Community Assistantship Program

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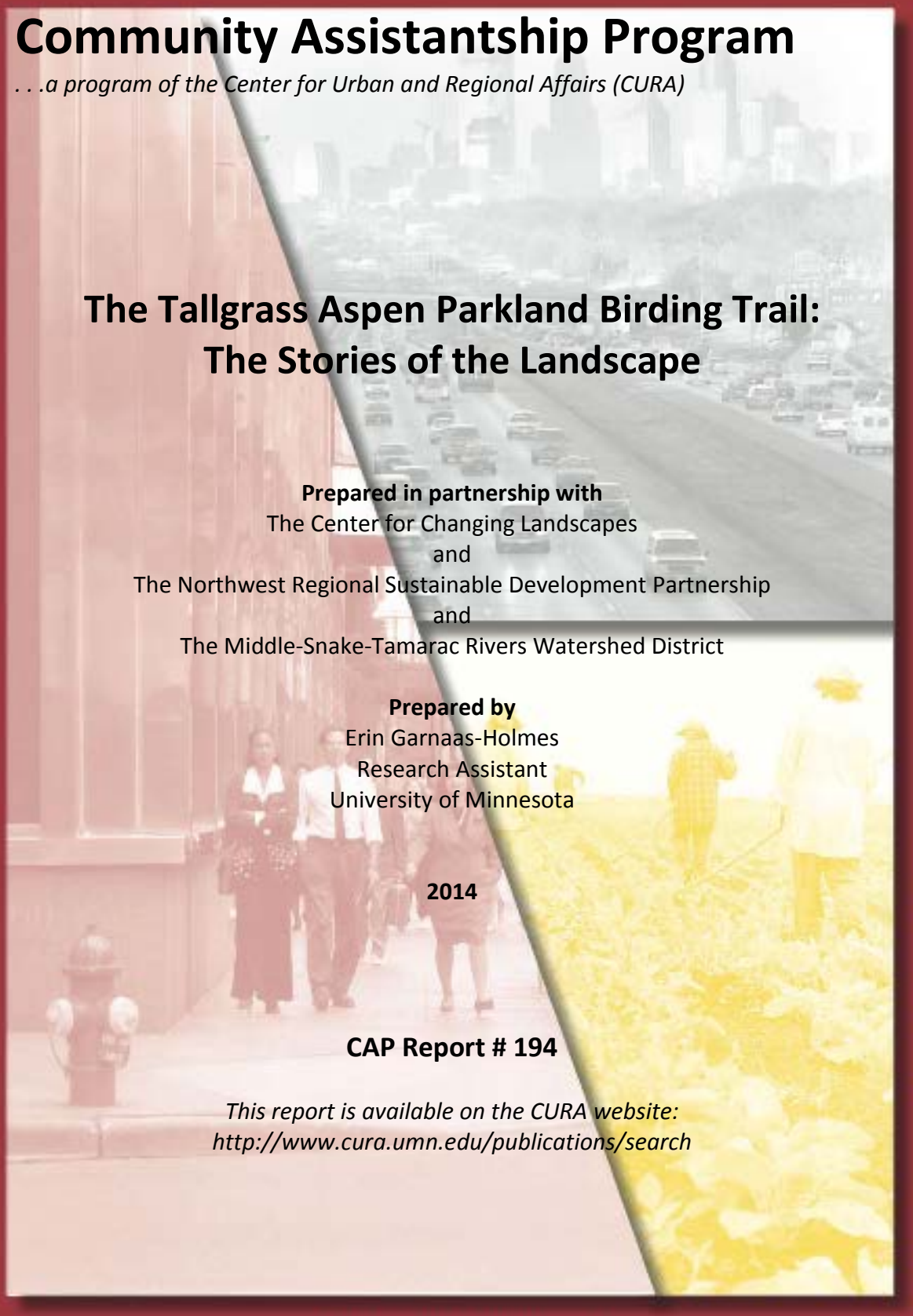

The Tallgrass Aspen Parkland Birding Trail: The Stories of the Landscape

Prepared in partnership with
The Center for Changing Landscapes
and
The Northwest Regional Sustainable Development Partnership
and
The Middle-Snake-Tamarac Rivers Watershed District

Prepared by
Erin Garnaas-Holmes
Research Assistant
University of Minnesota

2014

CAP Report # 194

This report is available on the CURA website:
http://www.cura.umn.edu/publications/search

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The Community Assistantship Program (CAP) is a cross-college, cross-campus University of Minnesota initiative coordinated by the Center for Urban and Regional Affairs (CURA). Funds for CAP were generously provided by the McKnight Foundation and the Blandin Foundation.

This is a publication of the Center for Urban and Regional Affairs (CURA), which connects the resources of the University of Minnesota with the interests and needs of urban communities and the region for the benefit of all. CURA pursues its urban and regional mission by facilitating and supporting connections between state and local governments, neighborhoods, and nonprofit organizations, and relevant resources at the University, including faculty and students from appropriate campuses, colleges, centers or departments. The content of this report is the responsibility of the author and is not necessarily endorsed by the Kris Nelson Community-Based Research Program, CURA or the University of Minnesota

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The Tallgrass Aspen Parkland Birding Trail

Introduction

The following report serves as a record of research and design work done during the fall of 2013 by the Center for Changing Landscapes and graduate student research assistant Erin Garnaas-Holmes to assist in the Tallgrass Aspen Parkland Birding Trail project. This project is part of a much broader community effort in northwestern Minnesota that seeks to both enhance economic development in the region by bringing more visitors to the area and also inform local residents of the power of their landscape.

The ecological biome of the Tallgrass Aspen Parkland is unique and rare in the United States, and the region attracts high concentrations of diverse migrating birds. Recent watershed management projects have formed large swaths of attractive habitat for both migratory and year-round birds. Meanwhile, at a time when the local economy is starting to grow, a tourist attraction like a birding trail could bring valuable business to local communities. According to the United States Fish and Wildlife Service, $38.4 billion was spent on wildlife watching activities in 2001[1]. About 48 million Americans observed birds in 2006, and as the population ages that number is predicted to increase. Birding is a year-round activity and has "considerable expenditures" associated with it, including lodging, food and supplies[2].

The establishment of a birding trail is not only a way to attract new visitors to a region, but it also can be a way for current residents to enjoy their own landscape. Birding trail infrastructure can serve locals as much as visitors, and it can also present opportunities to celebrate the stories and legacies of the region. Birds, like all wildlife and plants, are part of a larger ecosystem that is connected to human history and our current ways of living. By drawing attention to where, how and why wildlife lives where it does, a birding trail can also illuminate how people relate to their landscape and their communities.

Erin's contract with the University of Minnesota's Center for Changing Landscapes and Northwest Regional Sustainable Development Partnership was facilitated through the Center for Urban and Regional Affairs Community Assistance Program and the Middle-Snake-Tamarac Rivers Watershed District.

1 U.S. Fish and Wildlife Service, 2001. *National and State Economic Impacts of Wildlife Watching: Addendum to the 2001 National Survey of Fishing, Hunting and Wildlife-Associated Recreation.*
2 USFWS.

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The Tallgrass Aspen Parkland
Birding Trail

Middle-Snake-Tamarac Watershed District

Center for Changing Landscapes

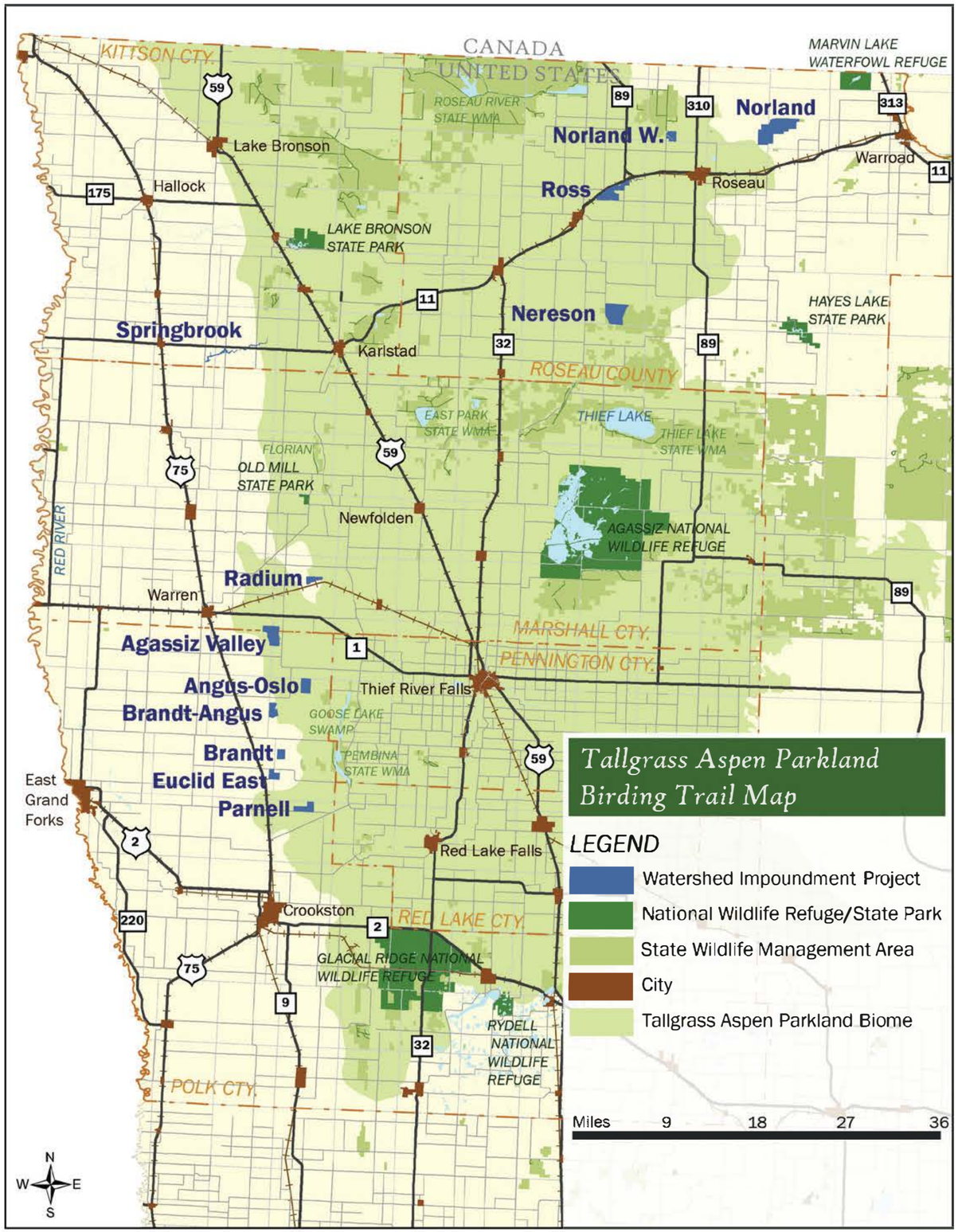
Center for Urban and Regional Affairs Community Assistantship Program

Northwest Minnesota Regional Sustainable Development Partnership

Northwest Minnesota Foundation

Red Lake Watershed District
Roseau River Watershed District
Two Rivers Watershed District
Agassiz Audubon Society
Marshall County Historical Society
Kittson County Historical Society
Polk County Historical Society

City of Warren, MN
Warren Chamber of Commerce
City of Crookston, MN
Crookston Convention and Visitors Bureau
Marshall County Board of Commissioners
UMN Crookston Communications Program
UND Geography Department



The Tallgrass Aspen Parkland

Aspen Stand near the Agassiz Valley Project east of Warren, MN. © Agassiz Audubon

The Tallgrass Aspen Parkland biome is one of Minnesota's four ecological biomes and is home to a wide variety of birds. Hundreds of migratory species also pass over the Parkland each year, some of which can only be seen in this part of the country. This region of Northwest Minnesota is also rich in history, dating back not only hundreds of years to the time of European settlers but also millennia, to the time of glaciers. The Tallgrass Aspen Parkland Birding Trail provides an opportunity for visitors and local residents to discover evidence of ancient geological forces, learn about the history of people and the land, and capture exciting views of wildlife in this powerful landscape.

Recent watershed management projects have created large areas of attractive habitat for both migratory and year-round birds, making this region an even more exciting place for birding and wildlife viewing. Read ahead to learn more about how this landscape has been formed over time and what kind of experiences the Tallgrass Aspen Parkland Birding Trail has to offer.

