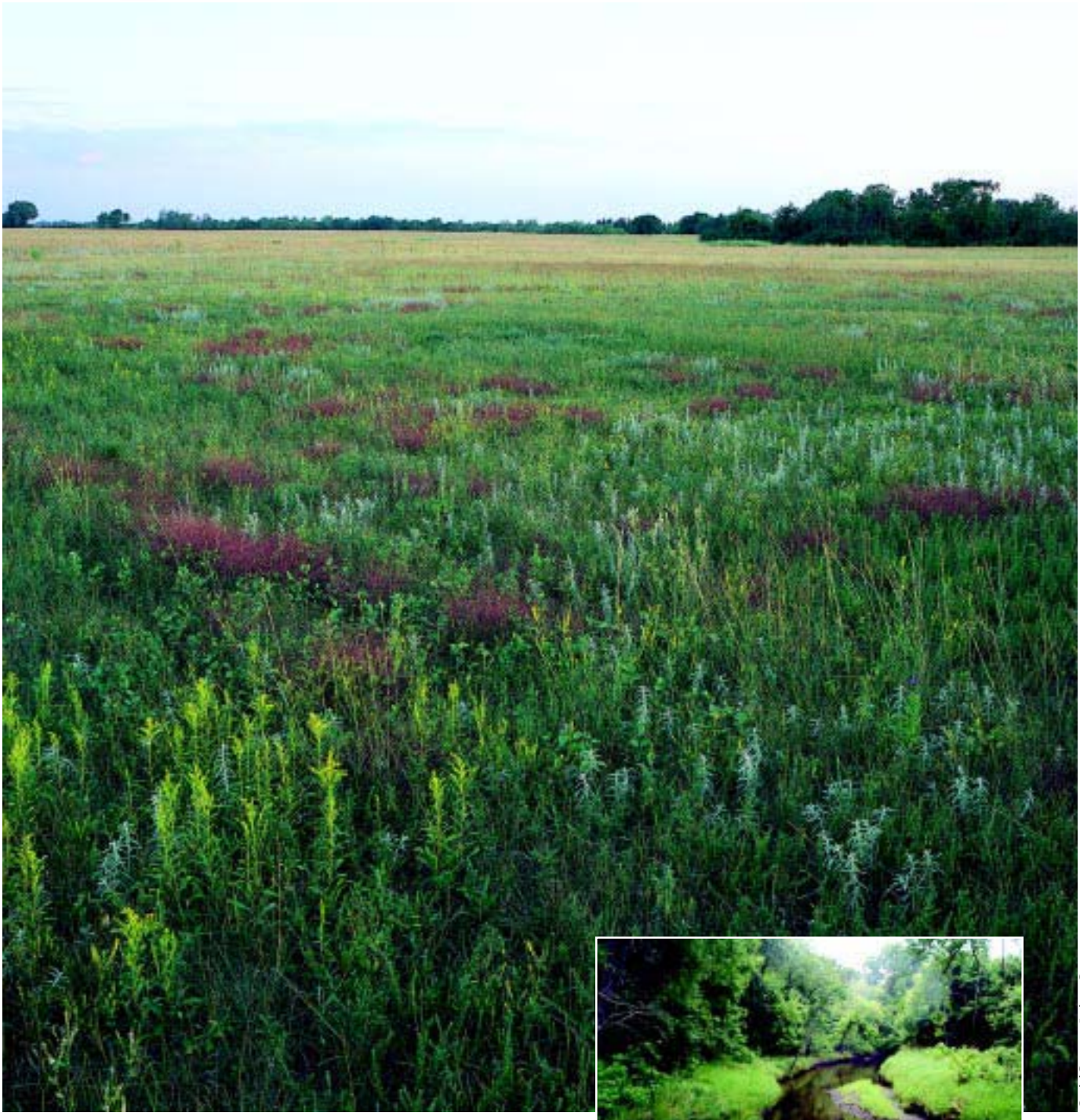
The Red River Valley is not so much a river valley as it is the exposed bed of an enormous lake formed 10,000 years ago in the wake of a receding glacier. Glacial Lake Agassiz was a 200,000 square mile sheet of water comprising parts of present-day Minnesota, North Dakota, Ontario, Manitoba, and Saskatchewan. The huge lake drained northward, exposing a flat lakebed edged with elongated sand and gravel beach ridges. The retreating glacier also left moraines—piles of rocky debris—dotted with numerous pothole wetlands and lakes.

As the millennia drifted by, a landscape evolved that was renowned for its luxuriant growth of tall grasses, eight to 10 feet high, its seemingly endless marshes and sloughs, and its wildlife. A tallgrass prairie ecosystem, part of a vast grassland stretching from Texas through Manitoba, dominated the basin, and included mosaics of wet meadows, deep marshes, calcareous fens, and—in the northern reaches of the Basin—extensive peatlands. At the edges of the prairie, oak and aspen savannas blanketed the low, rolling hills and then transitioned into dense pine and hardwood forests in the higher elevations. Small headwater streams rose in the moraine areas, cut through the beach ridges, and then meandered in intricate loops across the flat valley floor to the Red River or disappeared into swamps or sloughs. The mix of habitat types—reshaped and renewed by frequent prairie fires—made the beach ridges superb habitat for bison, elk, huge flocks of waterfowl, and many other wildlife species.

A rich human history includes native and non-native hunters, trappers, oxcart trails, and the arrival of homesteaders. The Basin's lakeplain is one of the largest level tracts of land in the world, with excellent soils and mild summers, and many recognized its tremendous agricultural potential. Beginning in the mid-1800s, waves of immigrants moved into the Basin, plowed up the prairie, connected and straightened segments of streams, and drained the standing water and saturated soils. In a remarkably short period of time, the Basin was transformed into one of the world's premier wheat-growing districts.

As in many other agricultural areas, the primary natural resource concerns here are soil erosion, poor water quality, and the loss of wildlife habitat and biological diversity. The flat, treeless, often unvegetated landscape is especially vulnerable to wind and water erosion which damages crops, clogs streams and ditches, degrades water quality, and diminishes soil fertility. Wildlife is also struggling, because of the loss and fragmentation of habitat areas. The natural areas that remain are often surrounded by cultivated fields and cut off from the flow of animals and seeds that keep them healthy.

Lakeplain



ColdSnap, John Gregor

DNR,
H. Van Offelen

Many believe that the single most important conservation strategy in the lakeplain region is ***buffering*** *watercourses and remnant and restored natural areas, such as the prairie pictured above.*

A great legacy of Glacial Lake Agassiz is the flat, virtually featureless lakeplain and its extraordinarily deep and rich soils. Flat topography—falling only six inches per mile in some areas—and minimal natural drainage caused some of the largest marshlands and peatlands in the United States to form here. Even today, in the colder, wetter north, the Red Lake peatlands and conifer bogs stretch across hundreds of square miles of the ancient lakebed.

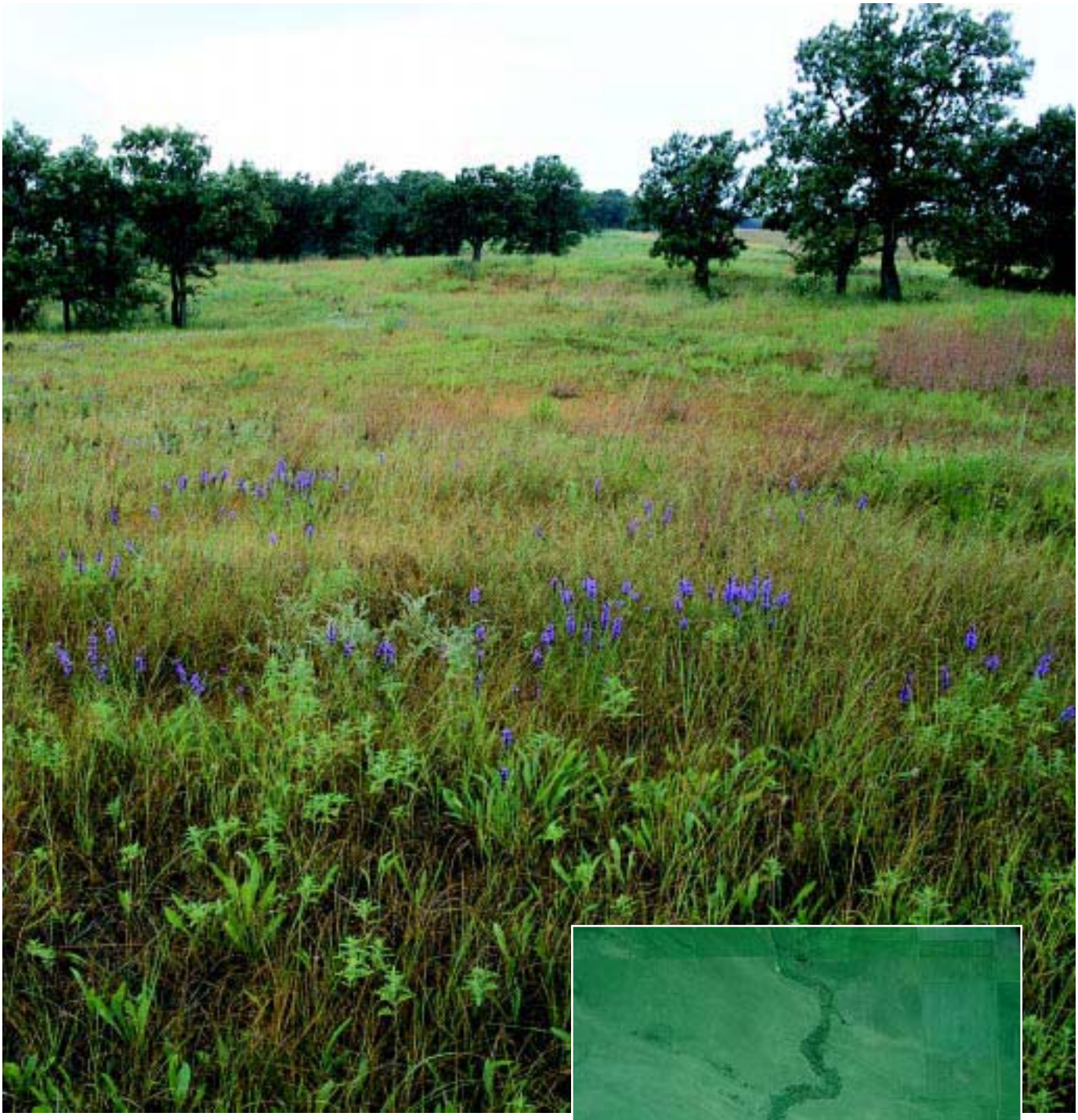
Before settlement, the valley floor was a mosaic of dry prairies, wet meadows, and shallow marshes. Subtle differences in elevation, soil moisture, and other factors resulted in diverse communities of grasses, sedges, and flowering plants. Early surveys described township-sized marshes and rivers that "became diffused and lost" within them. Frequent fires protected the tallgrass prairies from the advance of forests, except in the fire shadow of streams where broad zones of elm, ash, cottonwood, and box elder grew.

Today, the lakeplain is almost entirely converted to farmland. An extensive network of surface ditches transports water off the fields quickly. Turbidity and excess sedimentation have degraded water quality and aquatic habitats and reduced the channel capacity and stability of rivers and ditches. Keeping these channels clear is a costly, long-term maintenance burden. Only tiny remnants of the native plant communities that dominated the Basin—mesic tallgrass prairie, sedge meadow, and lakeplain wet prairie—can still be found, typically along railroads, in rural cemeteries, or the corners of fields. Shelterbelts planted over the years are declining in number and vigor. The most important habitat areas for game and non-game wildlife in the lakeplain are the forests that have advanced along river courses as a result of fire suppression.

