EDUCATOR'S GUIDE

PRAIRIES & WETLANDS OF THE MINNESOTA RIVER BASIN



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Ask an Expert: About the Minnesota River is produced by the Water Resources Center (WRC) at Minnesota State University, Mankato. Created in 1987, the WRC serves as a regional center for environmental research and information exchange.

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ASK AN EXPERT INTRODUCTION

Ask an Expert: About the Minnesota River is an on-line field trip featuring scientists and experts answering questions on the health of the Minnesota River Basin. A dramatically changed landscape has impacted the waterbodies of the Minnesota River Basin whether for recreation use, drinking water or the health of aquatic organisms. Today, the Minnesota River contributes a significant level of pollutants including sediment and nutrients downstream to Lake Pepin, the Mississippi River and the Gulf of Mexico.

Water quality can be a complicated and confusing issue to students and the general public. Terms like Total Maximum Daily Load (TMDL), Best Management Practices (BMPs), Total Suspended Solids (TSS) to name a few don't make it any easier. Government agencies responsible for coordinating the effort to protect, improve, and restore the health of our lakes and rivers struggle to find a balance between the science and citizen understanding these complex issues. *Ask an Expert: About the Minnesota River* will strive to bridge that gap by focusing on a set of themes to tell the story of how a dramatically changed landscape here in the Minnesota River Basin has resulted in water pollution problems we are being asked to deal with in many different ways.

The story of the Minnesota River Basin is one of sorrow, hope, and great patience. *Ask an Expert* uses videos, fact sheets, and educational modules to help clarify what is happening to this state and national significant resource. Experts answer questions about a host of issues organized in 20 major themes.

History of the Land recalls how glaciers formed the basin and the Dakota making their home on a vast prairie-wetland landscape dotted by shallow lakes and forested areas.

Landscape Today is dominated by agricultural production involving the growing of corn and soybeans long with some urban development.

Bio indicators of our rivers and lakes (fish, mussels, macroinvertebrates, etc.) provide a window into the health of the ecosystem and how much it has been impacted by water pollution and landscape change.

Water Quality is a term used to measure the impact of pollutants (sediment, nutrients, bacteria, etc.) on our rivers and lakes including the aquatic organisms like fish, mussels and macroinvertebrates.

Conservation Efforts plays a leading role by government agencies and citizens to reverse a trend of increasing water quality issues for our rivers and lakes.

Ultimately, *Ask an Expert: About the Minnesota River* highlights the dedicated scientists and citizens working hard to better understand our impact on the resource and how all of us can make a difference for today and for future generations.

For more information about *Ask an Expert: About the Minnesota River*, go to <u>http://mrbdc.mnsu.edu/learn</u>

ASK AN EXPERT THEMES

This story of the health of the Minnesota River is being told through 20 themes ranging from the basin's geology story to the disappearance of wetlands and other ecosystems to the status of fish and additional aquatic organisms to water quality or level of water pollutants.

Landscape History

- Geology Ten thousand years ago Glacial River Warren carved out the presentday Minnesota River Valley creating a fairly geologically young landscape.
- Pre-1850s Numerous Dakota tribes for centuries lived among an extensive prairie-wetland complex bracketed by a large swath of the Big Woods.
- Prairie Hundreds of prairie plants including grasses, flowers and forbs dominated the rolling landscape intermixed with shallow lakes and wetlands.
- Wetlands Thousands of wetlands of all sizes associated with prairies, forests and rivers provided a valuable hydrological function throughout the basin.
- Big Woods A deciduous of 2,000 to 3,000 square miles spread north and east from present-day Mankato in contrast to the vast prairie-wetland complex.
- Euro-American Settlement Americans and Euro immigrants began a push in the 1850s and accelerated after the tragic Dakota Conflict and end of the Civil War.

Landscape Today

- Agricultural Over 80 percent of the land is tied to growing crops particularly corn and soybeans along with raising of livestock including hogs, cattle and chickens.
- Urban The eastern portion of the basin comprising mostly of the Twin Cities suburbs have seen the largest population growth along with places like Mankato.

Water Quality

- Monitoring Water quality data is collected at hundreds sites to assess rivers and lakes to identify impaired waters and the health of biological organisms.
- Impaired Waters A significant number of the waterbodies for sediment, nutrients, bacteria and other pollutants have been placed on the impaired waters list.
- Sediment High levels of total suspended solids are beginning to a downward trend especially on the main stem and some of the major rivers.
- Nitrogen Levels of this nutrient have either remained high or increasing on some of the major rivers.

- Phosphorus In relationship with sediment this nutrient has also shown decreasing levels on many major rivers and the main stem of the Minnesota River.
- Bacteria More than 90 percent of the rivers monitored in the basin exceed health standards set by the Federal Clean Water Act.
- Downstream Impacts The Minnesota River is contributing significant levels of water-related pollutants affecting Lake Pepin, the Mississippi River and Lake Pepin.

Bio-Indicators

- Fish Studies have identified a little over 100 different fish species in the basin with some like channel catfish and walleye doing better than American eel and shoal chub.
- Mussels Only 23 out of the original 41 different species are still found in the basin with some watersheds like the Chippewa and Pomme de Terre doing better than others.
- Macroinvertebrates These aquatic organisms including mussels are considered sentinels for water quality with studies showing mixed results for health populations.

Making a Difference

- Urban Construction of wastewater plants, stormwater systems and other conservation practices and programs are making a difference.
- Rural Thousands of conservation practices and easements have been implemented to improve water quality showing some success in places like Beaver Creek Watershed.

EDUCATOR'S GUIDE OVERVIEW

This educator's guide is designed to directly link high school students with scientists and citizens' experts studying what is happening about the health of the Minnesota River Basin through lesson plans, videos, and fact sheets by concentrating on these goals:

- What happens on the landscape has a direct impact on the rivers and lakes including water quality and the living resources.
- These impacts are being studied by scientists and citizens throughout the Minnesota River Basin to identify how it affects the resource and what can be done to improve it.
- Conservation efforts are being implemented on both a small and large scale to improve, protect and restore our rivers and lakes. This will benefit the living resources and the public's ability to effectively address the consequences of how we manage landscape changes.

How to Use the Educator's Guide

The goal of *Ask an Expert: About the Minnesota River* is to increase the public awareness about the health of the Minnesota River through video interviews of scientists and citizens working in the field. These experts answer questions related to their particular topic of study in an engaging manner that brings the students and public right into this world of scientific research. This Educator's Guide provides a step by step process of navigating through a particular theme involving videos, lesson plans, fact sheets/field guides and much more.