Birdwatchers on the wildlife drive at the Agassiz Valley Project east of Warren, MN. © H. Hughes

The Story of the Tallgrass Aspen Parkland

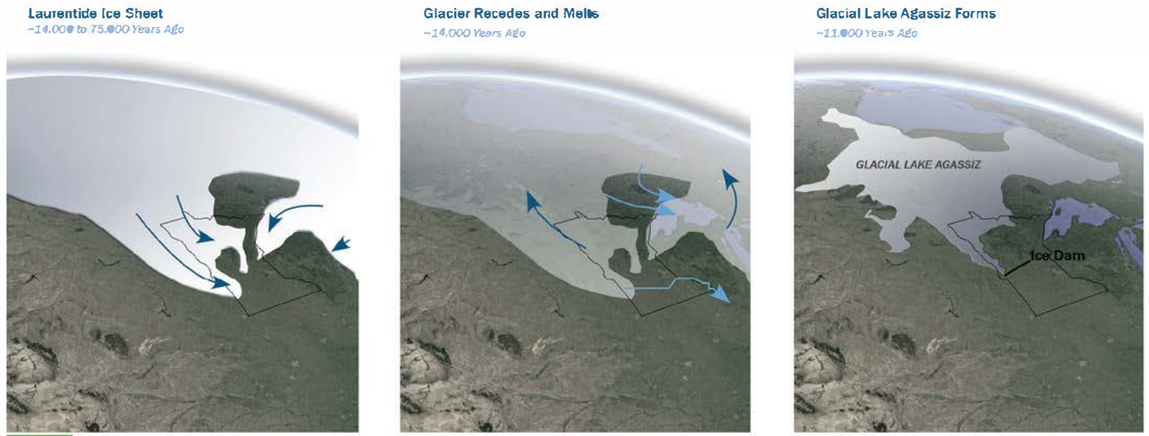
The Legacy of Glacial Lake Agassiz

The Tallgrass Aspen Parkland is the smallest of Minnesota's biomes, but perhaps one of the most unique. Northwestern Minnesota is the only place this biome can be found in the entire United States. It is an ecotone, or a transition zone, between the prairie to the west and the forests to the east. The story of the Tallgrass Aspen Parkland starts millennia ago with the movement of glaciers and the draining of the massive Glacial Lake Agassiz.

Minnesota Biomes


These maps show several ice advances and their associated end moraines that affected Minnesota in the Late Wisconsonian Age. Ice advances are arranged from oldest (top left) to youngest (bottom right). (Morey and Dahlberg, 23-24).

As the Laurentide Ice Sheet—a massive, mile-high glacier—began to recede by slowly melting away, its drainage patterns formed many of the landscapes we are familiar with in Minnesota today. An ice dam at its southern tip pooled glacial waters to create the Glacial Lake Agassiz, an enormous lake bigger than all of the Great Lakes combined, extending north to the current Hudson Bay. The southern tip of Glacial Lake Agassiz reached into present-day Minnesota and North Dakota.



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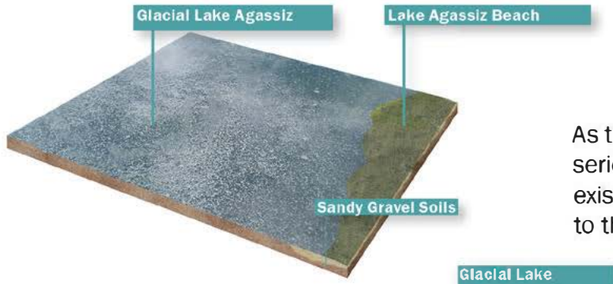
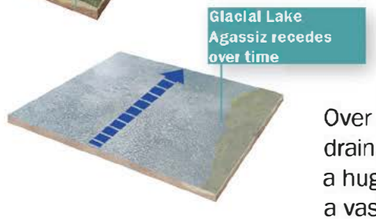
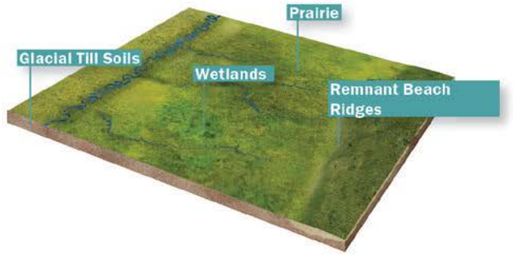


As the lake retreated, its edge created a series of beaches, ridges of sand that still exist today. Sediment and nutrients settled to the bottom of the lake.

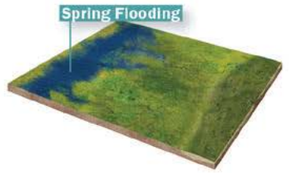


Over thousands of years, the lake began to drain away into other water bodies, creating a huge glacial river. As it drained north it left a vast, flat landscape with the small rivet that is now the Red River valley.

1600 A.D.

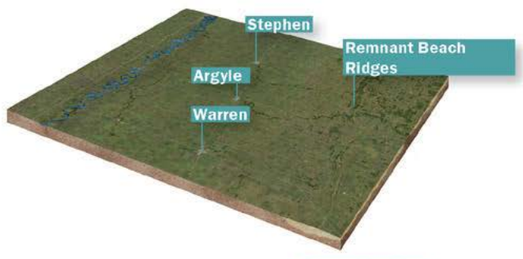


Over time, prairies and stands of aspen grew in the rich soils left behind by Glacial Lake Agassiz. Wetlands and prairie potholes, formed by the receding lake, dotted the landscape. Streams meandered through the landscape down to the river valley.

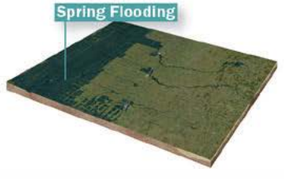


When snow melted in the spring and April showers fell, the river flooded over large portions of the flat landscape.

2013 A.D.



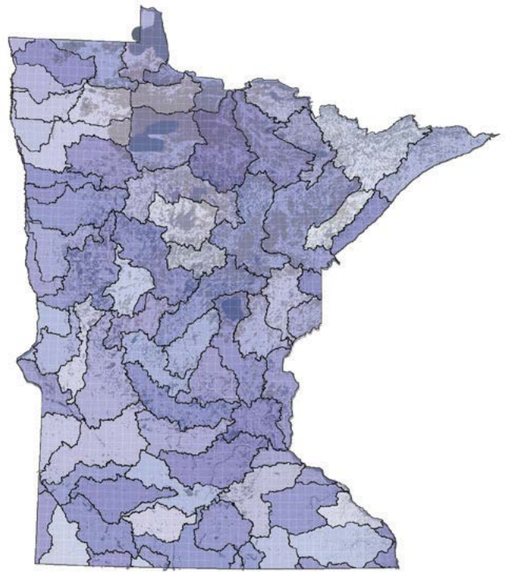
As European Americans settled the landscape, they took advantage of the fertile soil in the former lake bed. The gravelly soils of the beach ridges proved less suitable for farming.



The Red River still overflows in the spring, but now it floods farmlands, homes and towns.

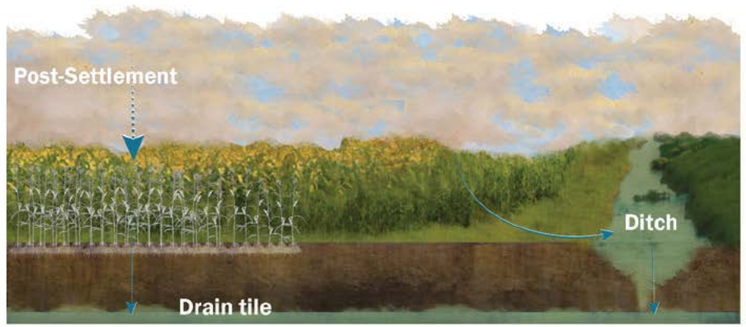
The Nature of Flooding

As Minnesota was settled along with other parts of the United States and Canada after the Revolutionary War, the Public Land Survey was a tool that the government used to define tracts of land that could eventually be sold for private use. Each "section" of the PLS was intended to be enough land, about the size of a city block, for one farmer to sustain his or her family. A township was made up of 36 of these sections (shown in white on the image to the right). This grid of townships was laid over the geography of Minnesota (without much heed to geological or hydrological characteristics, like watershed boundaries).

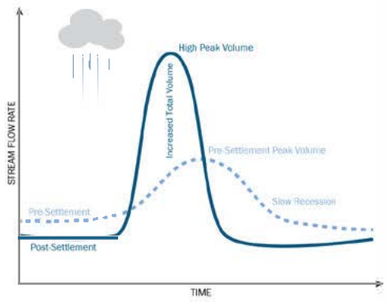


The Public Land Survey created the grid of townships and roads shown in white on this image. Watershed boundaries are shown in black.

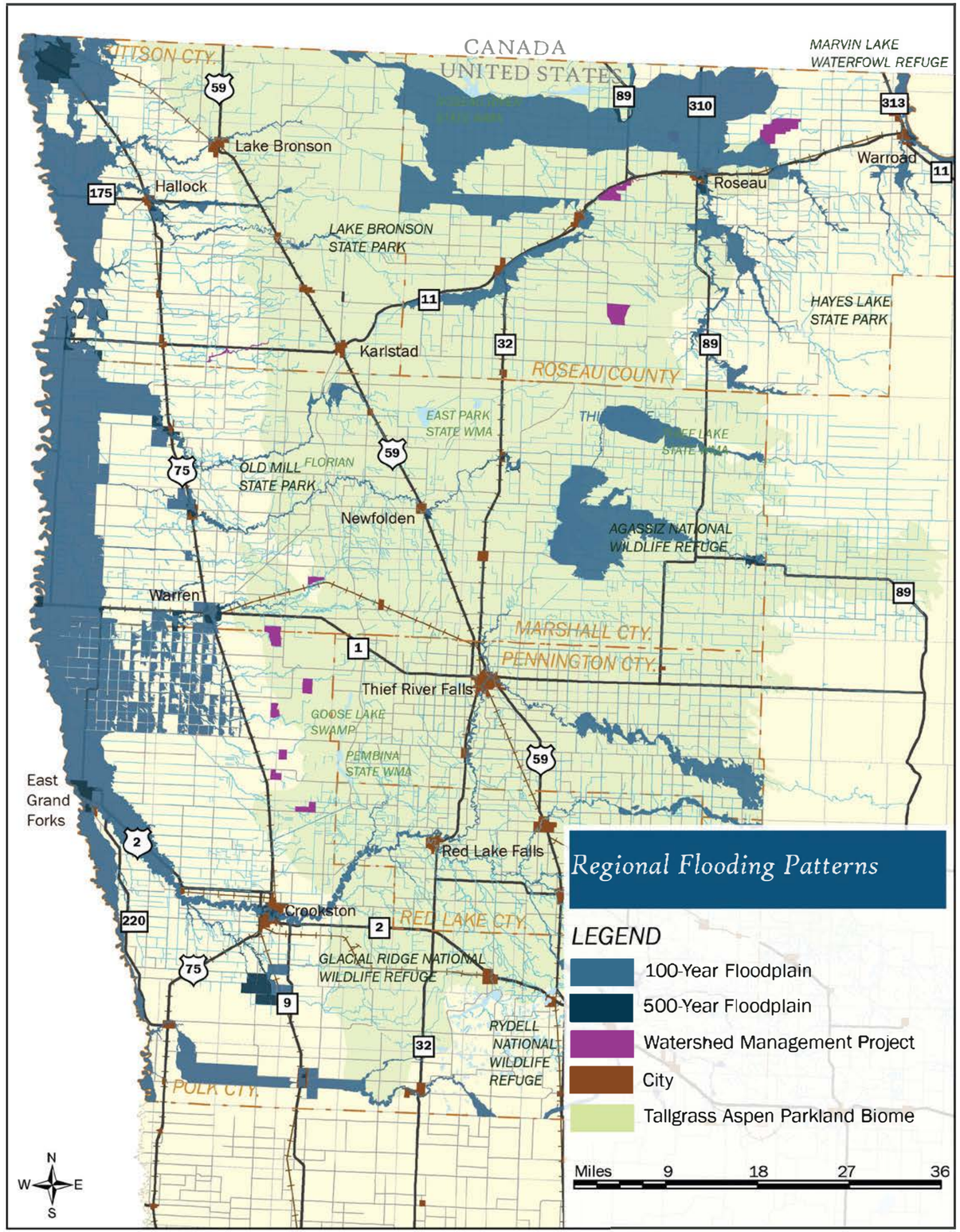
As farmers began to manipulate the landscape they formed it into the most efficient conditions for growing the food that sustains our nation. Agricultural efficiency drove landowner-s decisions and problems created by regional hydrological patterns were less extreme as they are today. In order to grow more food, wetlands were filled and lands that were too wet were drained through tile systems. A series of ditches were dug to quickly channel water from farmland downstream to the Red River. The drain tile and ditch system effectively replaced small stream systems and wetlands, causing water to flow faster towards the river than in pre-settlement times, increasing the peak flow rate of the river after a rain storm event.