Lakeplain Priorities

Priority ecological concerns and goals	Strategies to improve ecological functions	Optimal locations for natural resource projects
Preserve remnant natural areas	– Various easement programs, USFWS, pp. 30–31; DNR, pp. 38–39 – *Buffers,* p. 25 – Active land management, including controlled burns, DNR, pp. 38–39	– Unprotected natural resource areas, particularly those with sensitive species
Reduce wind and water erosion	– Numerous Conservation Practices (or Best Management Practices), pp. 21–29 – *Buffers*, p. 25	– Frequently flooded agricultural areas – Unbuffered or minimally-buffered waterways – Highly erodible soils
Reduce turbid runoff from cropped areas	– Conservation Practices, (BMPs) pp. 21–29 – *Buffers,* p. 25	– Croplands
Restore more natural stream characteristics	– *River Corridor Restoration,* p. 21 – Setting back levees, p. 21 – Baseflow augmentation	– Dam sites that can be modified or removed – Altered reaches of streams

Agassiz Beach Ridges

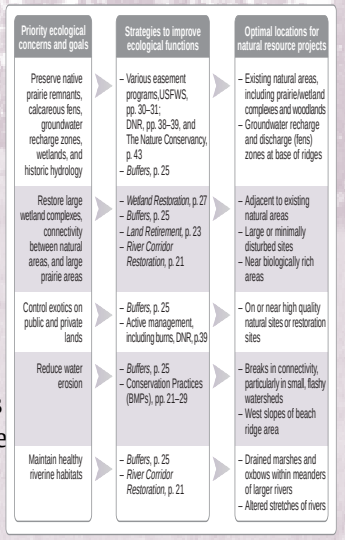


ColdSnap, John Gregor

DNR, Keene

*A key conservation strategy in the Beach Ridges is **connecting** areas, such as Agassiz Dunes, shown above, with other natural areas. Felton Creek, shown at right, is an important corridor for animals, plants, and recreation.*

Narrow ridges of low dunes and shallow depressions mark the ancient beaches of Glacial Lake Agassiz. Sand and gravel deposits underlie the prairie/wetland complexes of this rolling terrain, making the beaches important groundwater recharge and discharge zones. Groundwater discharges have created some of the unique treasures of the state—calcareous fens and saline seeps and their unusual plant communities—at the base of sand beaches. In some sections, brushlands and savannas—open parklike areas with a groundcover of prairie interspersed with aspen or oak—occupy extensive areas inhabited by moose, elk, black bear, and other rarely seen animals. The beach ridges provide important staging areas for migrating sandhill cranes, waterfowl, and shorebirds, and are critical breeding grounds for some of the largest prairie chicken populations in Minnesota.



In contrast to the fertile lakeplain, the agricultural development in the beach ridges was limited by the thin, stony soils, thus allowing areas of native prairie to survive. Most of the bluestem prairie still in existence in Minnesota can be found here, primarily in small patches over rocky soils. Some wetland complexes—mixtures of the deep and shallow marshes so valued by migrating and nesting waterfowl—have survived relatively intact. Others have been only partially altered or restored. Small clusters of biologically rich areas, containing most of Minnesota's rare species, sprinkle the region.

The primary threats to these valuable natural resources are invasion by aggressive plants such as reed canary grass and cattails and the continuing spread of more intensive farming practices. Improvements in drainage and land clearing are allowing prairie tracts formerly used for haying and grazing to be converted to row crops. Another concern is sand and gravel mining in some of the most valuable native tallgrass prairie left in the state.

Agassiz Beach Ridges Priorities

Priority ecological concerns and goals	Strategies to improve ecological functions	Optimal locations for natural resource projects
Preserve native prairie remnants, calcareous fens, groundwater recharge zones, wetlands, and historic hydrology	– Various easement programs,USFWS, pp. 30–31; DNR, pp. 38–39, and The Nature Conservancy, p. 43 – *Buffers,* p. 25	– Existing natural areas, including prairie/wetland complexes and woodlands – Groundwater recharge and discharge (fens) zones at base of ridges
Restore large wetland complexes, connectivity between natural areas, and large prairie areas	– *Wetland Restoration,* p. 27 – *Buffers,* p. 25 – *Land Retirement,* p. 23 – *River Corridor Restoration,* p. 21	– Adjacent to existing natural areas – Large or minimally disturbed sites – Near biologically rich areas
Control exotics on public and private lands	– *Buffers,* p. 25 – Active management, including burns, DNR, p.39	– On or near high quality natural sites or restoration sites
Reduce water erosion	– *Buffers*, p. 25 – Conservation Practices (BMPs), pp. 21–29	– Breaks in connectivity, particularly in small, flashy watersheds – West slopes of beach ridge area
Maintain healthy riverine habitats	– *Buffers*, p. 25 – *River Corridor Restoration,* p. 21	– Drained marshes and oxbows within meanders of larger rivers – Altered stretches of rivers

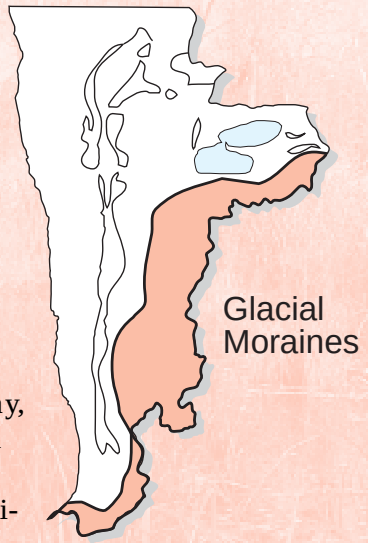
Glacial Moraines

Dominique Braud

Dominique Braud

The undulating terrain at the top of the Red River watershed has a powerful influence on erosion and flooding downstream. Tamarac National Wildlife Refuge (NWR) and other forested areas play an important ***stabilizing*** *role in the Basin.*

The major landforms in the eastern and southern parts of the Red River Basin are moraines—rocks, boulders, pebbles, and clays that have been transported and deposited by ice sheets. Outwash plains—broad bands of pure sand or glacial till—lie on either side of moraines. Unlike other parts of the basin, the moraines are a land of undulating terrain, pothole wetlands, kettle lakes, and forests.



Weather patterns in the Red River Basin result in higher levels of precipitation in the east, the headwater region of many rivers and streams. These headwaters are often clear and rocky and connect chains of lakes. A change in vegetation from prairie to forest occurs here, partly because of its higher precipitation, and because, historically, the numerous lakes and wetlands provided a partial barrier to fire. Mixed forests and savannas of oaks, sugar maple, basswood, and other hardwoods were found in these fire-protected areas, while tallgrass prairie grew on the more level till plains. Today, approximately half of these woodlands remain, most of them around waterbodies or on steeper slopes.

Tourism, forestry, and agriculture are the primary economic activities with major implications for natural resources. Lakes are among nature's most fragile ecosystems, highly sensitive to changes in the watershed. Removal of vegetative buffers, increased runoff, and pollutants from lakeshore developments and agricultural activities can harm the aquatic plants that fish depend upon and trigger oxygen-depleting algae "blooms" in the region's lakes. Increased runoff also destabilizes headwater streams, affecting aquatic species and processes far downstream.

Glacial Moraines Priorities

Priority ecological concerns and goals	Strategies to improve ecological functions	Optimal locations for natural resource projects
Preserve headwater streams, minimally-impacted lakes and wetlands, and large blocks of mature and diverse forests	– Various easement programs, USFWS, pp. 30–31; DNR, pp. 38–39; – *Buffers,* p. 25	– Existing natural or minimally-impacted areas, particularly biologically rich areas – Large forest blocks and other wildlife land
Restore natural characteristics to headwater streams, lakes, and wetlands	– *River Corridor Restoration,* p. 21 – *Buffers,* p. 25 – Various water retention strategies, pp. 27–28	– Where opportunities exist in altered systems
Connect and buffer biologically-rich areas	– *River Corridor Restoration,* p. 21 – *Buffers,* p. 25 – *Land retirement,* p. 23	– Adjacent to natural areas – Breaks in connectivity between natural areas
Protect water quality in lake watersheds	– Numerous Conservation Practices (BMPs), pp. 21–29	– Lakeshore watersheds
Limit removal of native woodlands	– Easements, DNR, p. 39	– Native woodlands

Red River Farmlands

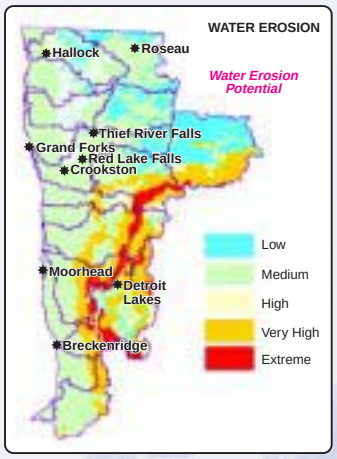
ColdSnap, John Gregor

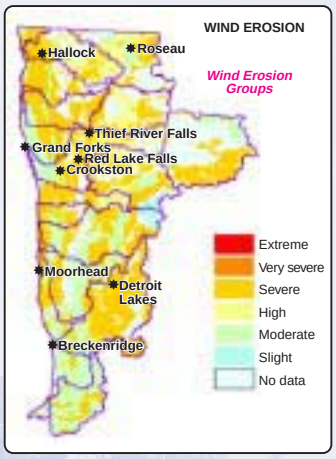
DNR,
H. Van Offelen

Stewardship *by Red River farmers is crucial to improving natural resources and reducing flooding. Conservation practices well-suited to the Basin are assessed on page 29.*

In the late nineteenth century, thousands of immigrants in search of fertile, affordable land streamed into the Red River Valley. Through their labor, the prairie was turned into a grain empire capable of filling the growing appetite of eastern cities. Today, the Valley is an important agricultural region, with an estimated 57 percent of the land devoted to the production of wheat, beans, hay, barley, corn, sugar beets, and sunflowers. Despite the tremendous fertility of the region, many Red River farmers have been hurt by low market prices for grain and livestock, by the loss of commodity support payments, and by flooding and wheat scab during the recent wet cycle. Here as elsewhere, farm population is declining while farm size is increasing.

The primary natural resource concerns on farmland are soil erosion, poor water quality, and loss of wildlife and habitat diversity. Wind erosion is among the worst in the nation and results in loss of long-term soil productivity, clogged waterways, crop damage, and water turbidity. Erosion and reduction of available habitat is made worse by removal of shelterbelts and by conversion of pastureland and wheat to row crops such as beans and corn.





Red River farmers play a crucial role in basin-wide efforts to reduce flood damages and improve natural resources. Conservation Practices, or Best Management Practices (BMPs) are voluntary measures, often with financial incentives, that landowners can adopt to reduce erosion and improve environmental conditions on their land. Increasing crop residues, planting windbreaks, and other BMPs greatly increase the effectiveness and longevity of flood reduction efforts and are an important part of a comprehensive watershed strategy.