I. Project Overview highlights each of the different themes selected to tell the story of the Minnesota River Basin through the eyes of our experts.

II. Theme Orientation will help guide the teacher and students in their use of the educator's guide and what each of the products offers for the classroom.

- Video Overview
- Key Terms
- Discussion Questions
- Fact Sheets and Field Guides

III. Lesson Plans are designed to give students a chance to learn about the particular theme through specific questions and hands-on activities.

IV. Additional Resources will allow students to conduct additional research on the various themes through websites, books, reports and more.

EDUCATOR'S GUIDE THEMES

Ask an Expert: About the Minnesota River captures scientists and citizens in the field answering questions about the health of the Minnesota River. This online field trip incorporates video of the experts answering questions related to a particular theme. Images, graphics, charts, and maps along with fact sheets, field guides, power point presentations, 360 panoramas, and website will be used along with the videos to tell this story.

For more information on *Ask an Expert: About the Minnesota River*, go to http://mrbdc.mnsu.edu/learn

THEME I: Landscape History

- Geology
- Prairie
- Wetlands

THEME II: Landscape Today

• Agriculture

THEME III: Water Quality

- Monitoring
- Impaired Waters
- Sediment
- Nitrogen
- Phosphorus
- Downstream Impacts
- Hydrology

THEME IV: Bio Indicators

- Fish
- Mussels
- Macroinvertebrates

ASK AN EXPERT: HISTORY OF THE LAND VIDEO SEGMENTS

Prairie Segments Segment Length Description

0:37 seconds **Prairie History –** Before Euro-settlement, Minnesota's land was covered in prairie grasslands as high as 6 feet. The prairie before, Euro-settlement, was home to diverse animal, plant life and insects we would not recognize today.

0:40 seconds **Current Prairie Status –** Southern Minnesota is supported by agriculture and agricultural growth. However, with big agricultural practices means the destruction and elimination of our prairies. Recently, there has been a big push to restore wetlands and create a balance between sustainable agriculture and restoring prairie lands.

1:42 minutes **Prairie Benefits –** Prairie ecosystems help hold soil in place (reduce sediment erosion) and increasing water quality. Prairies promote valuable wildlife habitats and thus many native grassland birds have returned. Prairie environments are important to our landscapes which helped establish the rich agricultural soils in the Basin today.

1:50 minutes **Prairie Restoration –**Helps restore natural habitats that have become extinct or threatened in the last 150 years.

1:20 minutes **Visiting the Prairie –** To visit a prairie is like visiting a new planet. There are diverse animals, insects, plants and sounds. It takes a prairie about 50 years to become filled with butterflies, wildflowers and tall grasses. Visiting a prairie is very nourishing.

0:58 seconds **What is a Prairie-** Prairies are defined by the plant community such as grasses, forbes and upland sedges. Prairie plants are defined by a deep root system.

Wetland Segments Segment Length Description

1:09 minutes **Wetland History-** Prior to Euro settlement there was a great diversity of wetlands in Minnesota. However, after settlement began and developments were expanding, wetlands began shrinking and disappearing.

0:47 seconds **What is a Wetland** - Area of digressional land that holds water. Home to many plants and animals.

1:50 minutes **Current Wetland Status** - currently, there is a big push to help conserve and preserve our wetlands. 90% of wetlands were lost after Euro-settlement began in the 1850s. Now, Minnesota environmentalists, conservationists and farmers are all pitching in to do their part to keep our wetlands alive.

0:46 seconds **Wetland Drainage –** There is drainage in urban and agricultural areas. Agricultural areas are drained to allow for good crop production which occurs when soils are wet. For agricultural soils to maintain to be wet there needs to be ample amount of drainage and the water that is drained from farmlands goes into our wetlands and ultimately into the Minnesota River.

1:12 minutes **Impacts of Wetland Drainage** - When farmers infiltrate drainage systems, more water is coming off their land faster causing erosion and flooding. Wetlands act as a buffer to slow down water so it can temporarily store it so it infiltrates the soil more slowly and feeds the stream at a more stable rate.

0:37 seconds Threats to Wetlands Today- Agriculture dominates the land use in the Minnesota River Basin. As such, agricultural practices such as drainage and ditching can threaten wetlands and contaminate them.

2:48 minutes **Protecting our Wetlands** - Wetlands are the only ecosystem protected by laws. There are federal and state agencies that help protect our wetlands. But complications arise with private land ownership vs. federally protected land. There is a push to decrease development on wetlands.

6:17 minutes **The Kidneys of the Landscape -** Wetlands filter sediments and impurities from our water, much like our own kidneys help purify our blood to keep us alive. Wetlands are an essential part of our natural habitat.

1:48 minutes **Wetland Benefits** – Wetlands do a lot to help keep our water clean and purified. Run off from wetlands are much cleaner. To keep water clean, wetlands and prairie biomes help settle out sediment from passing water; acts like a kidney. In order to keep wetlands preserved and functional there is a need for good farming practices.

KEY TERMS

Acre: Area of land approximately the size of a football field.

Bar: An elongated landform generated by waves and currents, usually running parallel to the shore, composed predominantly of unconsolidated sand, gravel, stones, cobbles, or rubble and with water on two sides.

Channel: "An open conduit either naturally or artificially created which periodically or continuously contains moving water, or which forms a connecting link between two bodies of standing water" (Langbein and Iseri 1960:5).

Channel bank: The sloping land bordering a channel. The bank has steeper slope than the bottom of the channel and is usually steeper than the land surrounding the channel.

Cobbles: Rock fragments 7.6 cm (3 inches) to 25 .4 cm (10 inches) in diameter.

Ecosystem: An area that contains organisms (living things) interacting with one another and with their non-living environment.

Emergent hydrophytes: Erect, rooted, herbaceous angiosperms that may be temporarily to permanently flooded at the base but do not tolerate prolonged inundation of the entire plant; e.g., bulrushes (Scirpus spp.), salt marsh cord grass.

Emergent mosses: Mosses occurring in wetlands, but generally not covered by water.

Eutrophic lake: Lake that has a high concentration of plant nutrients such as nitrogen and phosphorus.

Flat: A level landform composed of unconsolidated sediments usually mud or sand. Flats may be irregularly shaped or elongate and continuous with the shore, whereas bars are generally elongate, parallel to the shore, and separated from the shore by water.