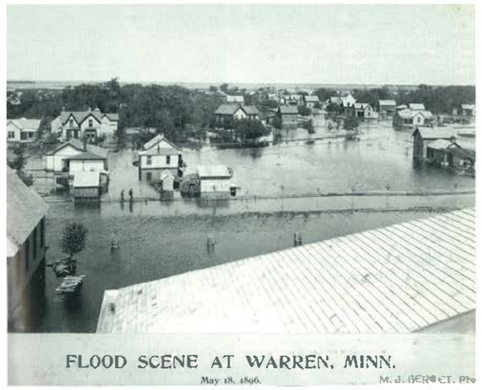
The drain tile and ditch system sends water from farmland downstream as efficiently as possible in order to support the growing of food crops that do not tolerate wet conditions.



Post-settlement water flow rate after a storm peaks higher and faster than a pre-settlement rate.



The Watershed Management Areas

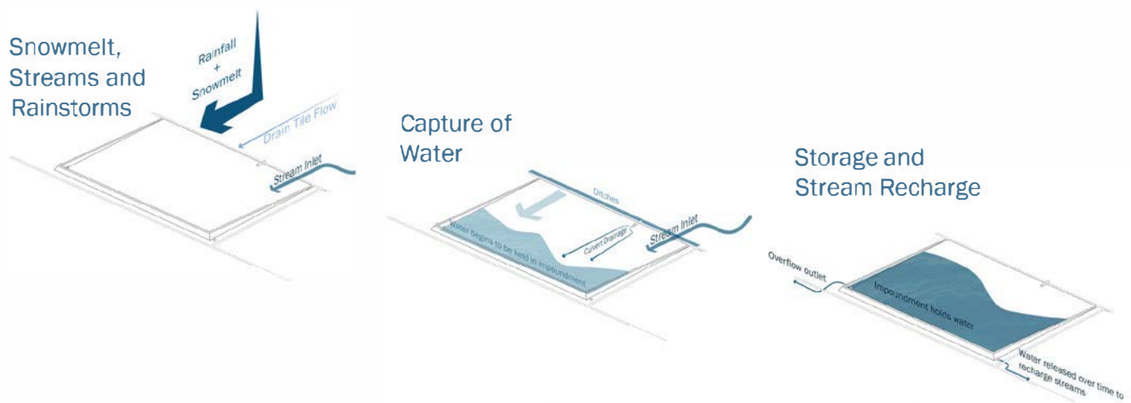


Flooding of Warren in 1896. *© Marshall County Historical Society.*

Flooding of farmland. The farmstead is protected by a ring dike. *© MSTRWD.*

Flooding has always been a part of life in the Red River Valley. The city of Warren documented extreme flooding events in 1896 and as recently as 1996 and 1997. Watershed Districts are government agencies tasked with managing water resources with the drainage areas of rivers and streams. They work along with other organizations and agencies to protect residents from the hazards of flooding. One way that Watershed Districts have approached the challenge of managing flood hazards in a region where the topography is very flat is to create large impoundment areas where flood water can be held during spring and summer and released to recharge streams and rivers later in the year. Several watershed districts in the region have implemented this strategy in addition to other projects like stream bed restoration. By creating a series of these management areas, the ultimate goal of the watershed districts will be to reduce flooding in the river valley and to protect communities and landowners.

HOW AN IMPOUNDMENT WORKS:



These diagrams show how rainfall and snowmelt slowly fill the impoundment area, allowing the water to be released at a controlled rate and preventing overflowing of water bodies downstream.

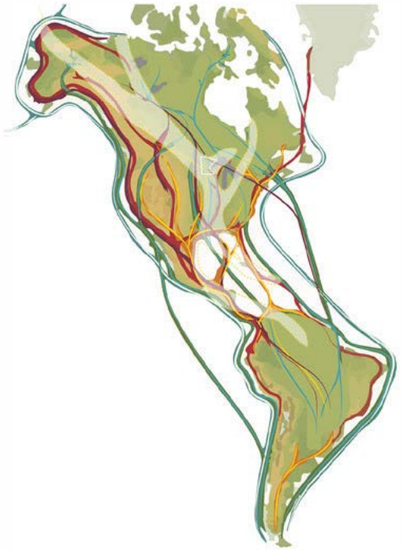
A series of "borrow pits" within the Agassiz Valley Water Management Area taken from an airplane. *© Kevin Bunde.*

Water levels in the impoundments are regulated by control gates like this one. *© Center for Changing Landscapes.*

Some impoundments contain augmentation pools that drain slowly during the summer, "augmenting" the rivers the might otherwise dry up. *© Center for Changing Landscapes.*

Impoundments are drawn down in the fall, leaving them ready to impound the spring melt and high water flows. *© Center for Changing Landscapes.*

Changing Habitat



Migratory birds take many different routes as they travel north and south across North and South America throughout the seasons. Minnesota lies within the path of main flyways.

An unintended consequence, but a benefit, of the watershed management projects is that they have begun to attract impressive amounts of birds. By temporarily holding water at different elevations throughout the seasons, the impoundments serve a similar function as ecological habitat that temporal wetlands and ponds once did in Minnesota.

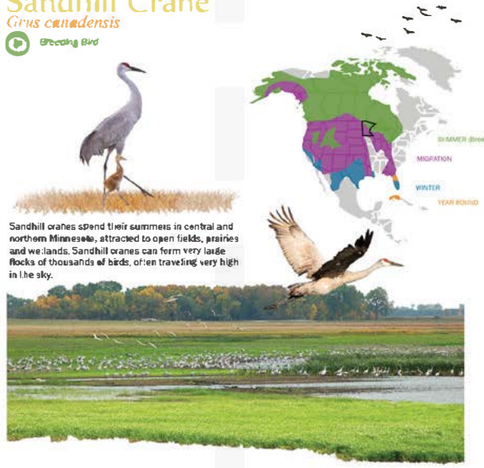
Northwestern Minnesota is located along several migratory bird flyways, including the Mississippi Flyway and the Central Flyway. This means that millions of birds fly over the region each year as they migrate north or south with the changing seasons. As birds fly over the landscape, they look for places to rest, find food, or to breed. The water management areas provide vast areas for many migrating species.

Even though only a few of the water management areas feature native plant species primarily, they do provide habitat value for native bird species, and non-native species as well. The deep water borrow pits of the impoundments, holes in the landscape dug to hold water, provide pond homes for waterfowl like swans, grebes, and ducks. The wetlands provide marshy grassland homes for birds like American Bitterns. Shorebirds like Greater Yellowlegs can be seen on the levee and upland species like Sharp-tailed Grouse, sparrows and birds of prey can also be spotted nearby.

Sandhill Crane

Grus canadensis

Breeding Bird

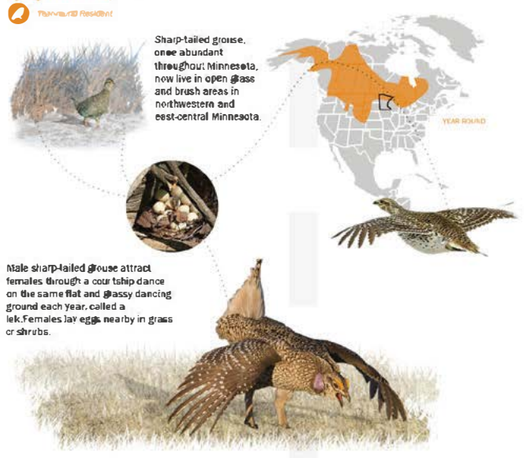


Sandhill cranes spend their summers in central and northern Minnesota, attracted to open fields, prairies and wetlands. Sandhill cranes can form very large flocks of thousands of birds, often traveling very high in the sky.

Sharp-Tailed Grouse

Tympanuchus phasianellus

Year-round Resident



Sharp-tailed grouse, once abundant throughout Minnesota, now live in open grass and brush areas in northwestern and east-central Minnesota.

Male sharp-tailed grouse attract females through a courtship dance on the same flat and grassy dancing ground each year, called a lek. Females lay eggs nearby in grass or shrubs.

Red-necked Grebe

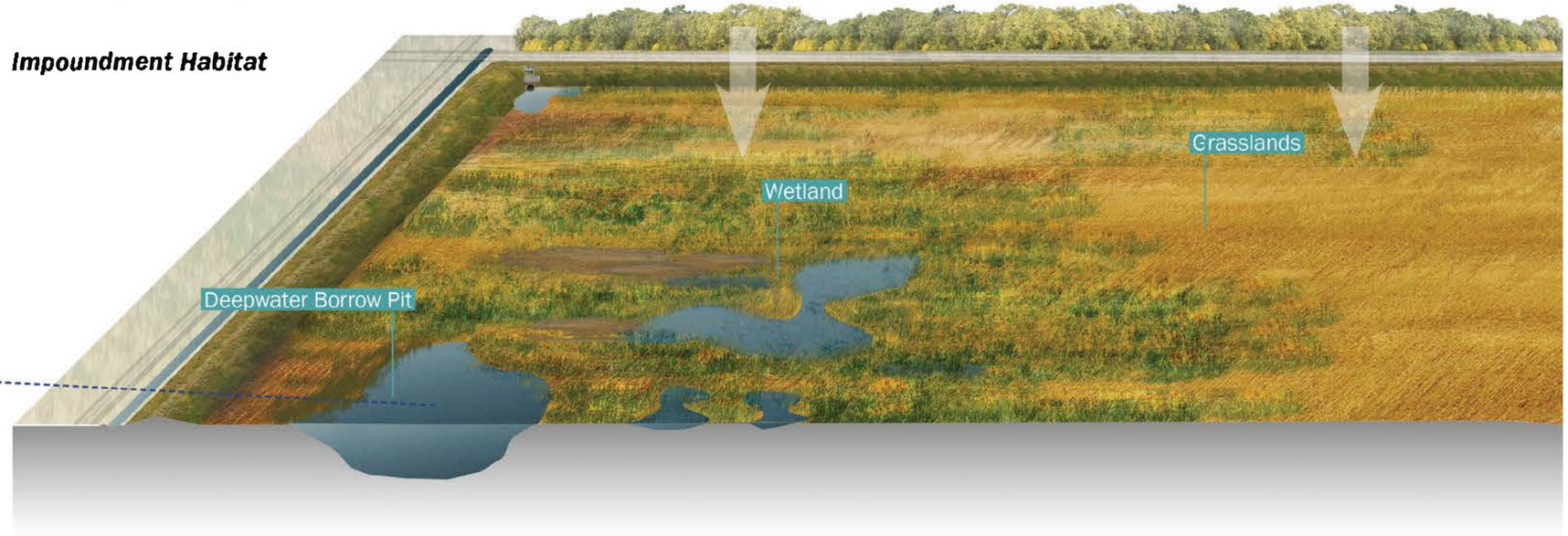
Podiceps grisegena

Winter Visitor

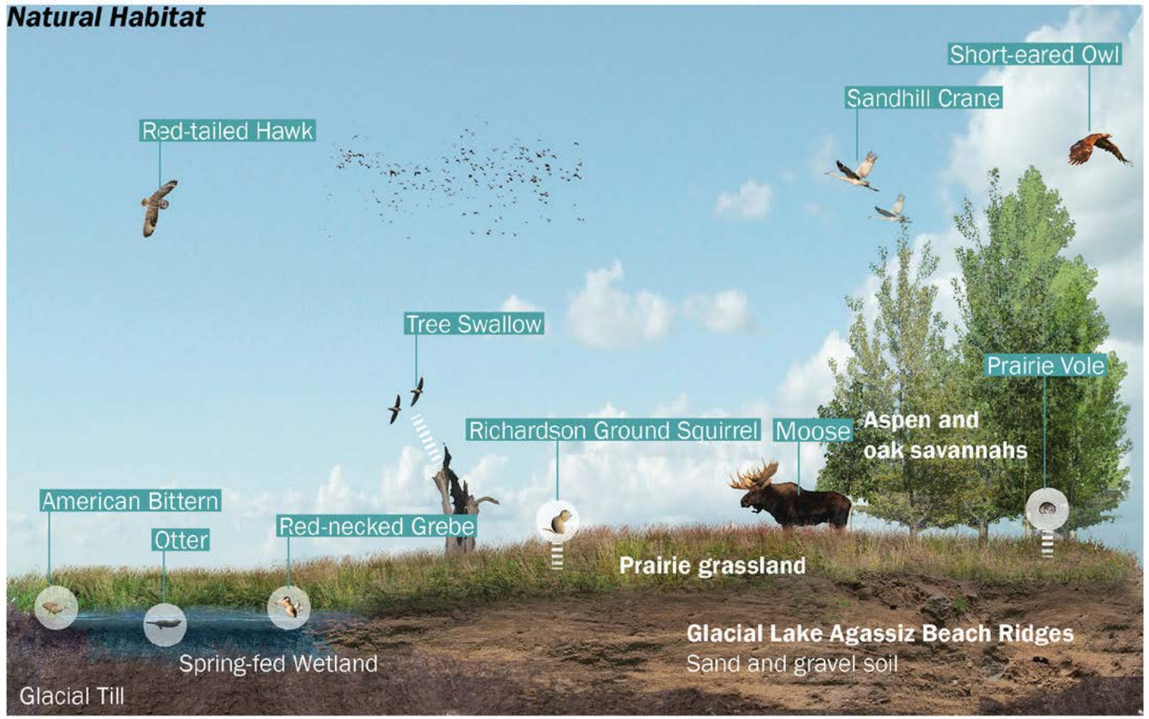
Red-necked grebes breed on inland lakes, ponds and reservoirs, and are often tolerant of human visitors.