Farmlands Priorities

Priority ecological concerns and goals	Strategies to improve ecological functions	Optimal locations for natural resource projects
Reduce wind erosion	– Conservation Practices (BMPs) pp. 23 and 25	– Major Land Resource Areas (MLRAs) having the highest erosive potential (see above)
Reduce water erosion	– Conservation Practices (BMPs) pp. 21, 23, and 28	– Adjacent to ditches and streams and over permeable soils, particularly in eastern regions
Improve water quality and aquatic habitat	– *Buffers,* p. 25 – *Wetland Restoration,* p. 27	– Watershed priority areas based on topography and land use

Red River Wildlife

DNR, C. Henderson

Representative native game & non-game species

Endangered, threatened, or special concern species

Rivers
- Lake Sturgeon
- River Otter
- Channel Catfish
- Beaver
- Hooded Merganser
- Wood Duck
- Bald Eagle

Wetlands
- American Bittern
- Blue-winged Teal
- Tundra Swan
- Moose
- Muskrat
- Mink

Grasslands
- Badgers
- Bobolink
- Western Meadowlark
- Grey Partridge
- Sharp-tailed Grouse

Woodlands
- Ruffed Grouse
- Woodcock
- Great Grey Owl
- White-tailed Deer
- Swainson's Hawk

Enlarging *existing natural areas to provide sufficient breeding territory for birds and wildlife is another important conservation strategy. If remnant areas become so small that populations fall below viable levels, a species is doomed. Minimum prairie tracts of 160 acres could improve conservation of Greater Prairie-chicken, pictured above.*

White-tailed Deer

DNR, C. Henderson

Dunlins

Northern Pike

The Red River Basin of the past was a wildlife wilderness of legendary proportions. Herds of bison and antelope; grizzlies; huge flocks of cranes and waterfowl; mink, otter, and beaver, and hundreds of other species inhabited the open grasslands and forests. An early visitor described a waterlogged world alive with the incessant chirping and croaking of frogs and the "doleful throat-gargling cry of numberless cranes." The region was the ancestral hunting grounds of the Dakota and other native people; in the 1600s, it was a major outpost of the North American fur trade.

This prodigious wildlife disappeared a century or more ago. Many native species are no longer found here. Others are experiencing varying rates of decline based upon the availability of habitat they require. The long-term survival of each of the Basin's primary wildlife communities—grassland, wetland, woodland, and riverine—is threatened by habitat loss, fragmentation, and degradation.

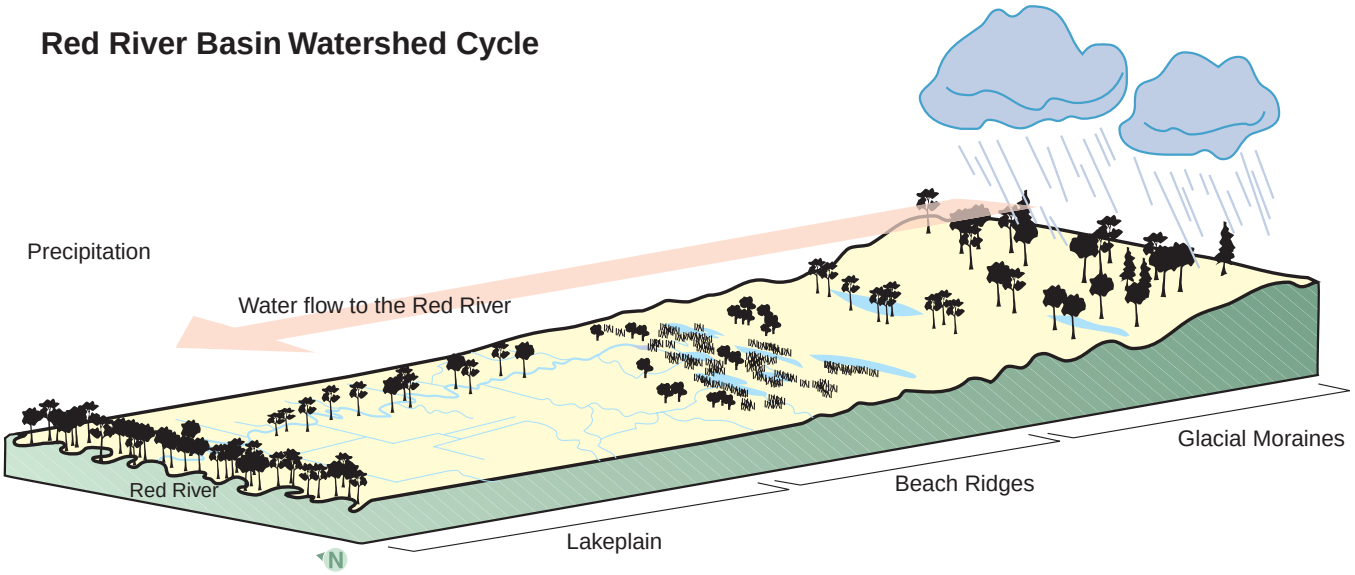
For terrestrial animals, the important habitat areas remaining in the Basin are floodplain forests and all areas of native vegetation, particularly those containing complexes or clusters of different plant communities. These sites provide habitat for more species than smaller, isolated spots and are able to fulfill wildlife needs during different stages of their life cycles, such as nesting, rearing young, overwintering, and migrating. Expanding, buffering, and connecting the wooded river corridors that remain intact in the Basin is critical to wildlife conservation. Other important habitat areas are deer wintering areas, native woodland communities, prairie chicken booming grounds, staging areas for migratory species, and habitat species of concern.

Rivers and streams in the Basin support over 80 species of fish. Many rivers support healthy populations of game fish, including channel catfish, walleye, sauger, and smallmouth bass. The network of streams in the Red River watershed are critical to different phases of a fish's life cycle, with the tributaries used for spawning and rearing young and on the main stem for refuges during harsh weather. Maintaining the connections between the main stem and small intermittent streams is critical to maintaining fish populations. Managing streamflows to ensure fish passage and adequate water levels is also important. Areas of special concern are trout streams, headwater streams, and pool/riffle complexes.

Wildlife Priorities

Priority ecological concerns and goals	Strategies to improve ecological functions	Optimal locations for natural resource projects
Stabilize populations of at-risk and native species	– Acquisition and various easements, USFWS, p. 31; DNR, pp. 38–39 – *Buffers,* p. 25 – Active management, DNR, p. 39	– Natural Heritage Program sites – Other critical habitat areas
Stabilize other sensitive species by habitat group	– Acquisition and easement, see above, DNR, pp. 38–39 – *Buffers*, p. 25	– Roadless forest areas, large grassland blocks in Beach Ridges, large wetland complexes in ridges and moraines
Maintain huntable levels of game and waterfowl species	– Various water retention strategies, p. 27 – *Land retirement,* p. 23	– Public and private lands – Upland areas adjacent to wetlands
Improve habitat to increase migrating and breeding waterfowl and shorebirds	– *Land retirement,* p. 23	– Near or connecting wetlands – Seasonal use areas in lakeplain – Impoundments
Preserve fish and mussel diversity	– Remove/modify fish barriers, DNR, pp. 38–39 – *River Corridor Restoration,* Low-flow augmentation, p. 21	– Wetlands in Beach Ridges – Lower watershed areas

Red River Basin Watershed Cycle



The hydrologic or water cycle is the continuous circling of water to and from the atmosphere and through the watershed. Precipitation falling on the earth has three principal routes. It *infiltrates* into the soil and subsurface aquifers. It *flows* across the ground surface, *collects* in streams, and is eventually carried to the ocean. It *evaporates* or *transpires* from vegetation, soil, and water back into the atmosphere.

Human activities and changing climate patterns can affect the functioning of the water cycle.

Watersheds are regions defined by the flow of water from topographic highs to topographic lows. Watersheds range in size from small, contained basins to continental river systems. The Red River watershed lies at the top of the vast Hudson Bay watershed. As water flows through the system, it carries with it soil, rock, and other materials. This erosion is strongly influenced by living and dead vegetation.

Multi-Objective Projects and Practices

Many natural resource goals—protecting sensitive areas, reducing erosion, and re-establishing more natural stream flows—can be accomplished through integrated watershed projects. The *Red River Basin Flood Damage Reduction Working Group Agreement* contains specific natural resource and flood damage reduction goals (see back cover). It also briefly describes 17 flood damage reduction strategies, the majority of which could also significantly improve natural systems if designed and constructed with environmental goals in mind. This section discusses how these strategies can be used, either singly or in combination, to achieve the multiple goals of the *Agreement*.

DNR, L. Pulchalski

The strategies are divided into four functional groups, each focused on one of the principal ecosystems in the Basin, its role in the basin's hydrologic cycle, and the blueprint it provides for designing and siting projects. Although these ecosystems perform other hydrologic functions, the focus here is on their role in flood reduction alongside their other roles in sediment retention, purifying water, recharging aquifers, and providing food and shelter for the region's wildlife. Focusing on restoring these important functions through combinations of measures scattered throughout the watershed gives the best chance of achieving self-sustaining systems that efficiently meet the overall goals of reducing flooding and improving natural resources.

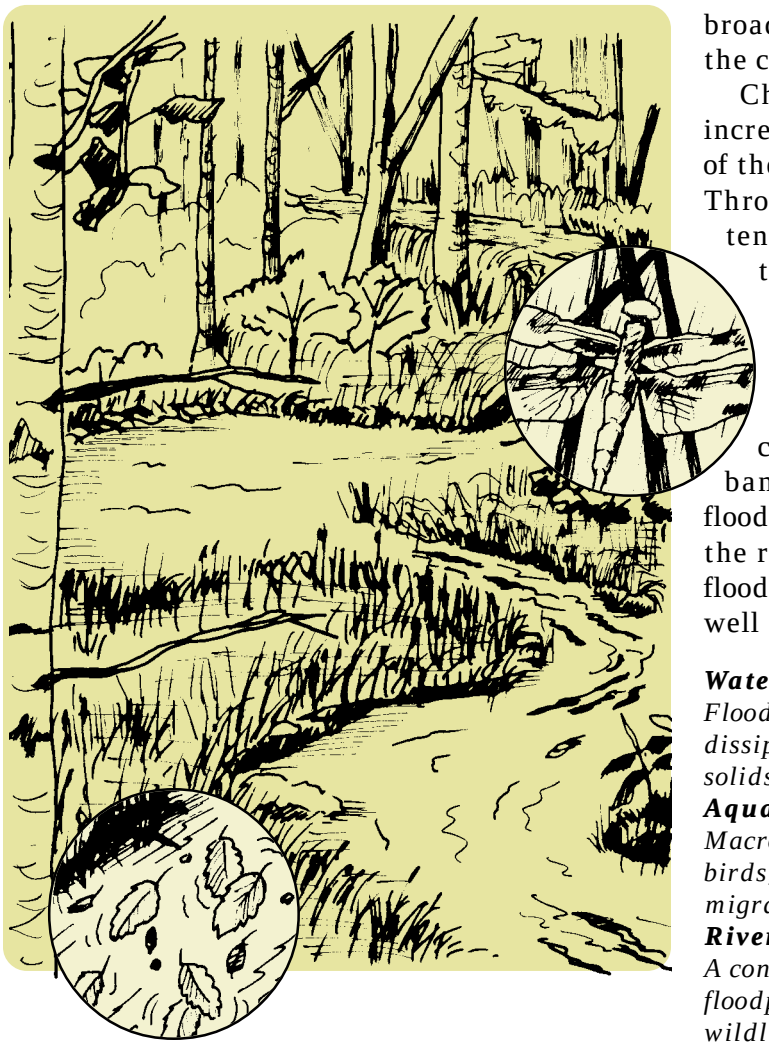
As stated elsewhere, this framework does not take the place of detailed assessment of the highly specific conditions, needs, and opportunities at hand. Expert assistance should be sought to determine the advisability of any of these strategies in meeting specific goals in specific areas.