Floating plant: A non-anchored plant that floats freely in the water or on the surface; e.g., water hyacinth (Eichhornia crassipes) or common duckweed (Lemna minor).

Floating-leaved plant: A rooted, herbaceous hydrophyte with some leaves floating on the water surface; e.g., white water lily (Nymphaea odorata), floating-leaved pondweed (Potamogeton natans). Plants such as yellow water lily (Nuphar luteum) which sometimes have leaves raised above the surface are considered floating- leaved plants or emergents, depending on their growth habit at a particular site.

Forage: Grass and other plants that grazing animals eat.

Forbs: Native prairie wildflowers with deep roots.

Gravel: A mixture composed primarily of rock fragments 2mm (0 .08 inches) to 7.6 cm (3 inches) in diameter. Usually contains much sand.

Growing season: The frost-free period of the year (see U.S. Department of Interior, National Atlas 1970:110- 111 for generalized regional delineation).

Herbaceous: With the characteristics of an herb; a plant with no persistent woody stem above ground.

Hydric soil: Soil that is wet long enough to periodically produce anaerobic conditions, thereby influencing the growth of plants.

Hydrophyte, **Hydrophytic**: Any plant growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content.

Lacustrine: The Lacustrine System includes wetlands and deep water habitats with all of the following characteristics: (1) situated in a topographic depression or a dammed river channel; (2) lacking trees, shrubs, persistent emergents, emergent mosses or lichens with greater than 30% areal coverage; and (3) total area exceeds 8 ha (20 acres). Similar wetland and deep water habitats totaling less than 8 ha are also included in the Lacustrine System if an active wave-formed or bedrock shoreline feature makes up all or part of the boundary, or if the water depth in the deepest part of the basin exceeds 2 m (6.6 feet) at low water. Lacustrine waters may be tidal or non-tidal, but ocean-derived salinity is always less than 0.5 parts per thousand.

Macrophytic algae: Algal plants large enough either as individuals or communities to be readily visible without the aid of optical magnification.

Mesophyte, mesophytic: Any plant growing where moisture and aeration conditions lie between extremes. (Plants typically found in habitats with average moisture conditions, not usually dry or wet.)

Non-persistent emergent's: Emergent hydrophytes whose leaves and stems break down at the end of the growing season so that most above-ground portions of the plants are easily transported by currents, waves, or ice. The breakdown may result from normal decay or the physical force of strong waves or ice. At certain seasons of the year there are no visible traces of the plants above the surface of the water; e.g., wild rice (Zizania aquatica), arrow arum (Peltandra virginica).

Obligate hydrophytes: Species that are found only in wetlands e.g., cattail (Typha latifolia) as opposed to ubiquitous species that grow either in wetland or on upland-e .g., red maple (Acer rubrum).

Palustrine: The Palustrine System includes all non-tidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean derived salts is below 0.5 parts per thousand. It also includes wetlands lacking such vegetation, but with all of the following four characteristics: (1) area less than 8 ha (20 acres); (2) active wave-formed or bedrock shoreline features lacking; (3) water depth in the deepest part of basin less than 2 m (6.6 feet) at low water; and (4) salinity due to ocean-derived salts is less than 0.5 parts per thousand.

Perennial: A plant that grows back year after year from the same root.

Persistent emergent: Emergent hydrophytes that normally remain standing at least until the beginning of the next growing season; e.g. cattails (Typha spp.) or bulrushes (Scirpus spp.).

Photic zone: The upper water layer down to the depth of effective light penetration where photosynthesis balances respiration. This level (the compensation level) usually occurs at the depth of 1% light penetration and forms the lower boundary of the zone of net metabolic production.

Pollen: A powder produced by certain plants and must be carried from plant to plant in order for the plant to reproduce.

Shrub: A woody plant which at maturity is usually less than 6 m(20 feet) tall and generally exhibits several erect, spreading, or prostrate stems and has a bushy appearance ; e.g., speckled alder (Alnus rugosa) or buttonbush (Cephalanthus occidentalis).

Submergent plant: Avascular or nonvascular hydrophyte, either rooted or nonrooted, which lies entirely beneath the water surface, except for flowering partsin some species; e.g. wild celery (Vallisneria americana) or the stoneworts (Chara spp.).

Water table: The upper surface of a zone of saturation . No water table exists where that surface is formed by an impermeable body (Langbein and Iseri 1960 :21).

Adapted from: Classification of Wetlands and Deep Water Habitats of the United States (U.S. Department of Interior, Fish and Wildlife Service, FWS/OBS-79/31, December 1979, Reprinted 1992).

DISCUSSION QUESTIONS

- 1. Why are the historical biomes important to the Minnesota River Valley?
- 2. What are key factors that lead to the destruction of Minnesota's beautiful prairies, wetlands, and big woods?
- 3. What has been done to try and save these biomes?
- 4. What can you, as a student, do to help keep these biomes around for years to come?
- 5. What are some economic and civic factors that lead to restoration projects as well as projects that destroy prairies, wetlands, and big woods?
- 6. What animals have been affected by these man-made changes?

LESSON I: WILDLIFE HABITAT RESTORATION

Lesson Objectives

Upon completion of this lesson, students will understand:

- Geographic inquiry is a process in which people ask geographic questions and gather, organize and analyze information to solve problems and plan for the future.
- Geographic factors influence the distribution, functions, growth and patterns of cities and human settlements.

Materials

- Lesson 1 Worksheet
- *Friends of the Minnesota Valley: Creating a Conservation Legacy* (2011-2012 Habitat Restoration Projectus: A Prosepectus) Packet attatched or the PDF of the packet located here:

http://www.friendsofmnvalley.org/getdocument.aspx?filename=Restoration Project Prospectus2.pdf

Background

Friends of the Minnesota Valley is a restoration partner in the Metro Conservation Corridors. Started in 2003, the Metro Conservation Corridors (MeCC) is a partnership of conservation organizations whose goal is to protect a series of connected corridors throughout the greater Twin Cities area. These corridors provide area citizens with open space, wildlife habitat, and water quality benefits. With funding from the Environmental Trust Fund as recommended by the Legislative- Citizens Commission on Minnesota Resources, the project partners permanently protect and restore ecologically important land in predetermined corridors. During the 2011 and 2012 field seasons, Friends of the Minnesota Valley plans to restore a minimum of 210 acres of significant biological communities and wildlife habitat throughout the MeCC-mapped corridors of the Lower Minnesota River Watershed within Carver, Hennepin, Le Sueur, Sibley, and/or Scott Counties. Our restoration projects focus on lands within the Minnesota Valley National Wildlife Refuge.