Red-necked grebes create floating nests made of plant material for their young. These nests can be found in open water or anchored to logs or in shallow areas.

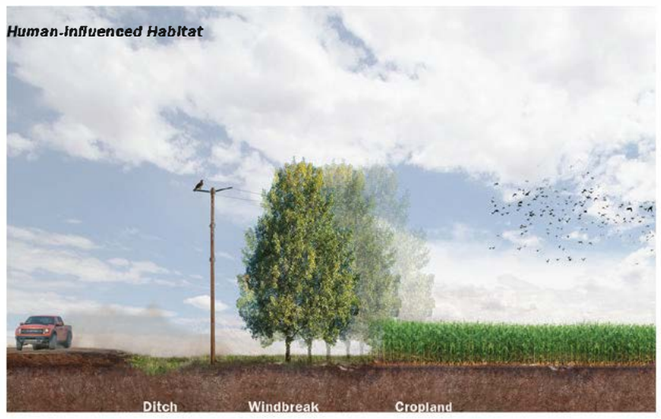
Impoundment Habitat



Wildlife of the Tallgrass Aspen Parkland



Although much of the landscape has changed dramatically from its form hundreds of years ago, there are many opportunities along the Tallgrass Aspen Parkland Birding Trail to find wildlife and native species, including many parks, wildlife refuges and natural areas. Moose, elk, foxes and birds can be found in reserves like the Agassiz National Wildlife Refuge or Lake Bronson State Park.



Sometimes wildlife can even be seen along roads, ditches, windbreak plantings or in fields of crops. Snowy Owls, Great-Horned Owls and Golden Eagles can be seen perched on power lines and fence posts in the winter. Kingbirds, blackbirds, swans and Sandhill Cranes can be spotted on roadsides and in fields of crops.

Visitor Infrastructure

The Neal Smith National Wildlife Refuge & Prairie Learning Center in Iowa is an example of the kind of visitor's center that reflects the character of the landscape and that could be a center of visitor information and activity along the Tallgrass Aspen Parkland Birding Trail.

Visitor Center

In order to accommodate future visitors along the Birding Trail, a central LEED certified Visitor Center will be designed and constructed on the beach ridge at the Agassiz Valley Water Management Area.

Information Kiosks

Some of the first pieces of visitor infrastructure to be constructed could be informational kiosks that inform readers about the stories of the landscape, the birds and wildlife they may see, maps of the region and entire Trail, and information about specific locations. These kiosks could be designed so that they also function as a Chimney Swift tower.

Chimney Swift Tower Concept

Toilets

Toilets will need to be constructed in some areas where facilities are far or few between. One option for restroom infrastructure is to use composting toilets made from sustainable materials that use less chemicals than standard toilets, and that can be constructed to reflect a desired aesthetic.

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Information Panels

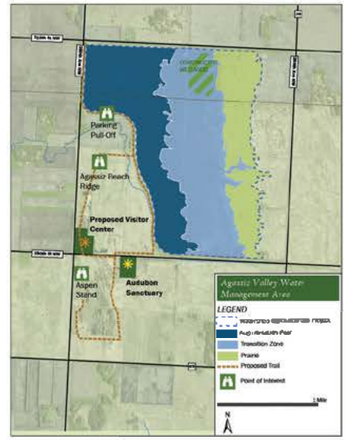
36"

72"

Tallgrass Aspen Parkland Birding Trail

Agassiz Valley Water Management Area

Trail Maps

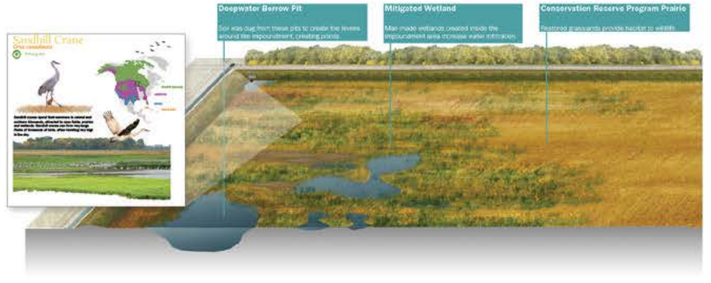


Tallgrass Aspen Parkland Birding Trail | **Agassiz Valley Water Management Area**

The Tallgrass Aspen Parkland biome is one of Minnesota's four ecological biomes and is home to a wide variety of birds. Hundreds of migratory species also pass over the Parkland each year, some of which can only be seen in this part of the country. This region of Northwest Minnesota is also rich in history, dating back not only hundreds of years to the time of European settlers but also millennia, to the time of glaciers. The Tallgrass Aspen Parkland Birding Trail provides an opportunity for visitors and local residents to discover evidence of ancient geological forces; learn about the history of people and the land; and capture existing views of wildlife in this powerful landscape.

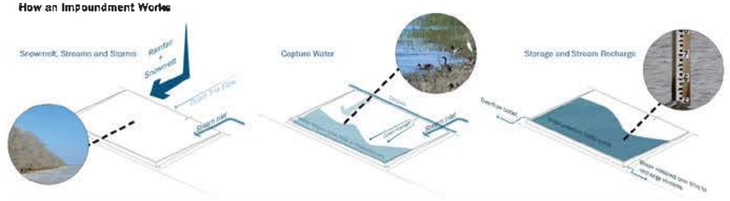
Recent watershed management projects have created large areas of attractive habitat for both migratory and year-round birds, making this region an even more exciting place for birding and wildlife viewing.

Impoundments



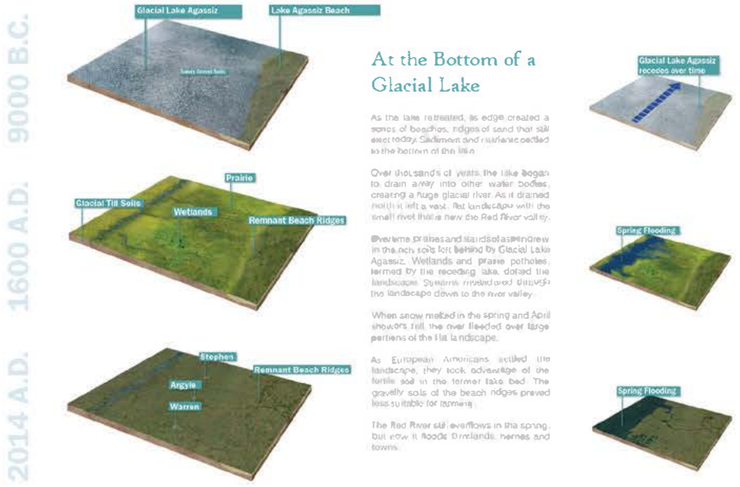
Local Watershed Districts operate and maintain water management areas like the Agassiz Valley Water Management Area in order to diminish flooding of the Red River in nearby communities. The Management Areas are designed to capture, retain and release water created by melting snow and rainwaters. Watershed Districts are governmental agencies tasked with managing water resources within the drainage areas of specific rivers and streams. They work along with other organizations and agencies to protect residents from the hazard set feeding. One way that Watershed Districts have approached the challenge of managing flood hazards in a very flat region like the Tallgrass Aspen Parkland is to create impoundments areas where flood water can be held in spring and released to recharge streams in the fall. Several watershed districts in the region have implemented this strategy, in addition to other projects like stream bed restoration. By creating a series of these management areas, the ultimate goal will be to reduce flooding in the river valley and to protect landowners.

How an Impoundment Works



The Story of the Landscape

Glacial History



At the Bottom of a Glacial Lake

As the lake retreated, its edge created a series of beaches, ridges of sand that still exist today. Sediment and nutrients settled to the bottom of the lake.

Over thousands of years, the lake began to drain away into other water bodies, creating a huge glacial river. As it drained north it left a vast, flat landscape with the small river that is now the Red River valley.

Over time prairies and stands of aspen grew in the rich soils left behind by Glacial Lake Agassiz. Wetlands and prairie potholes, formed by the receding lake, dotted the landscape. Systems created and nourished this landscape down to the river valley.

When snow melted in the spring and April showers fell, the river flooded over large portions of the flat landscape.

As European Americans settled the landscape, they took advantage of the fertile soil in the former lake bed. The gravelly soils of the beach ridges proved less suitable for farming.

The Red River still overflows in the spring, but now it floods farmlands, homes and towns.

Flooding

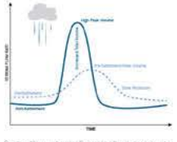
The Public Land Survey created the grid of townships and roads shown in white on this map. Watershed boundaries are shown in black.

A History of Flooding

As Minnesota was settled along with other parts of the United States and Canada after the Revolutionary War, the Public Land Survey was a tool that the government used to define tracts of land that could eventually be sold for private use. Each "section" of the PLS was intended to be enough land, about the size of a city block, for one farmer to sustain his or her family. A township was made up of 36 of these sections (shown in white on the image to the right). This grid of townships was laid over the geography of Minnesota (without much head to geological or hydrological characteristics, like watershed boundaries).

As farmers began to manipulate the landscape they formed it into the most efficient conditions for growing the food that sustains our nation. Agricultural efficiency drove landowners decisions and problems created by regional hydrological patterns were less extreme as they are today. In order to grow more food, wetlands were filled and lands that were too wet were drained through tile systems. A series of ditches were dug to quickly channel water from farmland downstream to the Red River. The drain tile and ditch system effectively replaced small stream systems and wetlands, causing water to flow faster towards the river than in pre-settlement times, increasing the peak flow rate of the river after a rain storm event.

The drain tile and ditch system sends water from farmland downstream as efficiently as possible in order to support the growing of food crops that do not tolerate wet conditions.



Post-settlement water flow rate after storm peaks higher and faster than a pre-settlement rate.

Flooding of farmland. The farmstead is protected by a ring dike.
© Middle-Snake-Tamarac Rivers Watershed District

Wildlife of the Tallgrass Aspen Parkland

Birds

Migratory birds take many different routes as they travel north and south across North and South America throughout the seasons. Minnesota lies within the path of many flyways.

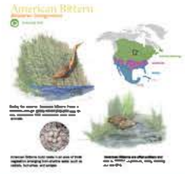
A Stop Along the Flyway

An additional benefit of the watershed management projects is that they attract different amounts of birds. By unexpectedly holding water at different elevations throughout the seasons, the impoundments serve a similar function as ecological habitat that "emorors" wetlands and ponds once did in this Minnesota landscape.

Northwestern Minnesota is located along several migratory bird flyways, including the Mississippi Flyway and the Central Flyway. This means that millions of birds fly over the region each year as they migrate north or south with the changing seasons. As birds fly over the landscape they look for places to rest, find food, or to breed. The water management areas provide rest areas for many migrating species.

Even though only a few of the water management areas feature native plant species currently, they do provide habitat value for native bird species, and non-native species as well. The deep water borrow pits of the impoundments, noted in the landscape as to need water, provide good homes for waterfowl like swans, grebes, and ducks. The wetlands provide naturally grassland homes for birds like American Bitterns. Shorebirds like Greater Yellowlegs can be seen on the levee and upland habitat. Big Sharp Tailed Grouse, sparrows and birds of prey can also be spotted nearby.