Ecological system	Primary hydrologic function	Strategies
rivers and streams	water conveyance	– river restoration – setback levees
grasslands	water infiltration	– land retirement – land modifications
woodlands	evapotranspiration	– buffers
wetlands	water retention	– wetland restoration – flood storage wetlands – impoundments – storage easements

Streams and Rivers / Water Conveyance

Natural waterways reflect their watersheds in shape, in volume and speed of water, in distinct groups of plants and animals. In their upper reaches, streams flow intermittently and are generally eroding down to their rocky substrates. The middle reaches of streams grow in size and consistency of flow and develop riffles and pools. Different types of vegetation and wildlife inhabit these alternating sections of fast shallow water and slow deep water. In their lower reaches, rivers slow to a meander and deposit their sediment loads onto floodplains along the river channel.

The Basin's three regions form the different sections of this continuum. In the moraines, head–water streams are faster, rockier, and more wooded. In the beach ridges, the enlarged streams develop riffle areas interspersed with pools. On the flat lakeplain, the river meanders in tightly constricted loops, depositing sediment in the broad, fertile, and regularly flooded lands along the channel.



Channelization and land use changes have increased water conveyance and disrupted many of the natural processes described above. Throughout the Basin, channelized stretches tend to have reduced water retention ("travel") time in the channel, altered riffle-pool sequences, increased turbidity, restricted and unvegetated floodplain areas, unstable banks, and degraded habitats.

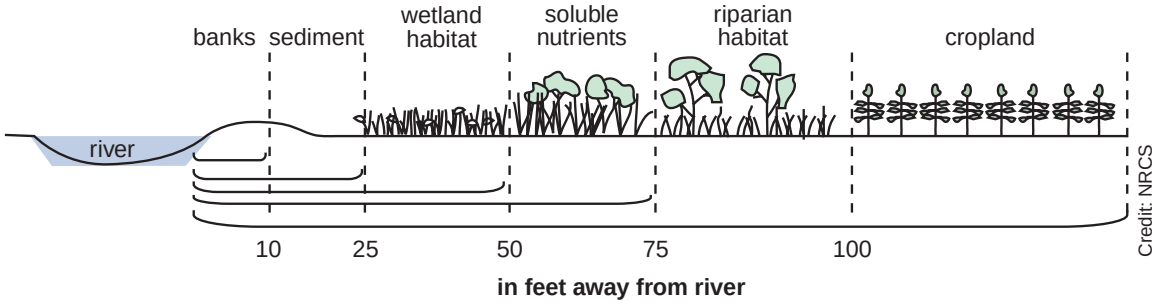
Strategies for water conveyance should consider the interaction of rivers, adjacent banks, floodplains, and wetlands. Expanding floodplain areas would increase the capacity of the river to store and move water, moderate flood pulses, and optimize sediment transport as well as provide wildlife habitat.

Water quality
Floodplain and riparian vegetation acts as a buffer to dissipate energy of moving water, drop suspended solids, and filters and absorbs dissolved substances.

Aquatic habitat
Macro-invertebrates, mussels, amphibians, water birds, and fish inhabit pools or riffle areas. Fish migrate upstream for spawning.

Riverine habitat
A continuous and diverse corridor of plants and floodplain features is essential habitat for many wildlife species.

Recommended Buffer Widths



Strategies to Manage Water Conveyance for Natural Resource Benefits

Project Types

River Corridor Restoration

Restoration of a river system means restoring channelized and diked streams to more natural dimensions, patterns, and profiles and to reconnect them to their floodplain and riverine areas. Re-establishing these natural characteristics restores critical ecological functions and stability.

Siting

- straightened or unstable streams
- lakeplain, below ridges and interlake region
- large drainage areas and perennial flows

Design criteria

- model on stable reference streams
- optimal width = 1.5 meander belt
- preserve/restore meanders and riffle/pool sequence
- incorporate isolated oxbows
- maintain or enhance base flows
- use native vegetation to stabilize streambank
- setback levees for flood storage may be required

USFWS, pp. 30–31
US Army COE, pp. 32–33; NRCS, pp. 34–35
DNR, pp. 38–39
BWSR, pp. 40–41; PCA, p. 37

Setback Levees

If dikes and levees are constructed too closely to a river, they may significantly affect flood levels and flows by decreasing floodway capacity and floodplain storage. Setback levees are constructed at a greater distance from the waterway.

Siting

- lower watershed, lakeplain
- to protect communities and farmsteads
- to protect farm fields from 10-year flood stage

Design criteria

- outside meander belt of stream
- design for overtopping for determined flood
- incorporate depressional areas
- design for internal drainage
- plant native species or compatible crops
- may be combined with off-channel storage

US Army COE, pp. 32–33
NRCS, pp. 34–35
BWSR, pp. 40–41

Conservation Practices

Filter Strips

Strips or areas of herbaceous vegetation to remove sediment and other pollutants transported by surface water runoff and wind. Filter strips are typically planted adjacent to streams, lakes, drainage ditches, wetlands, and calcareous fens. They may also be planted between cropland or disturbed land and environmentally sensitive land. Site specifications for plant species, buffer widths, buffer alignments, maximum watershed, and other factors vary according to goals and site conditions. May be designed to enhance wildlife and beneficial insects.

NRCS, pp. 34–35
BWSR, pp. 40–41

Grassed Waterways

A natural or constructed channel that is shaped or graded to convey water without erosion and protect water quality. Grassed waterways should be sited to avoid woodland and wetland habitats and may be used to connect habitat areas. May be used in conjunction with filter strips to improve water quality.

NRCS, pp. 34–35

Grasslands / Water Infiltration

Tallgrass prairies once covered a third of Minnesota. Only about one percent of these prairies still exists, making it our rarest and most fragmented ecosystem. Grasslands developed in flat, windy, and drier areas of the Basin. Porous soils, created by the dense root systems of prairie grasses, allow rainwater to penetrate quickly and deeply, replenishing groundwater supplies and reducing runoff.

Across the prairie, differences in the soil moisture and texture support distinct mixes of grasses, sedges, and flowering plants. This diversity allows the prairie to withstand periodic droughts and wet cycles and makes it reliable food and shelter for livestock and wildlife. Healthy prairies are dependent upon frequent fires to discourage woody plants and allow roots to send up lush new growth.

Human activities tend to increase the rate of runoff—paving, ditching, diking, compacting soils, deforestation—and prevent the replenishment of groundwater supplies. Land use practices that promote infiltration address these problems, while also reducing erosion and providing habitat. These practices also enhance the effectiveness and longevity of flood reduction activities and may increase farm income through incentive programs.

Water quality

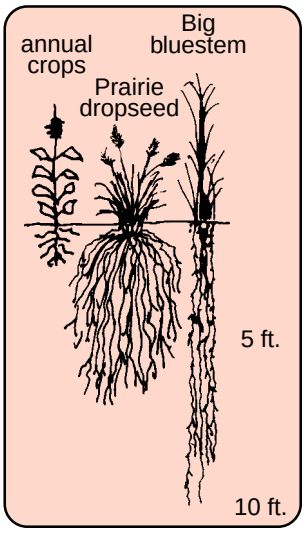
Prairie vegetation assimilates nutrients in runoff, effectively acting as both a nitrogen and carbon trap. Grasses in erodible areas help anchor soils and streambanks, preventing erosion and sedimentation.

Wildlife habitat

Many wildlife communities, including birds, are adapted to life in a treeless environment. Many grassland birds nest on the ground, and sing in the air or on stems of prairie grasses.

Other

Prairie soils play a major role in the carbon cycle. Frequent plowing releases carbon from the soil; re-establishing deep-rooted perennials helps store it.



The dense root systems of native grasses reach six feet or more underground and help maintain plants during wet and dry cycles. The roots are home to microbes and insects that turn deep glacial deposits into fertile soils and anchor them against wind and water erosion.

Water Infiltration Strategies

Project Types

Land Retirement

The conversion of cropland to grassland will usually significantly reduce runoff, particularly on more permeable soils. Land retirement addresses natural resource priorities of protecting and restoring prairie habitats, particularly if it also buffers or connects important natural resource areas.

Siting

- floodplain and floodprone areas
- beach ridges and wet prairies
- restore in proximity to remnant prairies
- permeable soils

Design criteria

- restore as prairie/wetland complexes
- larger is better
- interplant with native species
- use local native seeds and plants
- for prairie restoration, prescribed burns

USFWS, pp. 30–31; FSA, p. 36;
DNR, pp. 38–39

Land Use Modifications

Selecting land uses—including compatible crops or grazing—in floodplain, floodprone, or other areas that reduce runoff to downstream areas. Land uses are strongly influenced by economics and federal, state, and local policies.

Siting

- on or adjacent to problem areas
- adjacent to natural resource areas
- upper watershed

Design criteria

- perennial crops
- compatibility with flood conditions

NRCS, pp. 34–35; BWSR, pp. 40–41

Conservation Practices

Conservation Cover

Establishing and maintaining permanent vegetative cover to reduce soil erosion and sedimentation, improve water quality, and create or enhance wildlife habitat. To improve natural resource benefits: establish diverse native species; avoid disturbance during nesting season; minimize pesticide use to protect native pollinators, insect food sources, and other wildlife is encouraged.

NRCS, pp. 34–35; FSA, p. 36

Pasture Management

Establishment of long-term stands of forage plants to reduce erosion, increase infiltration, produce high-quality forage, and adjust land use. To improve natural resource values, use of diverse plant species, rotational grazing, and prescribed burns may be appropriate.

NRCS, pp. 34–35

Conservation Tillage

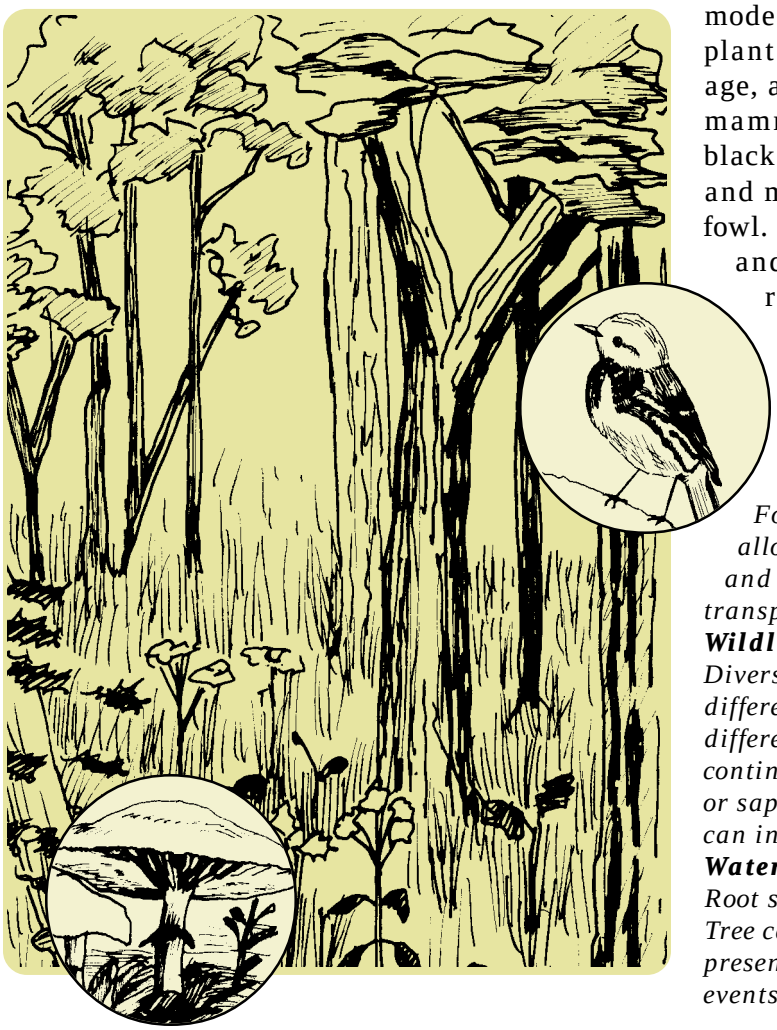
Managing the amount, orientation, and distribution of crop and other plant residues on soil surface year-round in order to reduce erosion; maintain or improve soil fertility; conserve moisture; and provide wildlife food and cover. Thirty percent crop residue is considered optimal for reducing erosion in the Red River Valley.