Students can either work in a small group or as individuals. This will allow the students to create a connection to the land around the Minnesota Valley Basin. This will also engage the students in civic activities happening in their community.

Procedure

- Give the students the *Creating a Conservation Legacy: Wildlife Habitat Restoration in the Minnesota River Valley.* Read through the packet as a whole class and have discussion questions following the Historical Habitat and Current Restoration Goals Sections. During this time as well students can fill out Worksheet #1.
- The students will then either with small groups or individually. They will then be choosing <u>one</u> of the Planned Restoration Projects. The students will then fill out question #8 on the Worksheet #1.
- After they have all of the groups have answered question #8 have the students present their finding to the class. This would include the location of the site, why this site, what is being done, the timeframe for completion, and the benefits of the restoration.

Follow up

- Have a class reflection as to why, how, when, and who is making this restoration process happen.
- What could be done to help in OUR community?
- Any areas that you want to see returned to their nature setting?
- What can you, as a student, do to help this process?

Lesson I Worksheet

	Date	_ Class	
Wildlife Habitat Re	storation in the Mir	nnesota River Valley	
. How many counties	are encompassed in th	ne Minnesota River Valle	y?
2. Early explorers in th	e 17/1800's described	a landscape covered in:	
3. In 1850, approximate Big Woods had been co	ely% of The Big onverted to farmland.	Woods was forest. By 19	88,% of The
4. The Minnesota Rive	r Basin is located in the	e so-called "duck	
5. Ducks rely on	area	as around wetlands and s	shallow lakes for
	1 147.11	limination of nearly	percent
both nesting and as a f	ood source. With the e		1
both nesting and as a f of wetlands in the basi	n over the last 80 years	s, there is less habitat and	l food sources for

field seasons? (at minimum) _____

7. When restoring only ______ plant species will be used with specific native seed mixes being adjusted for local site conditions and availability.

8. Now choose one of the projects given in the packet. Write a **reaction** to what is being done, what type of ecosystem they are restoring, why that site, what the benefits and results will be, as well as the timeframe they have placed on the project.



Lesson I Reading: Creating a Conversation Legacy: Wildlife Habitat Restoration in the Minnesota River Valley 2011-2012 Courtesy of the Friends of the Minnesota Valley

Habitat Restoration Projects: A Prospectus - Historical Habitat

Early explorers' accounts and paintings provide glimpses of what the landscape resembled before widespread European settlement. Many explorers wrote descriptions about the rich flora and fauna and Native Americans inhabiting the Minnesota River Valley in the 1700s and 1800s. They described a landscape covered in tall grass, wetlands, shallow lakes and forested areas with numerous American Indian tribes living along the Minnesota River. The area in which Friends of the Minnesota Valley is conducting wildlife habitat restoration in 2011-2012 is in commonly known as The Big Woods. At one time, a 2,000 to 3,000-square mile forest extended from the Mankato area north to Monticello. Filled with elm, sugar maple, basswood and oak, this deciduous forest stood in contrast to the surrounding immense prairie- wetland landscape.

French explorers in the 17th Century called it bois fort or bois grand, later translated as the "Big Woods" by English-speaking settlers. Today, less than 2 percent of the original "Big Woods" remain after Euro-American settlers began to clear the forest to establish farms, plant crops and build cities (Minnesota State University Water Resources Center, *Minnesota River Trends*, 2009). In 1850, approximately 62% of The Big Woods was forest. By 1988, 62% of The Big Woods had been converted to farmland. The Minnesota River runs through the middle of the once predominantly-forested Big Woods. The Mississippi River forms the northeastern boundary. Lakes and wetlands are common; more than 100 lakes are greater than 160 acres in size, and many are groundwater-controlled with no inlets or outlets. The Twin Cities metropolitan area continues to expand into The Big Woods, and both farming and urbanization have led to dramatic changes in habitats. Water quality is also a conservation concern in this agricultural landscape (Minnesota Department of Natural Resources, *Tomorrow's Habitat for the Wild and Rare, Big Woods Sub- section Profile*, 2006).

There are 121 Species in Greatest Conservation Need (SGCN) that are known or predicted to occur within the Big Woods, the fourth most of all subsections in Minnesota. These SGCN include 55 species that are federal or state endangered, threatened, or of special concern. Big Woods habitats feature woodland birds such as red-shouldered hawks and warblers, savanna species such as Blanding's turtles and redheaded woodpeckers, and wetland species such as turtles, ospreys, Forster's terns, and black terns. The Minnesota River also provides habitat to many species. Smooth softshell turtles utilize exposed sand bars and south-facing cut-banks as basking and nest sites. Forested river terraces are occupied by milk snakes and western foxsnakes, while bull snakes and racers live among open sandy terraces (Id.).

The Minnesota River Basin is located in the so-called "duck factory," considered North America's best waterfowl breeding habitat and one of the most important duck breeding areas in the world. This area covers the southern part of Minnesota along with the Dakotas, Iowa and central Canada. Much of the prairie and wetlands originally found in the "duck factory" area have disappeared and what remains, faces continued pressure to be broken up and drained for agricultural production. Ducks rely on upland areas around wetlands and shallow lakes for both nesting and as a food source. With the elimination of nearly 95 percent of wetlands in the basin over the last 80 years, there is less habitat and food sources for ducks. Many of the remaining wetlands have degraded water quality and quantity. The immense drainage system put in place across the basin has significantly decreased the duck population capability (*Minnesota River Trends*).