A Sample of Species

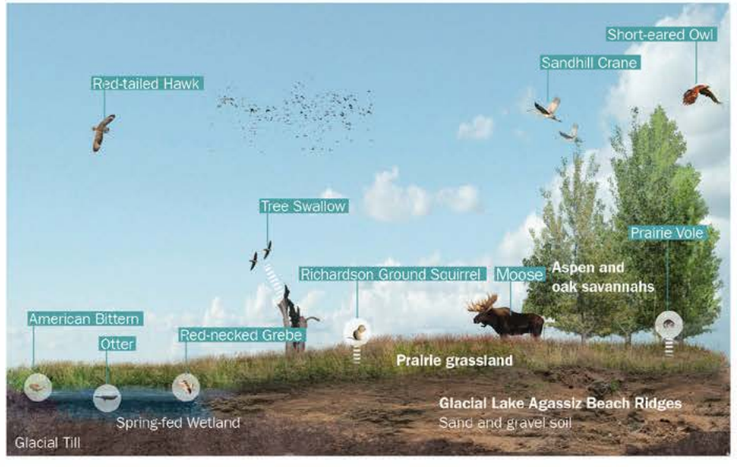


Native Wildlife

Natural Areas of the Tallgrass Aspen Parkland

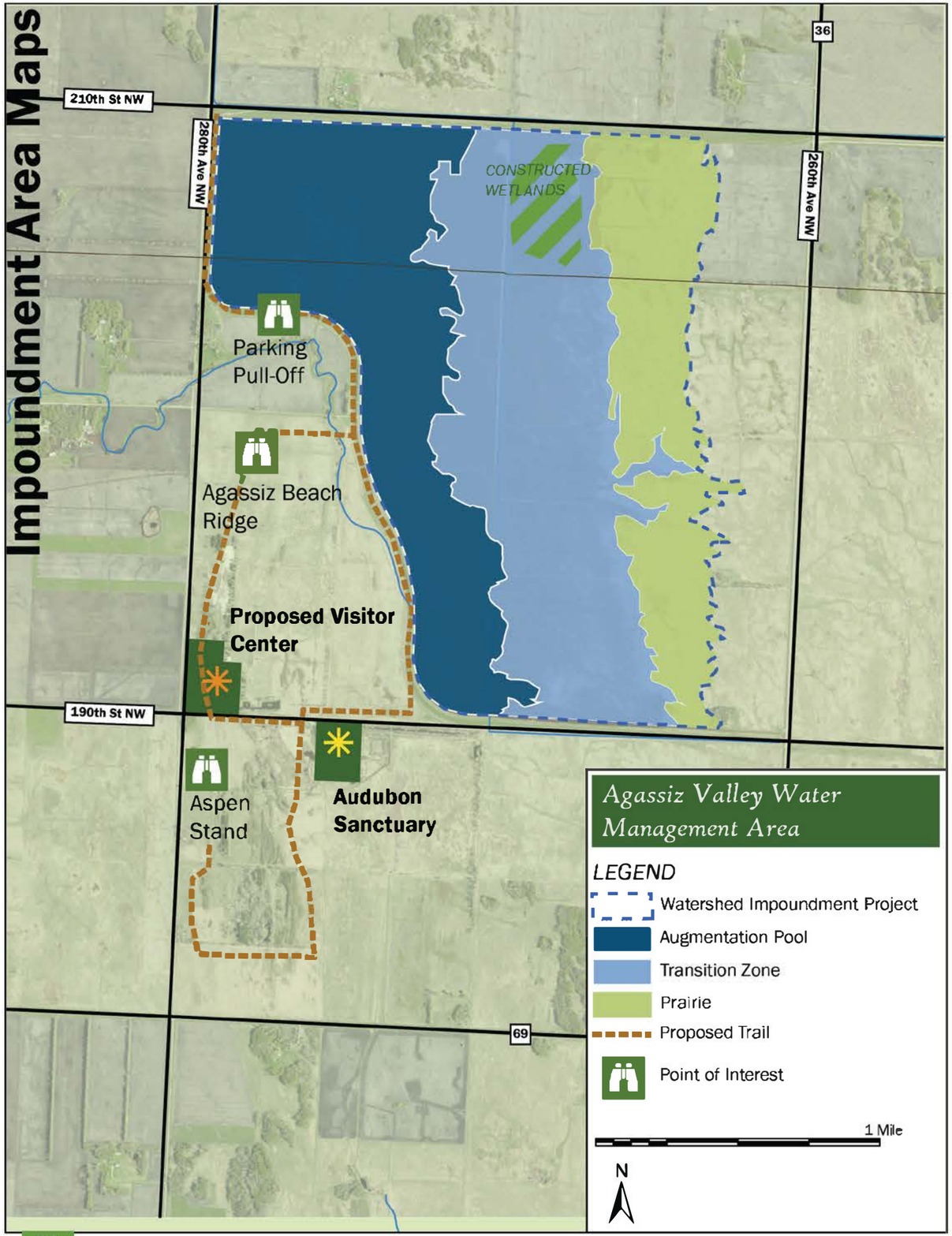
Although much of the landscape has changed dramatically from its form hundreds of years ago, there are many opportunities along the Tallgrass Aspen Parkland Birding Trail to find wildlife and native species, including many parks, wildlife refuges and natural areas. Moose, elk, foxes and birds can be found in reserves like the Agassiz National Wildlife Refuge or Lake Bronson State Park.

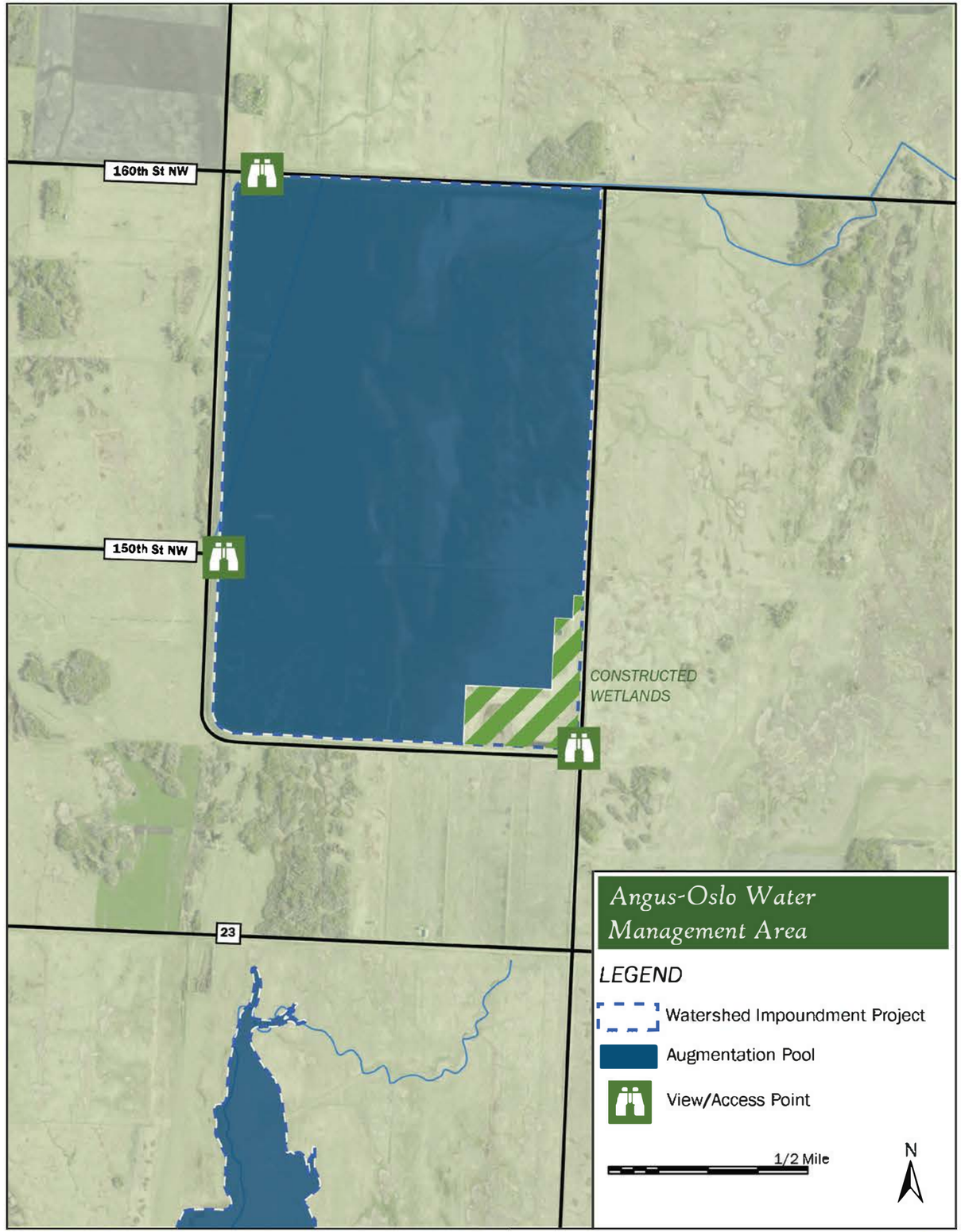
Sometimes wildlife can even be seen along roads; ditches, windbreak plantings or in fields of crops. Snowy Owls, Great Horned Owls and Golden Eagles can be seen perched on power lines and fence posts in the winter. Kingbirds, blackbirds, owls and Sandhill Cranes can be spotted on roadsides and in fields of crops.