NRCS, pp. 34–35

Woodlands / Evapotranspiration

It is estimated that in the late 1800s, woodlands comprised as much as 40 percent of the Basin. Different types of woodlands grew in areas protected from the annual fires that blazed across the prairie—around natural firebreaks like rivers, wetlands, and lakes; in bands of brush prairies and savannas in the beach ridges; in dense, mixed forests on the steeper valley slopes. Woodlands, indeed all types of vegetation, are critical components in the hydrologic cycle. Evapotranspiration is the process in which precipitation either evaporates from the surface of the earth or is absorbed through plant roots before being vaporized back into the atmosphere. Most of the precipitation in the Basin, ranging from 16 to 24 inches annually, is returned to the atmosphere in this way.

Wooded communities provide many other services, including stabilizing soils and helping them retain moisture; storing and recycling nutrients; moderating light and temperature for aquatic plants and animals; providing thermal cover, forage, and hiding places for some of the larger mammals in the region, including moose, elk, black bear, cougar, and lynx; as well as breeding and migratory habitat for songbirds and waterfowl. Forests also play a role in moderating local and regional climate through regulation of rainfall, and globally through a process of carbon sequestration, which pulls carbon from the atmosphere and stores it in plant tissue.



Runoff reduction

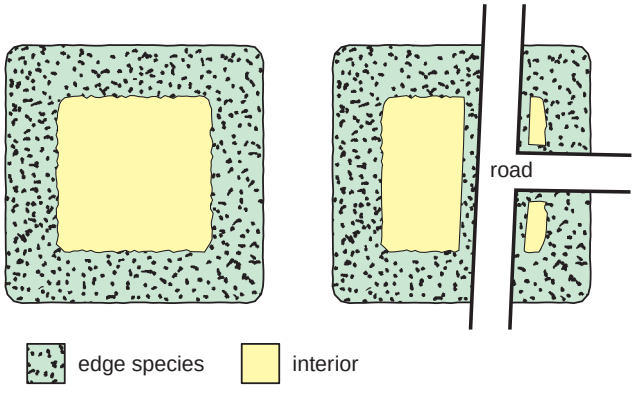
Foliage helps break the impact of downpour, allowing precipitation to percolate slowly into soil and gradually into streams. Trees also capture and transpire precipitation back into the atmosphere.

Wildlife habitat

Diverse woodlands provide habitat niches for different wildlife communities. The presence of different structural characteristics, such as continuous canopy, scattered openings, old growth, or saplings determine which species and how many can inhabit an area.

Water quality

Root systems stabilize soils and assimilate nutrients. Tree canopy intercepts and breaks up rain, and the presence of leaves helps prevent erosion during storm events.



The size and quality of habitat areas is essential to maintaining breeding populations of many species. Roads and other developments in natural areas create fragments that may be made up entirely of "edge habitat" that is more susceptible to nest predation and is only suitable for certain widespread species.

Evapotranspiration Strategies

Project Types

Buffers

Buffers are strips of grass, shrubs, and/or trees along or around waterbodies and other natural areas that act as a transition zone from human activities. They are widely considered the most important conservation strategy for agricultural landscapes because of their role in maintaining good water quality, regulating stream flow, and providing habitat as well as increasing transpiration. Numerous government agencies cover the costs of establishing and maintaining buffers as well as provide financial incentives to landowners.

The size and vegetation of a buffer should match the purpose, land uses, and topography of the site. In general, however, a wider buffer is more effective than a narrow one, though a narrow one is better than none at all! A buffer is especially important in areas that collect runoff and on steeper slopes. In agricultural areas, buffers of grass and shrubs can provide many of the benefits of a forested buffer without shading crops. Trees, however, do have some important advantages in preventing erosion, providing cover for birds and wildlife, and shading aquatic habitat in smaller streams. A diversity of native vegetation is preferable to non-native plants.

Riparian Forest Buffer

An area of predominantly trees or shrubs located adjacent to and up-gradient from watercourses or water bodies to reduce excess sediments, lower water temperature, create habitat, provide harvestable crop protect against scour erosion in the floodplain, and other purposes. Minimum widths are established to provide different benefits. To increase natural resource benefits, favor a diversity of native species and design layout, density, and location to complement natural features and mimic natural riparian forests.

Siting

- along all watercourses, including ditches
- to connect streams with wetlands
- around wetlands and lakes
- on erodible or frequently flooded land

Design criteria

- 20–200 feet wide based on land use and topography
- plant appropriate native vegetation
- manage to control exotics
- use bioengineering to stabilize streambanks

FSA, p. 36; NRCS, pp. 34–35
BWSR, pp. 40–41; PCA, p. 37

Conservation Practices

Farm Shelterbelts

Plantings of trees and shrubs to shelter structures and livestock from wind, snow, visual and noise disturbances, and to provide wildlife habitat. To improve natural resource values, all plantings should complement natural features and be diverse enough to avoid loss of function due to species-specific pests.

NRCS, pp. 34–35

Field Windbreaks

Plantings of single or multiple rows of trees and/or shrubs or sets of linear plantings to reduce wind erosion, protect plants from wind damage, provide wildlife habitat and corridors, prevent airborne chemical drift, and other purposes. In general, windbreaks should be oriented as close to perpendicular to the troublesome wind as possible and should be regularly maintained.

NRCS, pp. 34–35

Wetlands / Water Retention

Wetlands are the zone between dry land and deep water where soils are saturated or covered with shallow water at least part of the year. The varying glacial deposits in the Basin and water fluctuation, including its depth, duration, frequency, and flow patterns, determine the type of wetland that develops, including its physical and chemical processes and its biological communities. Changes in water fluctuation can cause significant changes—positive or negative—in species richness and productivity and other wetland characteristics.

Where there are many in a watershed, wetlands usually slow down, store, and significantly reduce or de-synchronize runoff from small, more frequent flood events. Most wetland functions, including water retention, work only as part of complex systems. Rainfall, snowmelt, and floodwaters are slowed and tamed most effectively by a combination of wet meadows which decrease the speed of snowmelt or stormwater runoff and deeper marshes, which then store the slowed water that flows into them.

Impoundments are generally designed to maximize flood storage but can be designed to improve natural resources. Siting and operating plans are critical to meeting natural resource concerns. While all retention strategies should be considered, the greatest natural resource benefits will result from projects that most resemble natural structures and dynamics.

Water quality

Wetland vegetation and substrates trap and cycle nutrients, limiting their entry into rivers and lakes. Plants also reduce erosion by anchoring soils along shorelines and breaking current and wave energy.

Wildlife habitat

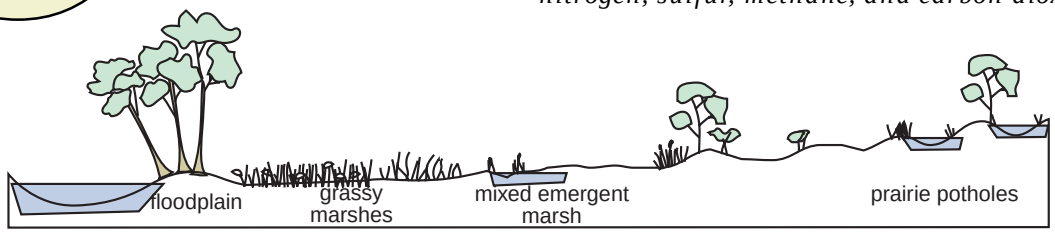
Invertebrates, bacteria, algae, fungi, and plankton plants are the base of a food web that extends to amphibians, reptiles, fish, waterfowl, songbirds, fur-bearers, and white-tailed deer. A high percentage of endangered species rely on wetland habitats.

Groundwater supply

Some wetlands recharge groundwater to supply drinking water to wells and augment the flow of spring- and seepage-fed streams.

Other

Wetlands may be significant in global cycles of nitrogen, sulfur, methane, and carbon dioxide.



Different types of wetlands formed in the varying glacial deposits of the Red River Basin. Grassy marshes or swamps with trees or shrubs typically form on the flat floodplains of rivers. Prairie pothole marshes develop in depressions in the glacial moraines. Fens discharge groundwater at the base of the beach ridges, bogs stretch for miles across the flat glacial plain. Riverine wetlands form linear strips through the landscape.

Water Retention Strategies

Project Types

General guidelines for siting
- identify priority watershed sites
- use previously drained wetlands
- connect with other natural areas
- behind beach ridges

General guidelines for design
- limit the frequency, duration, and height of inundation in the growing and nesting seasons;
- design with irregular shorelines;
- consider size for habitat and other spatial needs
- maintain 50–150 feet native perennial buffer
- monitor for exotics, erosion, project objectives

Wetland Restoration

Wetland restoration is defined as actions taken in a converted or degraded natural wetland to re-establish natural functions and that lead to a well-integrated and self-sustaining ecosystem. Restoration should result in the historic type of wetland but may not result in historic biological communities. Planning should include functional objectives and performance standards to measure success.

Siting
- previously drained wetlands
- wetland complex areas
- in protected, buffered areas

Design criteria
- restore natural hydrology by breaking tile, etc.
- maintain wide native perennial buffer
- mulch with litter, detritus, seed, and native roots for optimum diversity
- monitor re-colonization by plants and animals
- evaluate rehabilitation of structure/function
- pre-treat water with buffer, settling ponds, etc.

USFWS, pp. 30–31; FSA, p. 36; NRCS, pp. 34–35; BWSR, pp. 40–41; DU, p. 42

Flood Storage Wetlands

Small, dispersed retention structures created to store temporary floodpools of limited depth and detention time. They can be used to control spring runoff and damage from frequent summer storm events. During the growing season, they are managed to balance natural resource and flood reduction benefits. When combined with other measures, they can help stabilize regional hydrology and increase wildlife habitat.

Siting
- drained or poor quality wetlands
- in developed/converted areas
- in key runoff areas
- avoid existing wetlands

Design criteria
- designed to capture and hold surface runoff
- gated outlet for water level management
- maintain medium width perennial buffer
- 2-foot bounce per 3.5 inch summer rainfall
- 10-day duration per 3.5 inch summer rainfall
- manage for waterfowl/shorebirds resting and feeding

USFWS, pp. 30–31; FSA, p. 36; NRCS, pp. 34–35; BWSR, pp. 40–41; DU, p. 42

Impoundments

Wet dams, dry dams, and off-channel impoundments are important components of watershed management. These projects are primarily for floodwater storage but can be designed to minimize upstream and downstream disturbances. Whether the project has beneficial effects on natural resources depends on the resources provided, affected, or avoided at a given site.