Current Restoration Goals

Friends of the Minnesota Valley is a restoration partner in the Metro Conservation Corridors. Started in 2003, the Metro Conservation Corridors (MeCC) is a partnership of conservation organizations whose goal is to protect a series of connected corridors throughout the greater Twin Cities area. These corridors provide area citizens with open space, wildlife habitat, and water quality benefits. With funding from the Environmental Trust Fund as recommended by the Legislative- Citizens Commission on Minnesota Resources, the project partners permanently protect and restore ecologically important land in predetermined corridors. During the 2011 and 2012 field seasons, Friends of the Minnesota Valley plans to restore a minimum of 210 acres of significant biological communities and wildlife habitat throughout the MeCC-mapped corridors of the Lower Minnesota River Watershed within Carver, Hennepin, Le Sueur, Sibley, and/or Scott Counties. Our restoration projects focus on lands within the Minnesota Valley National Wildlife Refuge. We will focus our restoration efforts on publicly-accessible lands within the Minnesota Valley National Wildlife Refuge, within the Refuge's boundary expansion area, and on private lands. We will give priority to permanently protected lands. Restorations on private lands will be protected through a minimum 10-year landowner agreement through the U.S. Fish and Wildlife's Partners For Fish and Wildlife Program. Projects will be selected based on but not limited to criteria such as the ecological importance of the restoration area, based on size, habitat quality, buffering of existing high quality habitat, water quality benefits, connectivity to other natural areas, matching funds, and partner interest and commitment.

Friends of the Minnesota Valley and its partners will restore and enhance the hydrology of wetlands such as shallow lakes, for the benefit of wildlife and water quality, plant retired agricultural fields to prairie using native ecotype seed, remove and manage exotic species, and restore important floodplain forest communities along the Minnesota River. Only native plant species will be used with specific native seed mixes being adjusted for local site conditions and availability. We will develop ecological restoration and management plans prior to beginning our restoration work. Elements of the restoration and management plans will include a description of current conditions including biotic and abiotic elements; descriptions of target communities; descriptions of proposed restoration methodology; evaluation processes utilized for determining the effectiveness of restoration; and proposed ongoing management activities and responsibilities. Restoration and management plans

ongoing management activities and responsibilities. Restoration and management plans will be developed by the U.S. Fish & Wildlife Service in consultation with Friends of the Minnesota Valley.

Planned Restoration Projects

Project #1: Jessenland Unit, Sibley County Ecotypes: Wetland, Oak Savanna, Floodplain Forest Description:

<u>Restoration Phase I (Construction)</u> – 400 Total Unit Acres/ 126 Minimum Restored Acres Friends of the Minnesota Valley will restore approximately 25 acres of Type I, II, and VI wetlands by breaking drain tile, shallow scraping, and constructing earthen dams within drain- age ditches. We will seed wetlands with native wetland species. Local ecotype oak savanna grasses and forbs have been planted to restore approximately 101 acres. After the grasses are established, we will plant oak trees to complete the oak savanna restoration. We will re- move exotic species such as buckthorn through mechanical and chemical treatment to allow native species to re-establish or expand. In addition, woody species will be removed to create firebreaks for future fire management of the oak savanna.

Restoration Phase II (Management and Maintenance)

After the completion of Phase I, the land will be protected and managed in perpetuity by the U.S. Fish and Wildlife Service (USFWS). The USFWS will manage and monitor the restoration and will ensure the long-term success of the project through multiple mechanisms including prescribed fire, exotic species control, and ecological assessment.

Results and Benefits

This restoration is an important piece in linking floodplain forest habitats in the Jessenland Conservation Area Boundary. When combined with adjacent downstream parcels, the restoration will complete the Jessen land Unit of Valley National Wildlife Refuge and complement the permanently-protected Reinvest in Minnesota (RIM) and Conservation Reserve Enhancement Program (CREP) habitat easements on the Scott County side of the Minnesota River.

Project #2: Henderson Unit, Scott & Sibley Counties Ecotypes: Wetland, Floodplain Forest Description:

<u>Restoration Phase I (Construction)</u> – 1250 Total Unit Acres/ 130 Minimum Restored Acres

We will convert 80 acres currently in agricultural production to floodplain forest and shallow riverine wetland habitats. Approximately 50 acres of Type I, II, and III wetlands will be restored by breaking drain tile, shallow scraping, and constructing earthen dams within drainage ditches. We will also seed wetlands with native local ecotype wetland species. Exotic species such as buckthorn will be mechanically and chemically treated to allow native species to re- establish or expand.

Restoration Phase II (Management and Maintenance)

After completion of Phase I, the land will be protected and managed in perpetuity by the U.S. Fish and Wildlife Service (USFWS). The USFWS will manage and monitor the restoration and will ensure the long term success of the project through multiple mechanisms including pre- scribed fire, exotic species control, and ecological assessment.

Results and Benefits

Wetland and riparian habitat in the vicinity of the Henderson Unit that supports 22 species of ducks, geese and other waterbirds will be enhanced by this restoration project.

Many other birds are known to frequent the area, including gulls, terns, hawks, ospreys, eagles, herons, egrets, rails, kingfishers, and swallows.

Project #3: St. Lawrence Unit, Scott County Ecotypes: Wetland, Prairie Description

<u>Restoration Phase I (Construction)</u> – 160 Total Unit Acres/ 20 Minimum Restored Acres The absence of fire has resulted in the encroachment of woody species within the wetland and prairie, specifically cedar trees. Approximately 35 acres of cedars and other woody species such as buckthorn and honeysuckle will be mechanically removed and chemically treated to allow native species to re-establish and expand. In addition, approximately 20 acres of Type I, II, and III wetlands will be restored by breaking drain tile, shallow scraping, and constructing earthen dams within drainage ditches. Wetlands will also be seeded with native local ecotype wetland species.

Restoration Phase II (Management and Maintenance)

The property is located within the Minnesota Valley National Wildlife Refuge and is permanently protected by the U.S. Fish and Wildlife Service (USFWS). After completion of Phase I, the USFWS will manage and monitor the restoration and will ensure the long term success of the project through multiple mechanisms including prescribed fire, exotic species control, and ecological assessment.

Benefits and Results

This restoration will provide high quality habitat for nesting, breeding, and brood rearing of migratory waterfowl and birds. In addition, the close proximity to other permanently protected state and federal public lands magnifies the potential benefit to wildlife, water quality, and recreational opportunities.

Project #4: Upgrala Unit, Hennepin County Ecotype: Prairie

Description

<u>Restoration Phase I (Construction)</u> – 32 Total Unit Acres/ 15 Minimum Restored Acres The absence of fire has resulted in the encroachment of woody species within the prairie. The Friends and our partners will remove 4 acres of cedars, elms, and other woody species through mechanical means. Eleven (11) acres of non-native brush, such as buckthorn and honeysuckle, will be mechanically removed and chemically treated to allow native species to re-establish and expand.

Restoration Phase II (Management and Maintenance)

The property is located within the Minnesota Valley National Wildlife Refuge and is permanently protected by the U.S. Fish and Wildlife Service (USFWS). After completion of Phase I, the USFWS will manage and monitor the restoration and will ensure the long term success of the project through multiple mechanisms including prescribed fire, exotic species control, and ecological assessment.