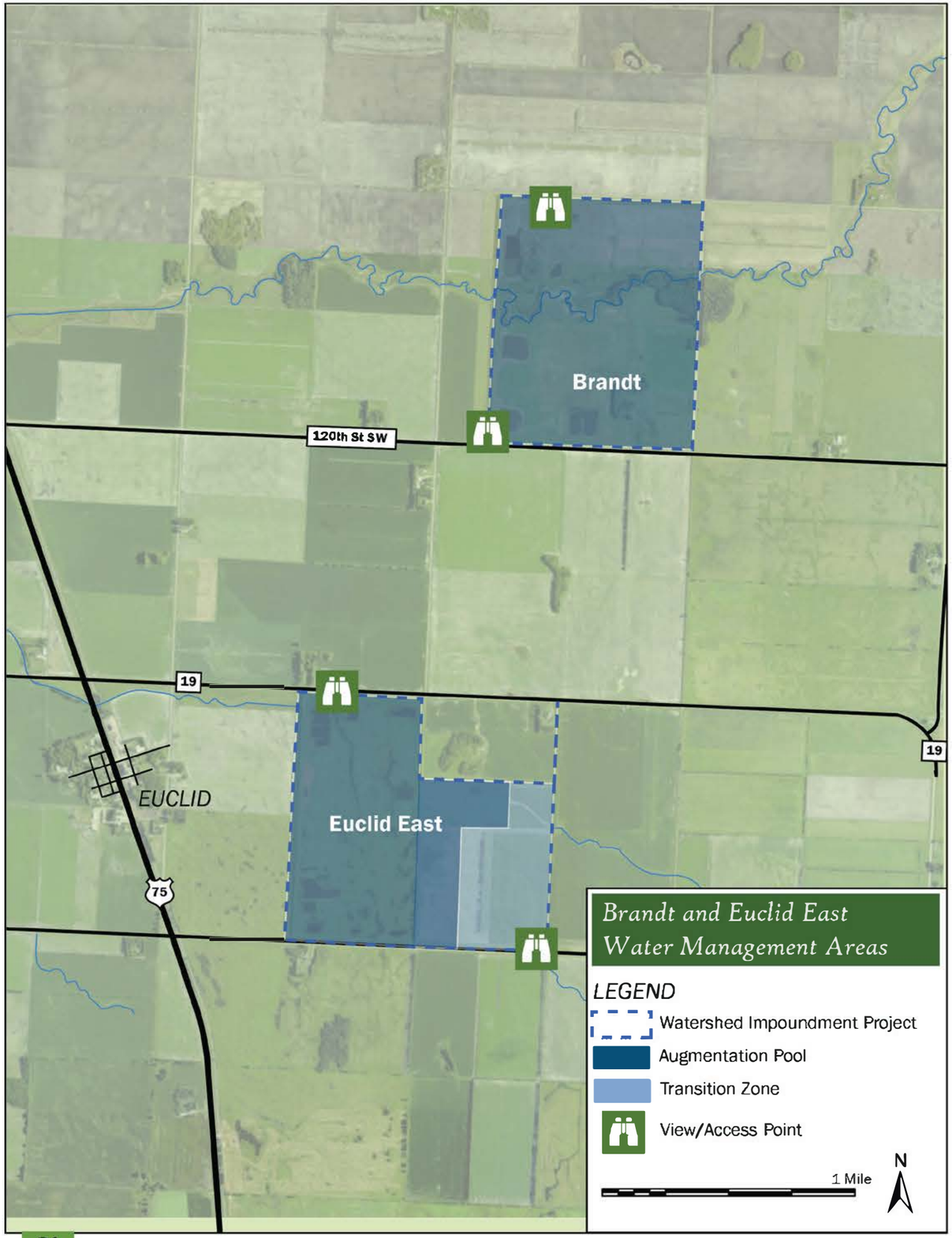


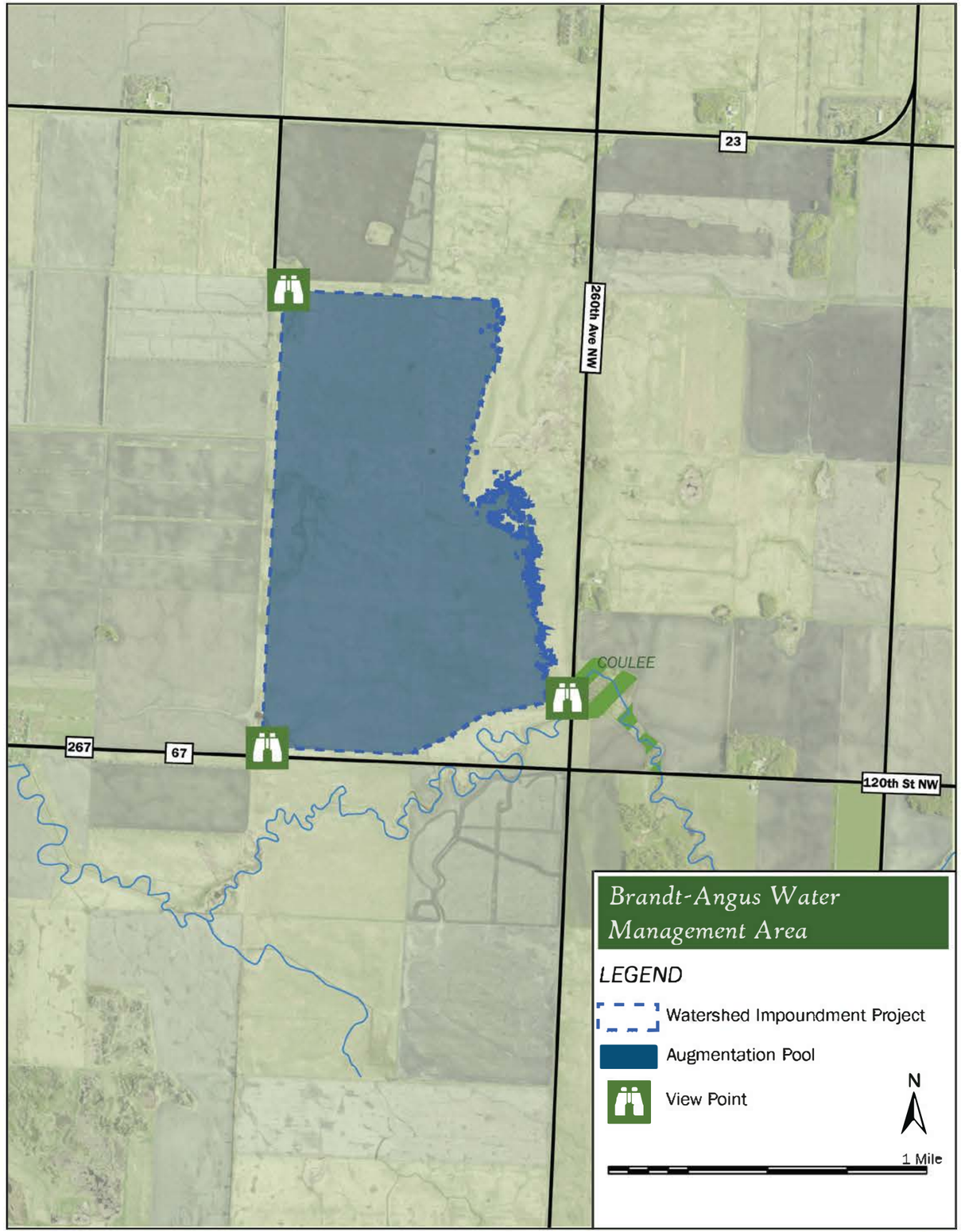
A Sample of Species

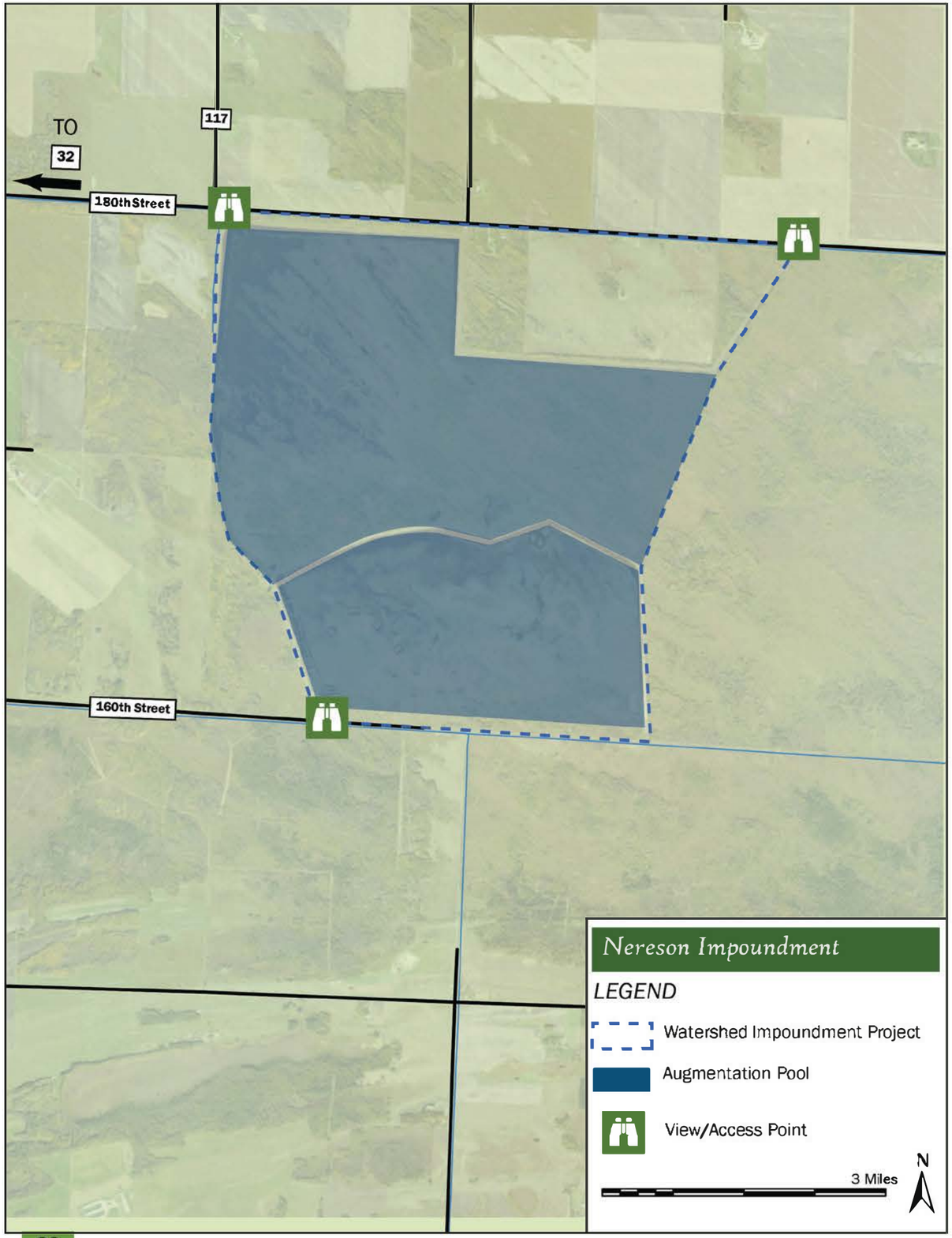
Impoundment Area Maps






Brandt
120th St SW
19
19
EUCLID
Euclid East
75
Brandt and Euclid East
Water Management Areas
LEGEND
Watershed Impoundment Project
Augmentation Pool
Transition Zone
View/Access Point
1 Mile
N


23
260th Ave NW
COULEE
267
67
120th St NW
Brandt-Angus Water
Management Area
LEGEND
Watershed Impoundment Project
Augmentation Pool
View Point
1 Mile
N