Siting
- to effect key runoff areas
- along ditches or channelized streams
- highly altered sites

Design criteria
- see general guidelines above
- storage depth and duration based on downstream channel capacity
- operate to improve migratory habitat for shorebirds and waterfowl

COE, pp. 32–33; NRCS, p. 34–35; Watershed FDR programs

Water Retention Strategies continued on next page

Water Retention Strategies continued from page 27

Storage or Flowage Easements

The purchase of temporary or permanent easements from interested landowners allows their land to be used for flowage or flood storage.

Siting

- frequently flooded areas

Design criteria

- utilize landscape features to store water
- use compatible crops or grazing
- use dikes or outlet controls if appropriate or necessary

BWSR, p. 41

Conservation Practices

Water and Sediment Control Basins

An earth embankment or a combination of ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin. This practice can improve farmability of sloping land, reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff, and improve downstream water quality.

NRCS, pp. 34–35

DNR, C. Henderson

Rose-breasted Grosbeak

DNR, R. Dana

Prairie Smoke

RESOURCE: *WATER*

Practices	Conservation Cover	Conservation Tillage	Farmstead Shelterbelt	Field Windbreak	Filter Strip	Grass Waterway	Pasture/Hayland Management	Water/Sediment Basins
Concerns								
Off-site Sediment Deposition	sl-signif decrease	sl-mod decrease	slight decrease	sl-mod decrease	sl-mod decrease	mod-signif decrease	sl-signig decrease	signif decrease
Groundwater Nutrients/Organics	sl-mod decrease	negligible	negligible	negli-sl increase	negli-sl increase	negli-sl increase	sl-mod decrease	mod increase
Surface Water Nutrients/Organics	sl-signif decrease	sl-signif decrease	negligible	negli-sl decrease	slight decrease	sl-mod decrease	sl-mod decrease	sl-signif decrease

Run-off/Flooding: water accumulates on the surface of the land
Off-site Sediment Deposition: water quantity that affects drainage ditches, road ditches, and culverts
Groundwater Pesticides: water pollution problems from pesticides (all chemicals used to manage weeds, insects and diseases)
Groundwater Nutrients/Organics: water pollution from human induced or natural nutrients (N, P, K, Ca, Na, Mg and from animal and other wastes)
Surface Water Pesticides: surface water pollution problems from pesticides (all chemicals used to manage weeds, insects, and diseases)
Surface Water Nutrients/Organics: surface water pollution problems that result from the use of all applied plant nutrients with emphsis on phosphorous plus animal and other wastes
Aquatic Habitat Suitability: pollution of open water, benthic, or streambed embryo habitat

USDA-Natural Resources Conservation Service, 2001

Natural Resource Organizations, Programs, Funds, and Contacts

Below are the federal, state, and local agencies and groups with natural resource objectives in the Red River Basin. These organizations may be able to provide information and expertise, funding assistance, and other services needed to design, build, and manage the types of integrated projects described.

United States Fish and Wildlife Service
Mississippi Headwaters / Tallgrass Prairie Ecosystem
www.fws.gov

Goals

1. Since humans and most fish and wildlife trust species depend upon aquatic systems, we will strive to restore, enhance, and protect water quality and quantity that approaches natural hydrologic functions.
2. Restore, enhance, and protect high quality and rare resources, especially threatened and endangered species, to increase or maintain biodiversity.
3. Restore, enhance, and protect important habitats/communities to minimize the loss, degradation, and fragmentation of habitats essential for fish and wildlife species.
4. Improve public understanding of fish and wildlife resources and issues with an emphasis on trust resources, increase public involvement in fish and wildlife conservation, and create or improve partnerships to accomplish common resource goals.

Related Programs

Wetland Restoration on CRP Lands
Purpose: To restore small wetlands on CRP lands in cooperation with NRCS. USFWS provides surveying, planning, and construction assistance.
Eligibility: Landowners with CRP contracts and willing to commit until contract terminates.
Contact: John Braastad, Assistant State Coordinator, Partners for Fish and Wildlife Program
Phone: (218) 449-4115 *Email:* john_braastad@mail.fws.gov

Partners for Fish and Wildlife Program
Purpose: To assist private landowners in restoring wetlands, riparian areas, and grasslands through voluntary agreements, technical assistance, and cost-sharing on projects.
Eligibility: All landowners.
Contact: Lance Kuester, State Coordinator
Telephone: (320) 253-4682 *Email:* lance_kuester@mail.fws.gov

National Wildlife Refuges and Wetland Management Districts
Purpose: To administer a national network of lands and waters for the conservation, management, and restoration of fish, wildlife, and plant resources and their habitats for the benefit of present and future generations of Americans. Each office can provide technical assistance to landowners and local units of government.
Eligibility: N/A
Contact: Don Hultman, Refuge Supervisor
Telephone: (612) 713-5411 *Email:* don_hultman@mail.fws.gov

North American Wetland Conservation Act
Purpose: To enhance, restore, and protect wetland resources of the U.S. for the benefit of migratory birds and other wildlife through partnerships with private, corporate, and government conservation interests.
Eligibility: Through grant proposals.
Contact: Barbara Pardo, Wildlife biologist
Telephone: (612) 713-5480 *Email:* barbara_pardo@mail.fws.gov

Northern Tallgrass Prairie Habitat Protection Area
Purpose: To protect, restore, and enhance remaining tallgrass native prairie in western Minnesota and Iowa through cooperative agreements, easements, and acquisition.
Eligibility: All interested landowners.
Contact: Ron Cole, Project Leader, Big Stone National Wildlife Refuge
Telephone: (320) 273-2191 *Email:* ron_cole@mail.fws.gov

Ecological Services
Purpose: To provide technical assistance and regulatory oversight on projects affecting wetlands, and to enhance habitat for threatened and endangered species.
Eligibility: Other agencies, the state, private landowners.
Contact: Russ Peterson, Field Supervisor
Telephone: (612) 725-3548 *Email:* russ_peterson@mail.fws.gov

Habitat and Population Evaluation Team (HAPET)
Purpose: To provide information based on GIS and remote sensing technology on wetland conditions and waterfowl breeding and production in prairie wetland areas.
Eligibility: N/A
Contact: Rex Johnson, Team Leader
Telephone: (218) 736-0606 *Email:* rex_johnson@fws.gov


DNR, C. Henderson
DNR
DNR
Wildlife recreation in the Red River Basin

United States Army, Corps of Engineers / St. Paul District
Project Management and Development Branch
www.mvp.usace.army.mil/

Goals

No specific goals or objectives for natural resources in the Basin. However the Corps has incorporated ecosystem restoration as a project purpose within the Civil Works program. Any project in the Red River Basin with which the Corps becomes involved has the potential to incorporate specific environmental enhancement or restoration goals.

Related Programs

Water Resources Development Act: Section 206

Purpose: To provide federal cost-share funding for the COE to undertake aquatic habitat restoration projects in rivers, lakes, and wetlands in partnership with state and local governments.
Eligibility: Public and private agencies meeting requirements of cost-sharing and local cooperation.
Contact: Tom Crump, St. Paul District, COE
Telephone: (651) 290-5284 *Email:* thomas.l.crump@usace.army.mil

Water Resources Development Act: Section 1135

Purpose: To provide federal cost-share funding for the COE to undertake fish and wildlife habitat restoration in projects constructed by the COE or sites affected by a COE project.
Eligibility: State and local agencies, tribes, and private entities with sufficient legal and financial authority to comply with all assurance items.
Contact: Tom Crump, St. Paul District, COE
Telephone: (651) 290-5284 *Email:* thomas.l.crump@usace.army.mil

Water Resources Development Act: Section 212 / Challenge 21 Program

Purpose: To provide federal cost-share funding for the COE to undertake flood hazard reduction and riverine restoration projects which emphasize nonstructural approaches for flood reduction. The Red River is one of 23 priority areas nationwide. At present, this program is not funded.
Eligibility: State and local agencies and federally recognized tribes.
Contact: Charles Spitzack, St. Paul District, COE
Telephone: (651) 290-5307 *Email:* charles.p.spitzack@usace.army.mil

Water Resources Development Act: Section 22/Planning Assistance to States

Purpose: To provide technical expertise to non-federal partners to address water resources concerns. Potential uses include wetland evaluations, cultural resources studies, nutrient studies, river spill response planning, and other data collection and analyses.
Eligibility: States and federally recognized tribes.
Contact: Terry Engel, St. Paul District, COE
Telephone: (651) 290-5287 *Email:* terry.j.engel@usace.army.mil

Emergency Bank Protection: Section 14 of Flood Control Act
Purpose: To permit construction of bank protection works to protect important and essential public facilities (e.g., highways, wastewater facilities); non-profit services (e.g., hospitals, schools); and cultural resource sites that are endangered by flood-caused bank or shoreline erosion.
Eligibility: State and local agencies and federally recognized tribes.
Contact: Tom Crump, St. Paul District, COE
Telephone: (651) 290-5284 *Email:* thomas.l.crump@usace.army.mil

Support for Others' Program
Purpose: To provide COE technical expertise to states, local governments, or tribes to meet specialized and technical needs in planning, environmental assessment and compliance, engineering and design, construction management, etc.
Eligibility: Federal, state, and local agencies and federally recognized tribes.
Contact: Russ Snyder, St. Paul District, COE, Project Management and Development Branch
Telephone: (651) 290-5429 *Email:* russel.k.snyder@usace.army.mil

Specifically Authorized Projects
Purpose: Congressional authorization to address needs and opportunities that are outside the scope or limits of existing COE programs. Examples include basin-wide water resource studies or environmental restoration projects that exceed the funding limits of Section 206 or 1135.
Eligibility: State and local agencies and federally recognized tribes.
Contact: Charles Spitzack, St. Paul District, COE
Telephone: (651) 290-5307 *Email:* charles.p.spitzack@usace.army.mil

Clean Water Act, Section 404
Purpose: To protect the physical, chemical, and biological integrity of our nation's waters by regulating fill and discharges of dredged material in waters of the United States, including wetlands.
Eligibility: Any fill activity affecting more than one-third of an acre may require an individual permit. Activities less than one-third acre may be covered by existing general permits.
Contacts: Leo Grabowski
Telephone: (218) 829-8402 *Email:* leonard.a.grabowski@usace.army.mil
Joe Yanta
Telephone: (651) 290-5362 *Email:* joseph.j.yanta@usace.army.mil


DNR, R. Dana
Regal Fritillary


DNR, C. Henderson
Bald Eagle

United States Department of Agriculture
Natural Resources Conservation Service
www.nrcs.gov/

Goals

The mission of the NRCS is to provide USDA technical leadership, working in partnership with local, state, and other federal conservation agencies and organizations, to help people conserve, improve, and sustain our natural resources.

Guiding principles are:

- Champion voluntary and incentive-based approaches to solving natural resource and environmental concerns on private lands;
- Provide timely conservation leadership and teamwork that is valued by our customers, partners, and public officials; and
- Provide conservation assistance using sound science and technology contained in each local Field Office Technical Guide.

Key activities in the Red River Basin are:

- Providing small watershed planning, technical, and financial assistance (PL-566)
- Carrying out technical responsibilities for CRP. There are over 600,000 acres of cropland in CRP contracts in the Red River Basin in Minnesota.
- Working with The Nature Conservancy to develop and implement the Wetland Reserve Program contract in their Glacial Ridge unit.

Related Programs

General contact in the Basin: Glen Kajewski, Assistant State Conservationist
Telephone: (218) 681-6600, Extension 101 *Email:* gak@mn.usda.gov

For information and assistance at the county level, interested parties should contact their local NRCS office.