Benefits and Results

The prairie is part of the Minnesota Valley National Wildlife Refuge and is identified by the Minnesota County Biological Survey as a high-quality southern dry prairie remnant with four documented species listed on this site. The site is listed as a critical habitat type in the Minnesota Valley National Wildlife Refuge/ Wetland Management District Comprehensive Conservation Plan and is also recognized as a rare ecosystem in the Minnesota Department of Natural Resources' Tomorrow's Habitat for the Wild and Rare Plan.

Project #5: Jailhouse Marsh Unit, Scott County Ecotype: Wetland

Description

<u>Restoration Phase I (Construction)</u> – 84 Total Unit Acres/ 50 Minimum Restored Acres River flooding has caused an earthen dike and fixed crest water control structures to fail, reducing the extent and quality of this wetland. With completion of this proposed work to replace the dike and water control structure, a minimum of 50 acres of this marsh will be restored or enhanced to support Type I, II, & III wetlands.

Restoration Phase II (Management and Maintenance)

The property is located within the Minnesota Valley National Wildlife Refuge and is permanently protected by the U.S. Fish and Wildlife Service (USFWS). After completion of Phase I, the USFWS will manage and monitor the restoration and will ensure the long term success of the project through multiple mechanisms including prescribed fire, exotic species control, and ecological assessment.

Benefits and Results

The site is listed as critical habitat type in the Minnesota Valley National Wildlife Refuge/ Wet- land Management District Comprehensive Conservation Plan. This restoration will provide high-quality habitat for nesting, breeding, and brood-rearing of migratory waterfowl and birds. In addition, the close proximity to permanently protected state and federal lands magnifies the potential benefit to wildlife, water quality, and recreational opportunities.

Project #6: Louisville Swamp Unit, Scott County Ecotype: Oak Savanna Description

<u>Restoration Phase I (Construction)</u> – 1,000 Total Unit Acres/ 5 Minimum Restored Acres The Louisville Swamp Unit of the Minnesota Valley National Wildlife Refuge includes many parcels of degraded oak savanna. With this project, restoration will be initiated on 5 acres of degraded oak savanna. This work will include mechanical removal of woody vegetation not associated with oak savanna ecosystems. Also included in this restoration phase is herbicide treatment of stumps (twice), seeding with oats to build a fine fuel base, and the application of prescribed fire.

Restoration Phase II (Management and Maintenance)

The property is located within the Minnesota Valley National Wildlife Refuge and is permanently protected by the U.S. Fish and Wildlife Service (USFWS). After completion of Phase I, the USFWS will manage and monitor the restoration and will ensure the long term success of the project through multiple mechanisms including prescribed fire, exotic species control, and ecological assessment.

Benefits and Results

The site is listed as critical habitat type in the Minnesota Valley National Wildlife Refuge/ Wet- land Management District Comprehensive Conservation Plan. Also, the project is identified by the Minnesota Department of Natural Resources' Minnesota County Biological Survey as supporting Dry Sand-Gravel Oak Savanna communities of significant (high) quality. With this project, we will maintain that quality and expand the extent of savanna communities. Restoration and management activities for this project specifically implement those actions recommended for this habitat as identified in Minnesota's Comprehensive Wildlife Conservation Strategy *Tomorrow's Habitat for the Wildlife and Rare.*

Project #7: Rapids Lake Unit, Carver County Ecotype: Oak Savanna, Prairie Description

<u>Restoration Phase I (Construction)</u> – 1,000 Total Unit Acres/ 35 Minimum Restored Acres

The Rapids Lake Unit of the Minnesota Valley National Wildlife Refuge includes many areas of degraded prairie remnant intermixed with degraded oak savanna. With this project, restoration will be initiated on 35 acres of degraded remnant prairie and oak savanna. This work will include mechanical removal of woody vegetation not associated with prairie and oak savanna ecosystems. Also included in this restoration phase is herbicide treatment of stumps and seeding with oats to stabilize erosive soils and build a fine fuel base for future prescribed fires.

Restoration Phase II (Management and Maintenance)

The property is located within the Minnesota Valley National Wildlife Refuge and is permanently protected by the U.S. Fish and Wildlife Service (USFWS). After completion of Phase I, the USFWS will manage and monitor the restoration and will ensure the long term success of the project through multiple mechanisms including prescribed fire, exotic species control, and ecological assessment.

Benefits and Results

The site is listed as critical habitat type in the Minnesota Valley National Wildlife Refuge/ Wetland Management District Comprehensive Conservation Plan. Also, the project is identified by the Minnesota Department of Natural Resources' Minnesota County Biological Survey as supporting Southern Dry Prairie and Dry Sand-Gravel Oak Savanna communities of significant (high) quality. With this project, we will maintain that quality and expand the extent of prairie and savanna communities. Restoration and management activities for this project specifically implement those actions recommended for this habitat as identified in Minnesota's Comprehensive Wildlife Conservation Strategy *Tomorrow's Habitat for the Wildlife and Rare*.

LESSON 2: SMALLVILLE PRAIRIE DEVELOPMENT PROJECT (SMALL UNIT)

Lesson Objectives

Upon completion of this lesson, students will understand:

- Democratic government depends on informed and engaged citizens who exhibit civic skills and values, practice civic discourse, vote and participate in elections, apply inquiry and analysis skills and take action to solve problems and shape public policy.
- Individuals, businesses and governments interact and exchange goods, services and resources in different ways and for different reasons; interactions between buyers and sellers in a market determines the price and quantity exchanged of a good, service or resource.
- Democratic government depends on informed and engaged citizens who exhibit civic skills and values, practice civic discourse, vote and participate in elections, apply inquiry and analysis skills and take action to solve problems and shape public policy.

Materials

- The Sunny Times newpaper article attatched (page 27)
- Smallville online resources located at: <u>http://ed.fnal.gov/help/prairie/6prairie/student/6grp_info.html</u>
- Computer Lab and the power point application

Background

Smallville is set up so that students can direct their own learning with guidance from their teacher. It is designed so that teachers can access teacher pages and student pages alike, but the pupils can only access the student pages. Smallville provides online resources to give all learners the necessary information to solve the presented problem. Teachers and students certainly do their own searches for additional information. Many times students will conduct these searches at home with parental supervision.