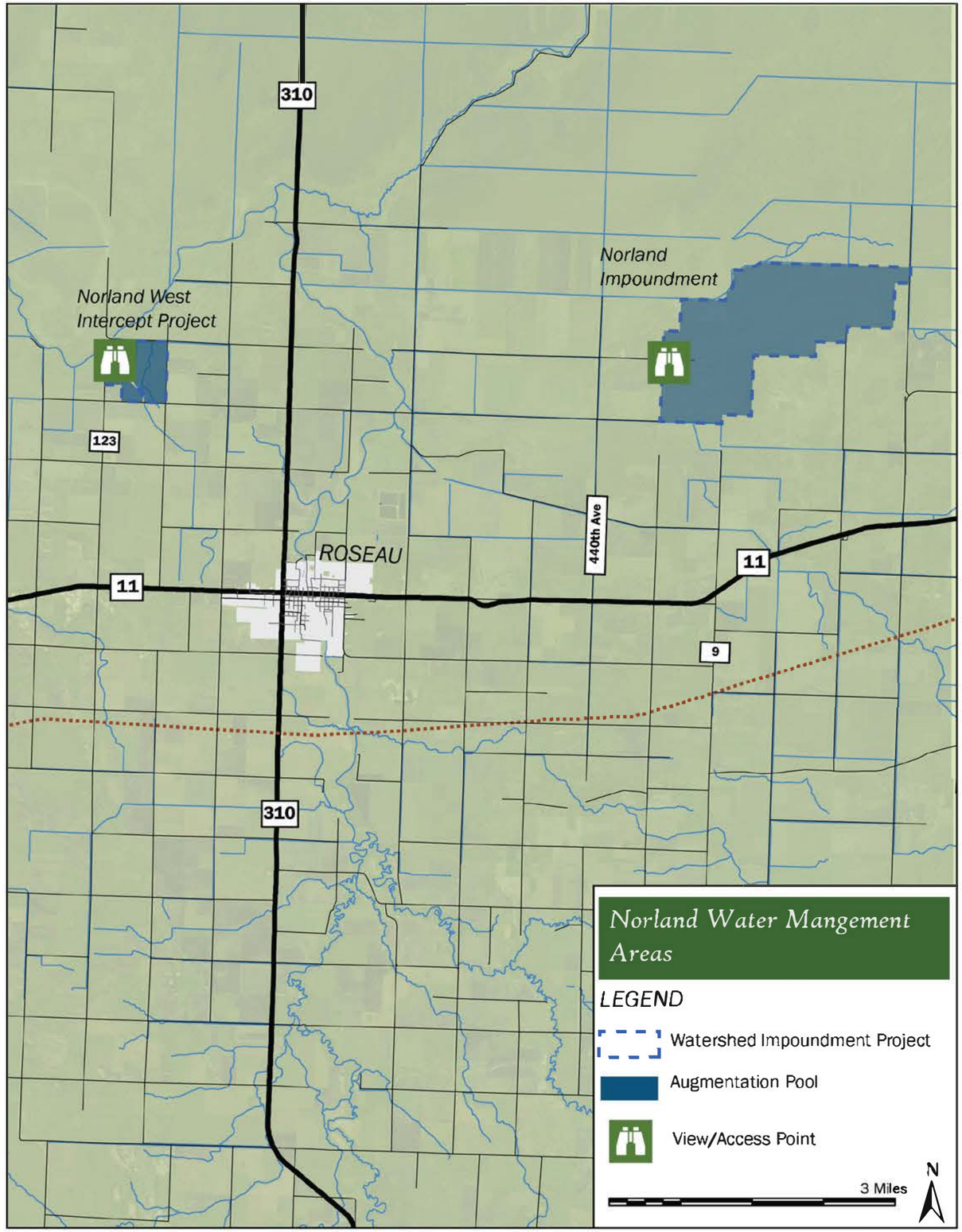
Nereson Impoundment

LEGEND

- Watershed Impoundment Project
- Augmentation Pool
- View/Access Point

3 Miles

N



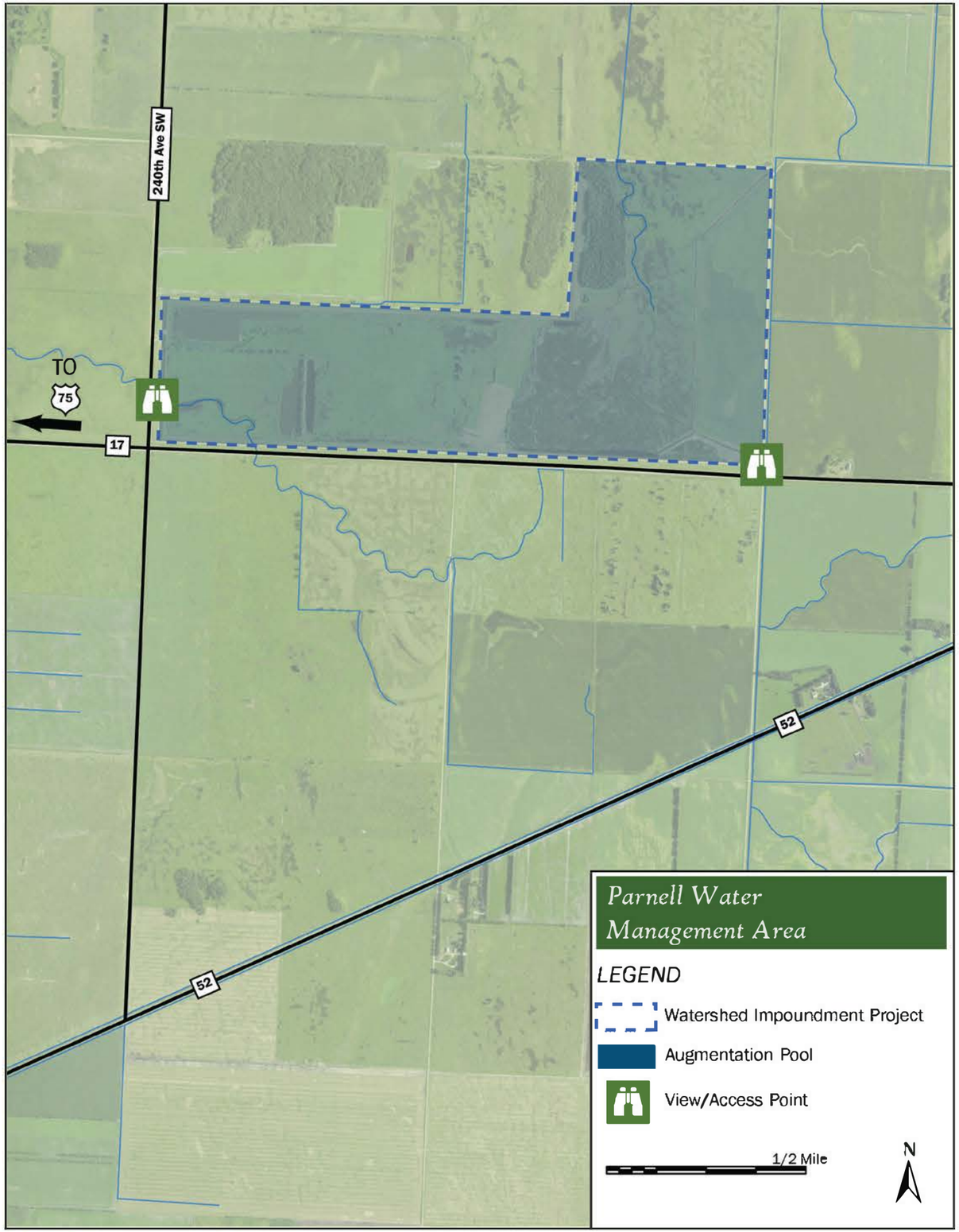
Norland Water Mangement Areas

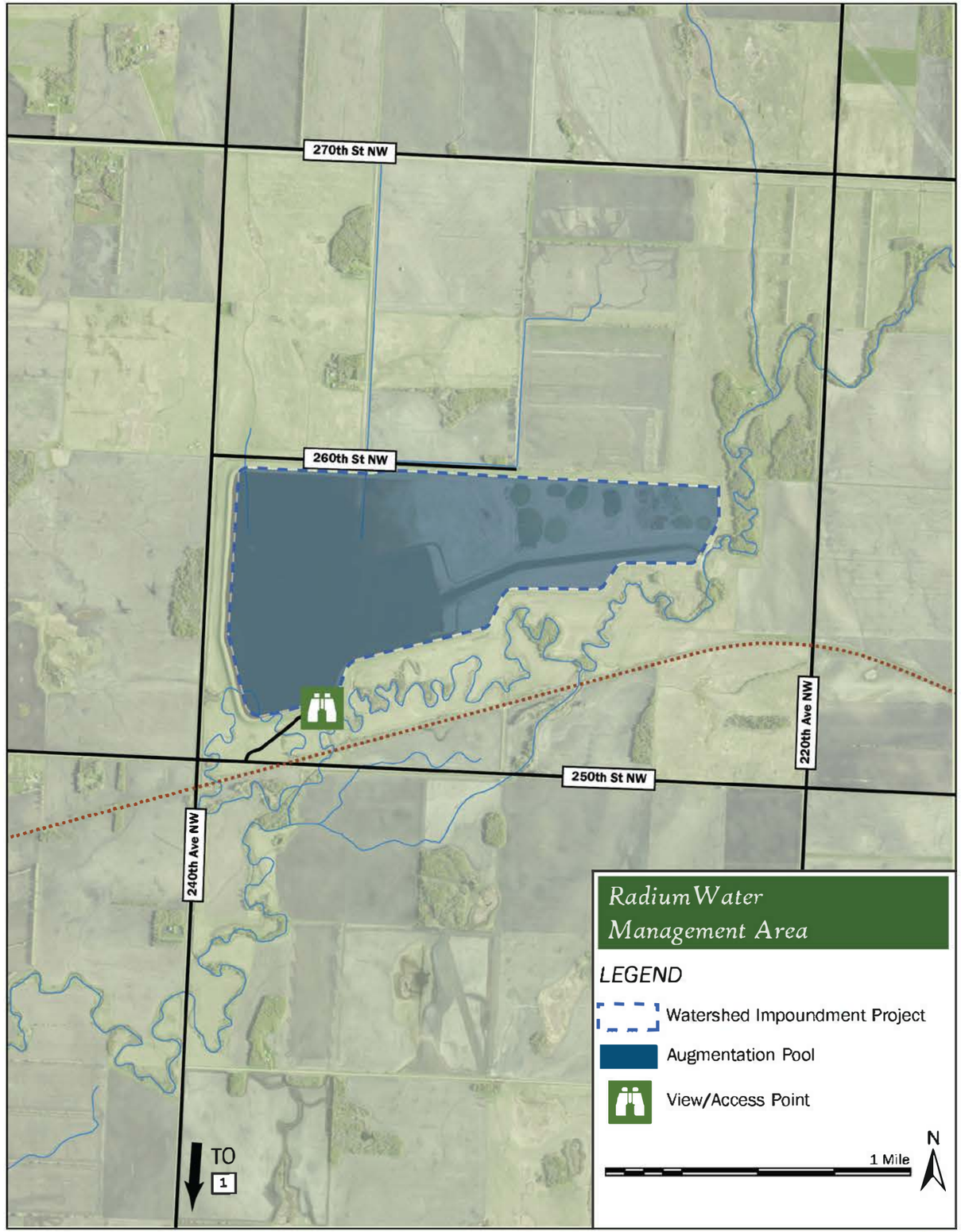
LEGEND

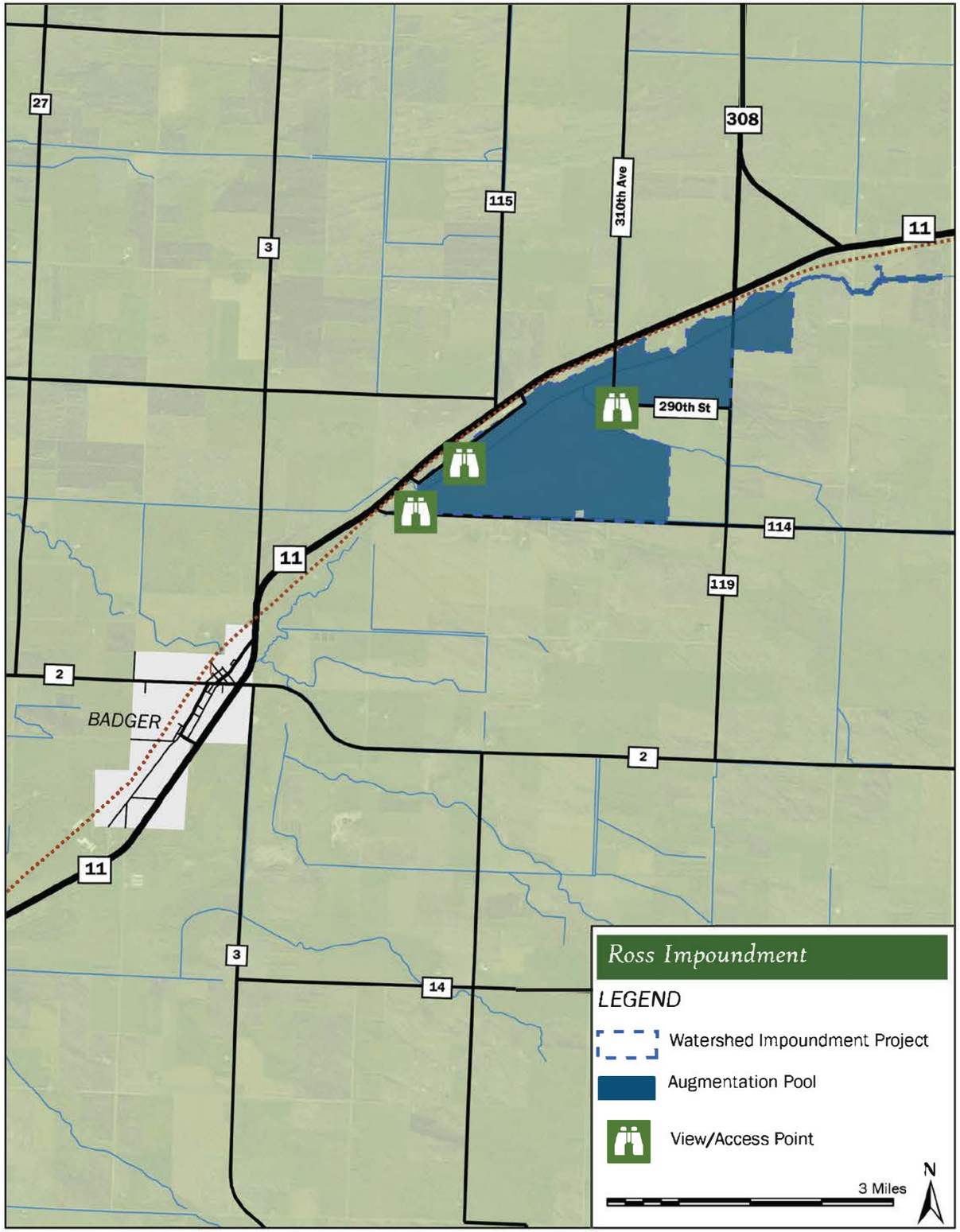
- Watershed Impoundment Project
- Augmentation Pool
- View/Access Point

3 Miles

N


240th Ave SW
TO
75
17
52
52
Parnell Water
Management Area
LEGEND
Watershed Impoundment Project
Augmentation Pool
View/Access Point
1/2 Mile
N


270th St NW
260th St NW
220th Ave NW
250th St NW
240th Ave NW
TO
1
RadiumWater
Management Area
LEGEND
Watershed Impoundment Project
Augmentation Pool
View/Access Point
1 Mile
N