National Conservation Buffer Initiative

Purpose: To encourage the use of conservation buffers by agricultural producers and other landowners in both rural and urban settings by providing financial incentives available through USDA conservation programs—the continuous Conservation Reserve Program (CRP) sign-up, Environmental Quality Incentives Program (EQIP), Wildlife Habitat Incentives Program (WHIP), general CRP, Wetlands Reserve Program (WRP), and Stewardship Incentive Program (SIP).
Eligibility: See specific programs below.

Wetland Reserve Program (WRP)

Purpose: To provide technical and financial support to help landowners with their wetland restoration efforts in order to achieve the greatest wetland functions and values.
Eligibility: Private landowners of areas that are restorable, including farmed wetlands, prior-converted cropland, riparian areas which link protected wetlands, lands adjacent to protected wetlands, and other areas.

Wildlife Habitat Incentives Program (WHIP)

Purpose: To provide technical assistance and up to 75 percent cost-share to establish and improve fish and wildlife habitat. WHIP agreements generally last from five to 10 years.
Eligibility: Landowners or managers of qualifying lands.

Watershed and River Basin Planning and Installation / Public Law 83-566 (PL566)
Purpose: To provide technical and financial assistance for watershed projects including flood prevention; water quality improvements; soil erosion reduction; rural, municipal, and industrial water supply; irrigation water management; sediment control; fish and wildlife habitat enhancement; wetlands creation or restoration; and public recreation.
Eligibility: Legally-organized entities with the authority to install, operate, and maintain works of improvement in watersheds less than 250,000 acres.

Emergency Watershed Protection Program (EWP)
Purpose: To assist groups of people, such as a city, township, county, or watershed district to respond to emergencies created by natural disasters. This program includes various easement and land use options.
Eligibility: State, township, county, special district, or city and individual landowners in floodplains.


DNR, C. Henderson
Richardson's Ground Squirrel

Environmental Quality Incentives Program (EQIP)
Purpose: To provide educational, technical, and up to 75 percent cost-share assistance to install or implement structural, vegetative, and management practices on agricultural land. Most EQIP contracts are for five to 10 years.
Eligibility: Persons engaged in livestock or agricultural production. Eligible land includes cropland, rangeland, pasture, forestland, and other farm or ranch lands where the program is delivered.

Resource Conservation & Development Program (RC&D)
Purpose: To provide a variety of services aimed at accelerating the conservation, development, and utilization of natural resources in authorized RC&D areas. The program provides grants for land conservation, water management, community development, and environmental needs.
Eligibility: State, tribal, and local units of government and local nonprofit organizations in RC&D areas designated by the Secretary of Agriculture.

Conservation Plant Material Centers
Purpose: To provide native plants to help solve natural resource problems, including biomass production, carbon sequestration, erosion reduction, and other conservation treatment needs.
Eligibility: State and federal agencies, commercial businesses, and seed and nursery associations.

Conservation Technical Assistance (CTA)
Purpose: To assist in planning and implementing conservation systems.
Eligibility: Units of state and local government and other federal agencies.

United States Department of Agriculture
Farm Service Agency
www.fsa.usda.gov

Goals

1. To provide assistance to all eligible participants in rural America, through the use of all available programs and resources. Emphasis in Red River Ecoregion is on development of projects for soil and water conservation, wetland preservation, wildlife habitat cover benefits, and environmental enhancement consistent with exiting law and department regulations.
2. To develop, in cooperation with state and federal agencies, conservation and environmental priority areas in the State of Minnesota and the Red River Ecoregion, which assist and complement FSA program delivery and usage. Delivery of these programs will utilize, to the extent possible, funding from federal agencies plus state and private sources, to develop projects within the comprehensive planning process. FSA will also carry out implementation of its programs outside the framework of the *Red River Basin Flood Damage Reduction Working Group Agreement*, as these programs apply to soil conservation and natural resource enhancement, in the region and state.

DNR, C. Henderson

Ruddy Turnstone

3. To participate as an active work group member in developing usage of FSA programs in resource management in the Red River Basin and to involve state office, district, and county staff in delivery of FSA programs as they relate to the *Agreement*.

Related Programs

Conservation Reserve Program (CRP)

Purpose: To enroll eligible cropland acres in a program providing conservation and environmental benefits, based on a contract conservation plan. Typical contract length is 10 or 15 years.
Eligibility: Record landowners, through an application process either during scheduled sign-up periods or—for some types of projects—throughout the year. Various signup or conservation eligibility requirements apply.
Contact: Individual landowners/producers should contact the FSA county office serving the area.

Conservation Reserve Enhancement Program (CREP)

Purpose: A special project area combining CRP with other federal or state conservation incentives. New CREP areas may be proposed and developed within the state through a comprehensive planning process involving federal, state, and private funding incentives. The only Minnesota CREP area presently formed is in the Minnesota River drainage basin.
Eligibility: Through application by individual landowners/producers within the prescribed CREP area.
Contact: Individual landowners/producers should contact the FSA county office serving the area.

Environmental Quality Incentives Program (EQIP)

Purpose: A joint program with the Natural Resources Conservation Service (NRCS) to provide cost-share funding and technical assistance for projects having environmental benefits.
Eligibility: Through application by individual landowners. Applications are ranked based on environmental criteria by a work group.
Contact: Local NRCS and FSA offices serving the area.

Minnesota Pollution Control Agency
Red River Basin Region
www.pca.state.mn.us

Goals

1. To help Minnesotans protect their environment by monitoring environmental quality, enforcing environmental regulations, and providing technical assistance.
2. To reduce pollutant loading from industries, municipalities, and individuals in order to protect human health and the environment.
3. To limit phosphorus in the surface waters of the state.
4. To protect the Red River as a drinking water source.
5. To protect and restore the quality of surface waters in the Basin.

Related Programs

Red River Basin Water Quality Plan

Purpose: To provide a planning and implementation framework for protecting and enhancing the water quality of the Red River. The plan names sedimentation as the water quality issue of concern for the Red River and recommends numerous strategies for reducing sedimentation. The Plan establishes advisory teams of stakeholders to meet routinely, review water quality issues, and recommend and advocate solutions.
Eligibility: N/A
Contact: Molly MacGregor, Red River Basin Coordinator
Phone: (218) 846-0494 *Email:* molly.macgregor@pca.state.mn.us

Clean Water Partnership Program

Purpose: Grant and loan program for watershed projects focused on the protection or restoration of Minnesota water resources. Both diagnostic and implementation projects are eligible for funding.
Eligibility: Local units of government.
Contact: Jim Ziegler, Supervisor, CAW Unit
Telephone: (218) 846-0731 *Email:* james.ziegler@pca.state.mn.us

319 Grant Program

Purpose: Federal water quality grant program aimed at nonpoint source pollution abatement. The program funds both implementation and demonstration projects.
Eligibility: Local units of government and private organizations.
Contact: Jim Ziegler, Supervisor, CAW Unit
Telephone: (218) 846-0731 *Email:* james.ziegler@pca.state.mn.us

Citizen Lake Monitoring Program

Purpose: To support citizen lake water quality monitoring and education.
Eligibility: Anyone interested in monitoring a lake in Minnesota.
Contact: Jennifer Klang, CLMP Coordinator
Telephone: (651) 282-2618 *Email:* jennifer.klang@pca.state.mn.us

Citizen Stream Monitoring Program

Purpose: To provide citizen stream water quality monitoring and education as well as technical assistance and support for the Red River Valley River Watch Project.
Eligibility: Anyone interested in monitoring a stream in Minnesota.
Contact: Laurie Sovell, CSMP Coordinator
Telephone: (507) 389-1925 *Email:* laurie.sovell@pca.state.mn.us

Minnesota Department of Natural Resources
www.dnr.state.mn.us

Goals

1. ***Prairies:*** To protect all remaining prairie tracts and develop a series of large and connected prairie complexes in the beach ridges and inter-beach wet prairies. Properly site new gravel pits, based on comprehensive mining plans, and restore mined-out areas to natural conditions.
2. ***Agricultural lands:*** To hold soil erosion to levels less than "T", by establishing permanent vegetative cover on roadsides and ditch banks and assisting landowners establish tree cover. Maintain wildlife cover in woodlots and shelter belts for a host of farmland wildlife species.
3. ***Aspen Parkland and Brushlands:*** To restore prairies, brushlands, fens, and woodlands in large blocks (ideally 2,000 or more acres) and manage with prescribed burns.
4. ***Recreation:*** To cooperate in recreation/education programs in local communities and parks with emphasis on providing suitable access to rivers and streams and native prairies.
5. ***Rivers:*** To sustain water flow in natural vegetated streams and rivers to keep fish populations safe, keep oxbows full for wildlife needs, and to provide season-long recreational boating. Remove artificial barriers to fish migration where appropriate.
6. ***Lakes:*** To provide private shoreline owners with guidance in managing aquatic resources. Reduce populations of the most harmful aquatic exotic or invasive species and prevent new introductions.
7. ***Wetlands:*** To maintain a substantial component of diverse sizes and types of wetlands in large complexes across the watershed, including seepage zones within the beach ridges. Restore or mitigate all drained wetlands on state lands.
8. ***Forests:*** To enlarge and protect Minnesota's forestland and manage for structural and plant species diversity. Connect forest habitats with natural corridors.

DNR, C. Henderson

White Lady Slipper

Related Programs

Critical Habitat Private Sector Matching Program

Purpose: To provide cost-share assistance for acquiring and developing critical fish and wildlife habitat. Matching contributions may be in cash, land, easements, or a pledges.
Eligibility: Individuals and groups.
Contact: Kim Hennings
Telephone: (651) 297-2823 *Email:* kim.hennings@dnr.state.mn.us

Natural and Scenic Area Grant Program

Purpose: To increase, protect, and enhance natural and scenic areas through acquisition of lands that contain outstanding natural resource value.
Eligibility: Cities, counties, townships, and school districts.
Contact: Joe Hiller
*Telephone: (*651) 296-4891 *Email:* joe.hiller@dnr.state.mn.us

Wetlands Tax Exemption Program

Purpose: To provide financial incentives, in the form of property tax exemptions, for maintaining wetlands in their natural state.
Eligibility: Private landowners.
Contact: Bruce Gerbig
*Telephone: (*651) 296-0515 *Email:* bruce.gerbig@dnr.state.mn.us

Minnesota Department of Natural Resources

Supplemental Private Lands Program
Purpose: To encourage wetland restoration, prairie restoration, and brushland shearing/ burning.
Eligibility: Private landowners.
Contact: Jim Breyen
*Telephone: (*218) 755-3958 *Email:* jim.breyen@dnr.state.mn.us

Minnesota Native Prairie Bank Conservation Easement Program
Purpose: To purchase conservation easements on privately owned native prairie.
Eligibility: Private landowners.
Contact: Peter Buesseler
*Telephone: (*218) 739-7576 *Email:* peter.buesseler@dnr.state.mn.us

Prairie Stewardship Planning Assistance
Purpose: To provide planning and technical assistance from private sector consultants and organizations on managing and improving prairie.
Eligibility: Private landowner with at least five acres of native prairie.
Contact: Peter Buesseler
*Telephone: (*218) 739-7576 *Email:* peter.buesseler@dnr.state.mn.us

Native Prairie Tax Exemption Program
Purpose: To conserve native prairie by providing property tax exemptions on approved native prairie lands.
Eligibility: Private landowners located in a program-eligible county.
Contact: Peter Buesseler
*Telephone: (*218) 739-7576 *Email:* peter.buesseler@dnr.state.mn.us

Natural Heritage and Nongame Research Program
Purpose: To aid in the conservation of native species and plant communities by providing information on the location of known rare species and high quality plant communities.
Eligibility: Any agency involved in land use planning.
Contact: Janet Boe
Telephone: (218) 755-4421 *Email:* janet.boe@dnr.state.mn.us

Conservation Partners Grant Program
Purpose: To fund research, surveys, and projects that enhance fish, wildlife, and native habitats.
Eligibility: Private organizations, counties, cities, townships, and school districts.
Contact: Jeff Asfoor
*Telephone: (*218) 755-3954 *Email:* jeff.asfoor@dnr.state.mn.us

Community Environmental Partnership Grant Program
Purpose: To provide funds for environmental service projects and related educational activities.
Eligibility: Private organizations, counties, cities, townships, and school districts.
Contact: Jeff Asfoor
*Telephone: (*218) 755-3954 *Email:* jeff.asfoor@dnr.state.mn.us

Minnesota Board of Soil and Water Resources
www.bwsr.state.mn.us

Mission and Strategies

Mission: To assist local governments to manage and conserve their irreplaceable water and soil resources.