Procedure

Day I

- Students read a *Sunny Times* newspaper article about the potential development of a prairie site near the town of Smallville. This leads to a general discussion of the problems communities face when they balance economic development with a desire to maintain open spaces.
- Students begin by brainstorming what they know about how communities reach land use/development decisions, how companies present ideas for land use and about what a prairie is. A hard copy of the newspaper article from the Web page is posted on the bulletin board notifying the Smallville residents of the town meeting when interested

parties will present development plans.

• Student form cooperative learning groups--each one representing one of the parties interested in the potential prairie development. They begin working by creating a project time line and assigning tasks to group members. One student sets up a daily group log to keep track of the work done by each member; another student prints out the record sheet on which he will keep track of completed tasks. A third student sets up a log to keep track of Internet sites visited and the information found there.

Days 2-5

- With teacher guidance, students have been accessing various Web sites to find information about their development, consulting with experts via bulletin boards, and performing lab studies to create documents and visual aids for their presentation. The teacher has been monitoring the group work daily, providing support, questioning rationale for activities, observing group dynamics, and guiding information searches.
- At the beginning of the class period groups assess their progress and review tasks to be accomplished during that class period. The teacher moves from group to group discussing options and providing feedback on work from the previous day.
- Throughout this process, students keep journals, maintaining a running account of their progress, reflecting upon their research and the discoveries of others, and documenting their findings. Opportunities for peer and self-assessment are readily available, and performance rubrics are accessible to students online.

Days 6-7

- The day of the Smallville town meeting has arrived! Students have invited the principal, the mayor, the head of the Chamber of Commerce and a representative of the Forest Preserve District to attend their mock town meeting.
- Each guest is greeted by one of the students selected to serve as members of the Smallville Town Council, introduced to the rest of the students and invited to join the Town Council at the head of the room.
- The presentations begin and proceed in an orderly fashion with the secretary of the Town Council keeping the proceedings on schedule. Students listen attentively to identify pros and cons of each development plan that are recorded on the forms provided by the Town Council.
- At the conclusion of all of the presentations, students write down their choices for the prairie site development, explaining the reasons for that choice.
- The Town Council takes a quick poll of the audience before each member casts his/her vote for the best proposal. After the winner is announced

the class and their guests enjoy light refreshments as they share in the success of the Smallville prairie development project!

Follow up

- Why are natural resources important?
- What can we, as a class, do to improve the environment?
- What role does local government play?

Lesson 2 Reading

Smallville Sunny Times Newspaper

"Prairie Plot to be Considered for Commercial Use; Proposed sale of 40 Acres." By Bill Fraccaro, Larry Cwik, Pat Franzen and Chris Schwarz

SMALLVILLE, USA - The town of Smallville will vote at next month's town council meeting on the proposed sale of 40 acres of the existing 100-acre prairie west of the Otter River. Several companies have offered to purchase the land and develop it for commercial or multifamily residential use. All bidders must present an environmental impact statement, a blueprint of land development, and a statement of social and economic benefit for the community. Additionally, each bidder must establish a prairie management plan to improve and maintain the remaining 60 acres of prairie in its natural state. The town council will determine which party will purchase the prairie based on the community's best interest.

Smallville is interested in potential windfall profits that will be realized with the sale of the property. Due to a lack of other industry in town, the tax base is relatively small. This impacts the community by limiting the budgets of all the town resources such as police, fire protection, schools, and maintenance.

The town is situated adjacent to a large industrial area, and most of the town's adult residents work in the factories. The average income of the residents is below the state average. While there are woodlands nearby and a river separating the east and west sides of town, pollution from external sources are a constant concern. Recently, a railroad car traveling through the town jumped the track and spilled ammonia over a three-block area. Neighbors reacted strongly, complaining about a general lack of concern for the environment.

The town council will meet to hear the presentations and discuss the feasibility of the bids. Obviously, the most convincing presentation will have the edge when the vote is taken. Each of the prospective bidders will present a carefully prepared presentation. Town council members and the public will analyze the pros and cons of each bid before making a final decision. This decision could change the complexion of the community for many years to come.

Interested parties include:

- **Commonwealth Franklin** A projected power plant that will provide 75% of the energy for Smallville.
- **Ten Banners Over Smallville Amusement Park** A family-oriented theme park featuring Hootsie the Owl and his prairie friends.
- **Dino-matic Oil Refinery** A fossil fuel finishing factory focusing on fine fuel for factories.
- Wright-Built Prairie Homes A multifamily residential community providing affordable housing options for up to 200 families.

- **Prairie Rover Automobiles** A subsidiary of Colonel Motors producing mufflers and chassis parts.
- Prairiefield Mall A corporation offering more than 100 stores in one location.
- Scent of the Prairie Landfill A 40-acre waste depository that will be transformed into a local recreation attraction when it is completely filled.
- Pride of the Prairie Internet Shopping Discount Club Corporate Headquarters and Warehouse Corporate headquarters and warehouse for a multinational purchasing club offering discounted items to club members.

Prairie Advisory Council (PAC) – PAC President, Sylphium Monarda, and members of the PAC will also address the city council in an effort to save the prairie in its entirety. PAC members have cataloged a variety of threatened and/or endangered species in the general area of the Smallville Prairie. Hoary puccoon, Franklin ground squirrel, white-fringed prairie orchid and *Bombus griseocollis*(the prairie bumblebee) are all possibly facing partial destruction. Also, the PAC will indicate potential benefits derived from these species, including such qualities as possible medical uses, and develop a plan for community utilization and maintenance of the prairie.

LESSON 3: SEVEN MILE CREEK TOUR

Lesson Objectives

Upon completion of this lesson, students will understand:

- Historical inquiry is a process in which multiple sources and different kinds of historical evidence are analyzed to draw conclusions about how and why things happened in the past.
- The meaning, use, distribution and importance of resources changes over time.

Materials

• Virtual tour Website

http://mrbdc.mnsu.edu/sites/mrbdc.mnsu.edu/files/public/major/midminn/subshe d/sevenmi/vtour/smvt_1.html

- Worksheet #1 on page 30
- Computer access

Background

The Seven Mile Creek Watershed is an important area to people living in the Minnesota River Basin. It has gone through countless changes over the last 100 years. This is a great way for the students to make the connection from the classroom to a watershed in their community.