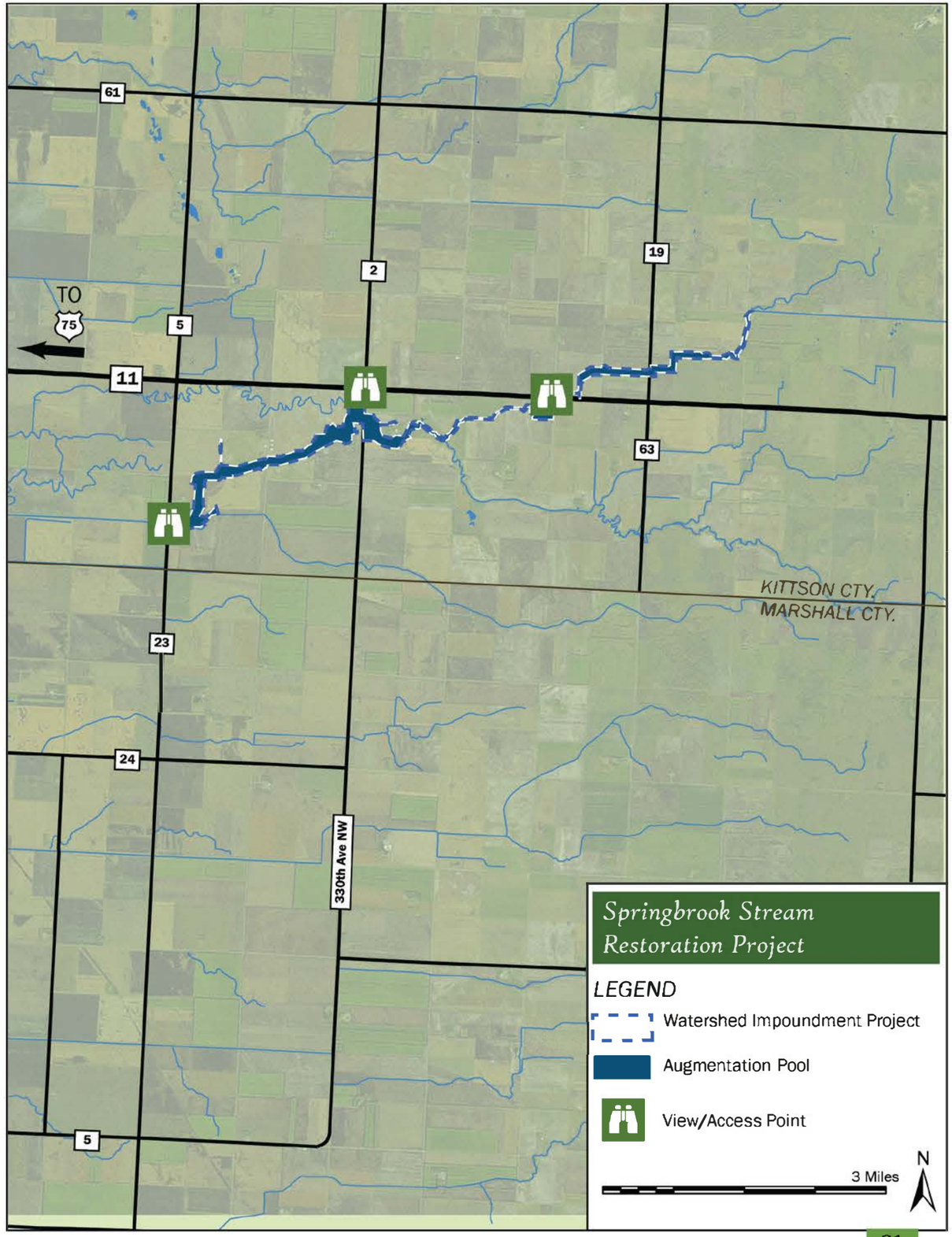
Ross Impoundment

LEGEND

- Watershed Impoundment Project
- Augmentation Pool
- View/Access Point

3 Miles

N



Springbrook Stream Restoration Project

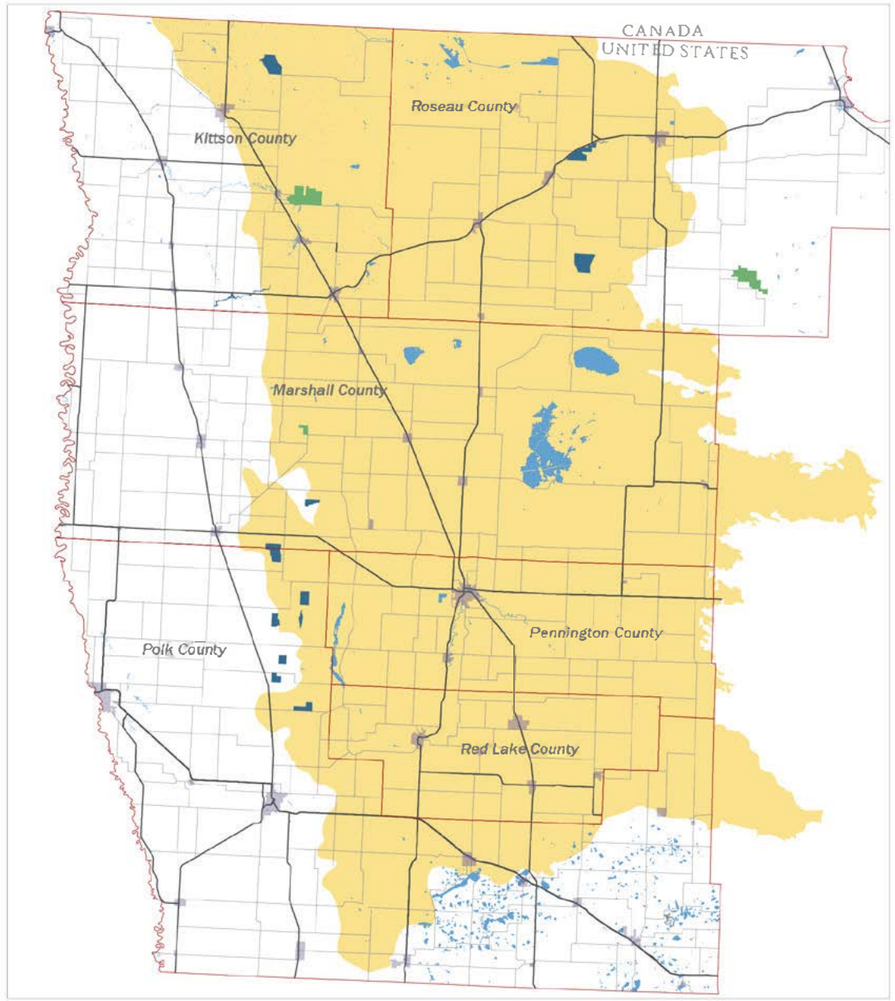
LEGEND

- Watershed Impoundment Project
- Augmentation Pool
- View/Access Point

3 Miles

N

TALLGRASS ASPEN PARKLAND BIRDING TRAIL



Tallgrass Aspen Parkland Province

25 miles N

- Tallgrass Aspen Parklands
- County Boundary
- Watershed District Project Site
- Municipality

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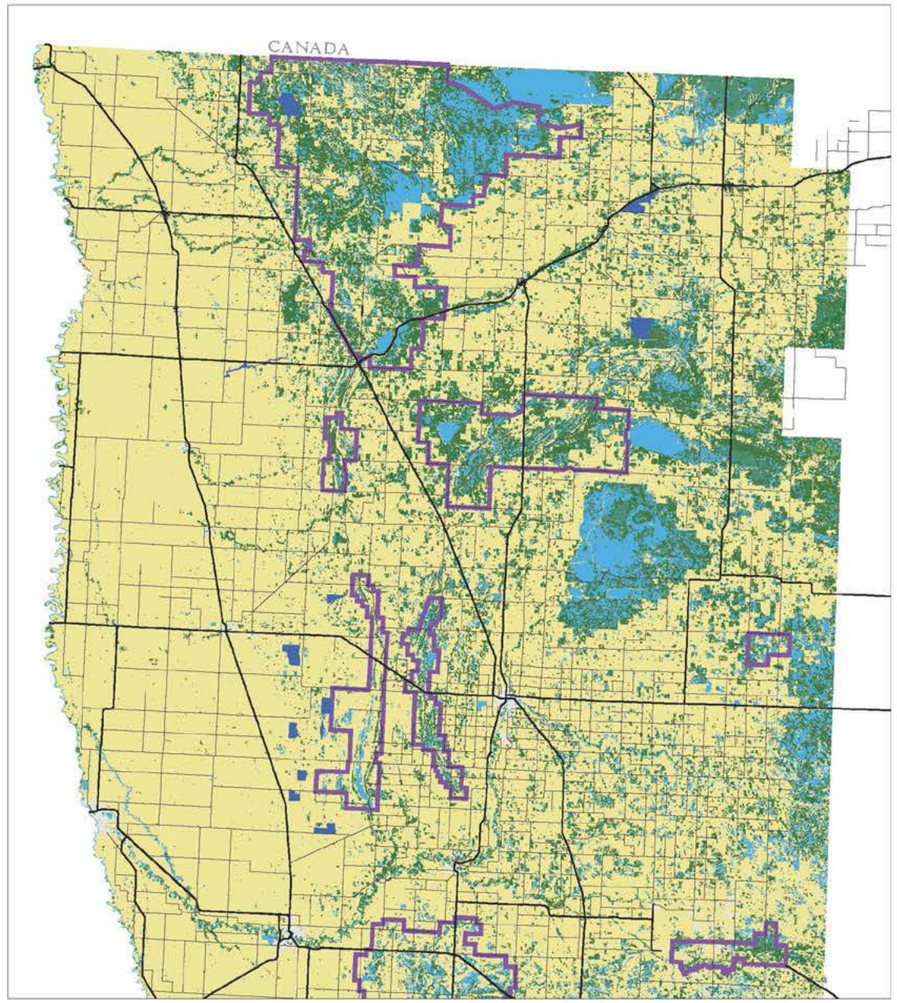
TALLGRASS ASPEN PARKLAND BIRDING TRAIL



Land Cover and Prairie Conservation Areas

25 miles N

- Cropland or Grassland
- Wooded Area
- Open Water
- Prairie Conservation Area
- Watershed District Project Sites

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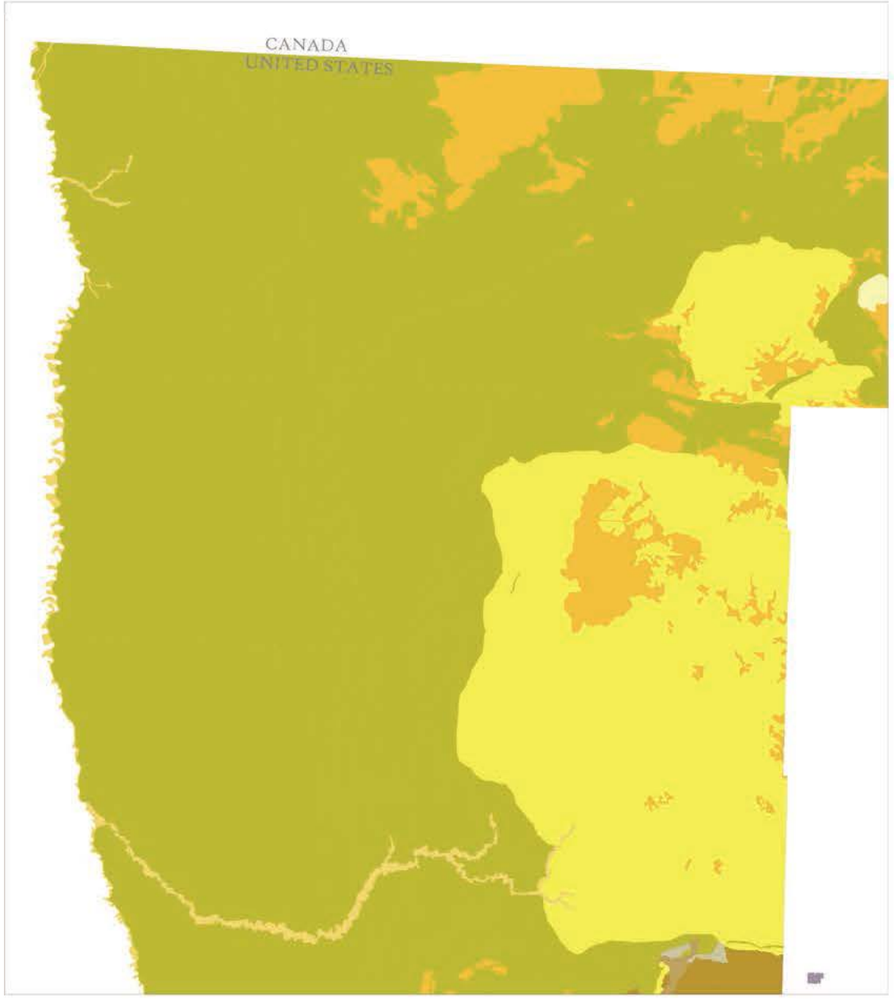
TALLGRASS ASPEN PARKLAND BIRDING TRAIL



- Alluvium
- Ice Contact
- Lacustrine
- Outlets
- Outwash
- Peat
- Supraglacial Drift Complex
- Till Plain

25 miles N

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TALLGRASS ASPEN PARKLAND BIRDING TRAIL

Presettlement Vegetation

25 miles N

- Aspen-Birch (trending to Conifers)
- Aspen-Birch (trending to Hardwoods)
- Aspen-Oak Land
- Big Woods - Hardwoods
- Brush Prairie
- Conifer Bogs and Swamp
- Jack Pine Barrens and Openings
- Lakes (open water)
- Mixed Hardwood and Pine
- Mixed White Pine and Red Pine
- Oak Openings and Barrens
- Open Muskeg
- Pine Flats
- Prairie
- River Bottom
- Undefined
- Wet Prairie
- White Pine

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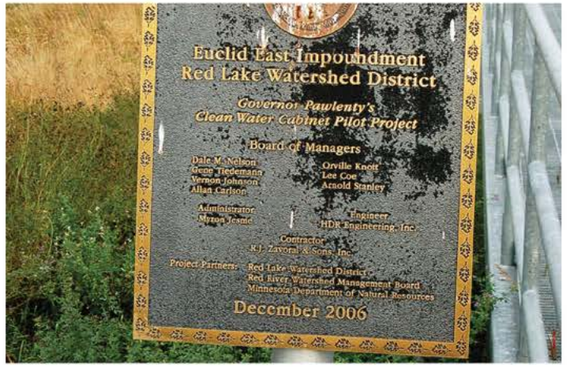
Photos from Site Visit


Euclid East Impoundment
Red Lake Watershed District
Governor Pawlenty's
Clean Water Cabinet Pilot Project
Board of Managers
Dale V. Nelson
Rene Tiedemann
Vernon Johnson
Allan Carlson
Orville Knott
Lee Coe
Arnold Stanley
Administrator
Myron Jeans
Engineer
HDR Engineering, Inc.
Contractor
K.J. Zavoral & Sons, Inc.
Project Partners:
Red Lake Watershed District
Red River Watershed Management Board
Minnesota Department of Natural Resources
December 2006