Strategies:

- To encourage local resource planning and protection efforts.
- To support local resource management activities.
- To develop and maintain the capacity to deliver competent service to local units of government.

Related Programs

Comprehensive Local Water Planning Programs

Purpose: To assist counties, watershed districts, and metro water management organizations to coordinate the development, adoption, and implementation of local water plans for the protection and management of water and related land resources. Includes Local Water Planning Base and Challenge Grants.
Eligibility: Minnesota counties, watershed districts, and metro water management organizations.
Contact: Marybeth Block
Telephone: (651) 297-7965 *Email:* marybeth.block@bwsr.state.mn.us

State Cost-Share Program

Purpose: To provide financial assistance (up to 75 percent cost-share) and technical assistance through SWCDs to reduce soil erosion and sedimentation and to protect and improve water quality.
Eligibility: Private landowners with existing high priority soil conservation and water quality management problems.
Contact: Wayne Zellmer
Telephone: (651) 297-7361 *Email:* wayne.zellmer@bwsr.state.mn.us

Special Project Cost-Share

Purpose: To provide cost-share funding through SWCDs for eligible large or innovative conservation practices and projects that reduce soil erosion and sedimentation and protect and improve water quality. Part of the State Cost-Share Program.
Eligibility: Private landowners with existing erosion and water quality management problems, based on an annual, statewide competitive process.
Contact: Wayne Zellmer
Telephone: (651) 297-7361 *Email:* wayne.zellmer@bwsr.state.mn.us

Feedlot Water Quality Management Cost-Share Program

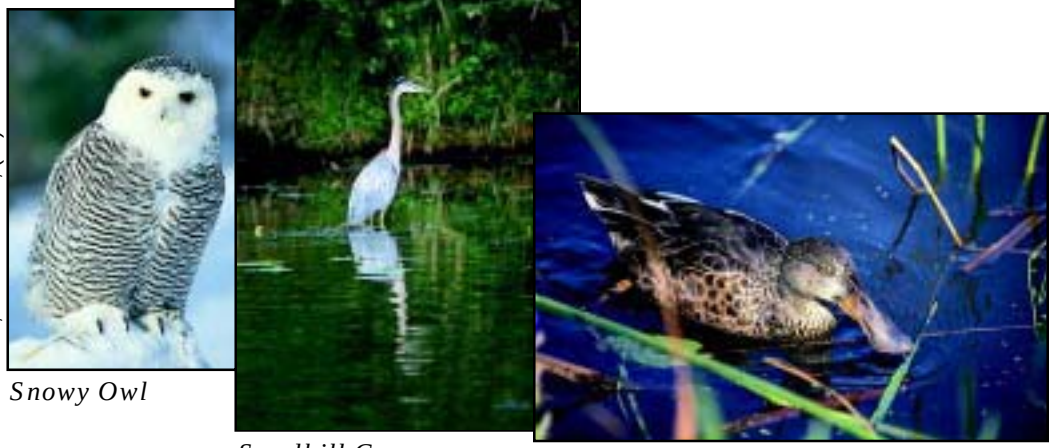
Purpose: To provide financial assistance (up to 75 percent cost-share) and technical assistance through SWCDs for eligible cost-share practices to solve existing feedlot water quality management problems.
Eligibility: Private landowners with existing feedlot water quality management problems, based on an annual, statewide competitive process.
Contact: Wayne Zellmer
Telephone: (651) 297-7361 *Email:* wayne.zellmer@bwsr.state.mn.us

Reinvest in Minnesota Reserve Program (RIM)
Purpose: To reduce erosion, protect, and improve water quality, and enhance fish and wildlife habitat by acquiring conservation easements on environmentally sensitive private lands.
Eligibility: Private landowners with eligible lands, based on program priorities and a local screening process lead by SWCDs.
Contact: Tim Fredbo
Telephone: (651) 296-0880 *Email:* tim.fredbo@bwsr.state.mn.us

Permanent Wetland Preserves Program (PWP)
Purpose: To protect existing, high priority, at-risk wetlands on private lands.
Eligibility: Private landowners with eligible lands, based on program priorities and a local screening process lead by SWCDs.
Contact: Tim Fredbo
Telephone: (651) 296-0880 *Email:* tim.fredbo@bwsr.state.mn.us

Nonpoint Engineering Assistance Program (NPEA)
Purpose: To provide engineering assistance through SWCDs for investigation, design, and construction of nonpoint best management practices on private lands.
Eligibility: Private landowners with existing nonpoint pollution problems, based on program and member SWCD priorities, including comprehensive local water plan priorities.
Contact: Al Kean
Telephone: (651) 297-2907 *Email:* al.kean@bwsr.state.mn.us

Flood Storage Easements Pilot Program
Purpose: To investigate the feasibility of small, dispersed flood storage easements for flood damage reduction and natural resource enhancement.
Eligibility: Authorization for minimum of two pilots with local government units. Two pilots were initiated in 1999, one with the Wild Rice Watershed District and the other with the Red Lake Watershed District.
Contact: Brian Dwight
Telephone: (218) 755-3963 *Email:* brian.dwight@bwsr.state.mn.us



DNR, C. Henderson, (all)

Snowy Owl

Sandhill Crane

Northern Shoveler

Ducks Unlimited
www.ducommunity.org/sites/mndu

Goals

1. To maximize the value of water projects to waterfowl and other wetland wildlife.
2. To partner with watershed districts and natural resource agencies to implement good wetland conservation projects.

Related Programs

Wetland Project Engineering

Purpose: To use Ducks Unlimited technical expertise for waterfowl habitat enhancement by providing survey, design, and construction management expertise.
Eligibility: All government agencies.
Contact: Tom Landwehr
Telephone: (651) 283-3838 *Email:* tlandwehr@ducks.org

Wetland Conservation Grants

Purpose: To provide funds for conservation of waterfowl habitat. Average grants of $10,000 to $30,000.
Eligibility: All government agencies.
Contact: Tom Landwehr
Telephone: (651) 283-3838 *Email:* tlandwehr@ducks.org

Rivers Council of Minnesota

Goals

1. To gather and disseminate information about the health of river ecosystems in the region.
2. To increase awareness of and support for healthy rivers by the general public.

Related Programs

Red River Basin River Watch Program

Purpose: To set up water quality monitoring and macro-invertebrate monitoring by students and citizens in the Basin using River Watch protocols to produce credible data for agencies and local units of government.
Contact: Wayne Goeken
Telephone: (218) 574-2622 *Email:* wrg@gurel.com

The Nature Conservancy
Minnesota Chapter
www.nature.org

Goals

1. To protect biological diversity by protecting those areas with high remaining biodiversity through acquisition and other means.
2. To connect the areas above through acquisition, easement, and restoration to provide migration corridors and enlarged habitat areas.
3. To focus on restoring the function of natural systems rather than on individual species.

Contact: Brian Winter, Director, Science Stewardship, Northern Tallgrass Prairie
Telephone: (218) 493-2679 *Email:* bwinter@tnc.org

Audubon Minnesota
www.audubon.org

Goals

1. To conserve and restore natural ecosystems, focusing on birds, other wildlife, and their habitats for the benefit of humanity and the earth's biological diversity.
2. To promote the conservation of Minnesota's forests, wetlands, and watersheds through education and public policy advocacy.
3. To work with Audubon chapters and Audubon centers around the state on education and conservation projects that benefit birds, other wildlife, and their habitats.
4. To assist in implementation of the *Agreement*

Related Programs

Wetlands and Watersheds Program

Purpose: To promote conservation of wetland and aquatic habitat through education and publications, public policy advocacy, and participation in habitat conservation projects.
Contact: Cheryl Miller
Telephone: (651) 225-1830 *Email:* cmiller@audubon.org

DNR, C. Henderson

Trumpeter Swans

Related Documents and Publications

Red River Basin Flood Damage Reduction Working Group, "*Mediation Agreement,*" December 8, 1998.

Compendium of Technical and Scientific Advisory Committee Working Papers. Prepared in support of the Red River Basin Flood Damage Reduction Working Group. December 8, 1998

Red River Basin Information Document. 1997. Minnesota Pollution Control Agency

Northern Tallgrass Prairie Habitat Preservation Area, Environmental Impact Statement. United States Fish and Wildlife Service. 1997.

Bird Conservation Plan for the Northern Tallgrass Prairie (Physiographic Area 40) by Jane Fitzgerald, David Pashley, Stephen Lewis and Barbara Pardo. Partners in Flight, United States Fish and Wildlife Service. 1998.

Land Management Plan, Northwest Region. Minnesota Department of Natural Resources. 1995.

Ecoregional Planning in the Northern Tallgrass Prairie. The Nature Conservancy, Midwest Regional Office. 1998.

U.S. Shorebird Conservation Plan, Northern Plains / Prairie Potholes Region by Susan Skagen and Genevieve Thompson. United States Geological Survey. 2000.

North American Waterfowl Management Plan, U.S. Prairie Pothole Joint Venture. Ft. Snelling: United States Fish and Wildlife Service. 1995.

Geographic Information System, Minnesota Land Use. The International Coalition for Land and Water Stewardship in the Red River Basin. 1990.

Inventory Process, Final Reports. Red River Basin Board, 2000. See especially *Conservation Inventory Report, A Report on Conservation Planning Efforts in the Red River Valley.*

Environmental Impact Study of Flood Control Impoundments in Northwestern Minnesota. 1995. See particularly Technical Appendices on Natural Resources.

Minnesota County Biological Survey Maps (MCBS). Natural Communities and Rare Species of Traverse and Wilkin Counties, Minnesota (map). 1:75,000 and 1:150,000. MCBS Map Series No. 17. Minnesota Department of Natural Resources, St. Paul. 1998. Also available: Clay County (1997) and Marshall County (2001).

Valley of Grass: Tallgrass Prairie and Parkland of the Red River Region by Kim Chapman, Adelheid Fischer, and Mary Kinsella Ziegenhagen. North Star Press of St. Cloud, Inc. 1998

An Assessment of Biodiversity in the Lake Agassiz Interbeach Area: An Ecoregion within the Great Plains by W.R.Ostlie and T.M. Faust. The Nature Conservancy, Midwest Regional Office. 1997.

Red River Stream Survey Reports (Bois de Sioux, Roseau, and Wild Rice Rivers). Minnesota Department of Natural Resources, Detroit Lakes. 2001.

Stream Corridor Restoration: Principles, Processes, and Practices
Federal Interagency Stream Corridor Restoration Working Group, Washington D.C. 1998
Available at: www.usda.gov/stream_restoration