Procedure

• Hand out the Seven Mile Creek worksheet to the students. Proceed to let the students either in partners or individually access the virtual tour. This will correlate directly to the worksheet and questions. This is a one-day lesson plan; it creates a better image for the students what has happened to watersheds around the Minnesota River.

Follow up

- How has the watershed changed over time? Why?
- What economic factors lead to these changes?
- What animals have been affected by the changes in the watershed?
- How has this changed the ecosystem of the watershed?

Lesson 3 Worksheet SEVEN MILE CREEK VIRTUAL TOUR WORKSHEET

Name:

<u>VIRTUAL TOUR</u> - <u>http://mrbdc.mnsu.edu/sites/mrbdc.mnsu.edu/files/public/major/midminn/subshe</u> <u>d/sevenmi/vtour/smvt_1.html</u>

STOP I

Start at #1 on the website.

1. Headwater streams are typically the ______ streams in a watershed. They form from ______ runoff, melting snow, or ______ that seeps out to the surface as springs.

2. Three primary ditches eventually flow into Seven Mile Creek, the largest waterway in this ______ acre (36.8 square miles) watershed.

3. Early settlers named it Seven Mile because:

STOP 2

4. Approximately ______ percent of the watershed is under corn and soybean cultivation while ______ percent is deciduous forest, and the remaining is wetlands, grassland, and farmsteads

STOP 3

5. Today, the ______ square mile watershed has more than 24 miles of open ditches and over ______ miles of public and private drain tile.

STOP 4

6. ______ and _____ has been monitored at three locations in the watershed since 1996.

STOP 5

7. The vast majority of sediment, phosphorus, and nitrate losses from the watershed take place in the ______ months. More than _____ percent of the growing season load carried by Seven Mile Creek to the Minnesota River occurs in just three months

STOP 6

8. Nicollet County Environmental Services staff estimate that approximately _____% of the homes could potentially be discharging sewage into tiles, drainage ditches, and eventually Seven Mile Creek.

STOP 7

9. Two very popular programs used to help protect and enhance water quality are the:

10. Planting vegetation along drainage ditches and restoring wetlands helps to filter pollutants such as ______ before they reach Seven Mile Creek.

STOP 8

11. T / F Seven Mile Creek is a designated bass stream.

12. Each spring, the Department of Natural Resources stocks Seven Mile Creek with

STOP 9

13. There are many rare features in the park. You might catch a glimpse of the Acadian ______ or the Yellow Sandshell ______.

STOP 10

14. The Minnesota River joins the ______ River near St. Paul and ultimately drains into the ______.

SUGGESTED RESOURCES

A great variety of Programs through the DNR website. http://www.dnr.state.mn.us/forestry/education/activity_guides.html

Information and Lesson Plans about Minnesota

http://www.cloudnet.com/~edrbsass/edmin.htm

Water science and water cycle along with some videos <u>http://www.watersheddistrict.org/education.html</u>

Minnesota Historical Society – Online Resources http://www.mnhs.org/school/online/index.html

POWER-POINT PRESENTATION: WETLANDS

Introduction

Slide 1 - Ask an Expert

Slide 2 - Wetlands on the Minnesota River

• Video

Slide 3- Types of Wetlands

- Seasonal Basins or flats are small, isolated wetlands that contain water only seasonally. Seasonal basins or flats are found throughout Minnesota including Fort Snelling State Park.
- Shrub and Wooded swamps are shrubby or forested wetlands found along the edges of lakes, rivers, and streams

Slide 4- Types of Wetlands

• Prairie potholes are shallow depressions formed by retreating glaciers. They provide excellent habitat and breeding grounds for migratory birds. Sibley, Crow Wing, and Maplewood State Parks provide good examples of these wetlands.

Slide 5- Benefits of Wetlands

- Video
- Erosion control. Wetland vegetation reduces erosion along lakes and stream banks by reducing forces associated with wave action.

Slide 6- Benefits of Wetlands

- Flood control. Wetlands can slow runoff water, minimizing the frequency streams and rivers reach catastrophic flood levels.
- Ground water recharge and discharge. They receive ground water even during dry periods. This helps reduce the impact of short-term droughts on rivers and streams.

Slide 7- Benefits of Wetlands

• Natural filter. Allowing cleaner water to flow in to the body of water beyond or below the wetland.

Slide 8- Wildlife Habitat

- Fisheries habitat. Many species of fish utilize wetland habitats for spawning, food sources, or protection.
- Rare species habitat. 43 per cent of threatened or endangered species in the U.S. live in or depend on wetlands. This includes plants and animals.

• Wildlife habitat. Many animals depend on wetlands for homes and resting spots. Fish, amphibians, reptiles, aquatic insects and certain mammals need wetlands as a place for their young to be born and grow.

Slide 9- Struggling to stay alive

• River Otters timeline

Slide 10- The "Duck Factory"

- Minnesota River Basin is in the so-called "duck factory"
- North America's best waterfowl breeding habitat.
- Ducks rely on upland areas around wetlands and shallow lakes for both nesting and as a food source.

Slide 11- Seven Mile Creek

• Seven Mile Creek <u>Virtual Tour</u>

Slide 12- Land Drainage

- The landscape has been drastically altered since settlers moved in and drained the wetlands to farm the rich, productive farmland.
- As a result of expanding drainage tile lines and ditches, large, previously isolated wetlands were artificially connected to the Minnesota River.
- The Department of Natural Resources estimates that over 90% of the wetlands in the prairie have been lost.
- Video 1
- Video 2

Slide 13 -What's being done now?

- From the Minnesota Supreme Court's 1976 decision disallowing the construction of a highway through William Bryson's marsh, which he brought suit to save.
- To some of our citizens a swamp or marshland is physically unattractive, an inconvenience to cross by foot and an obstacle to road construction or improvement.
- "It is quiet and peaceful the most ancient of cathedrals antedating the oldest of manmade structures. More than that, it acts as nature's sponge, holding heavy moisture to prevent flooding during heavy rainfalls and slowly releasing the moisture and maintaining the water tables during dry cycles.
- "In short, marshes and swamps are something to preserve and protect."

Slide 14- Sources

• Minnesota DNR. 2011.

http://www.dnr.state.mn.us/wetlands/index.html

• Minnesota River Basin Data Center. Oct 2004.

http://mrbdc.mnsu.edu/sites/mrbdc.mnsu.edu/files/public/major/midminn/subshe d/sevenmi/vtour/smvt_1.html

POWER-POINT PRESENTATION: PRAIRIES

Introduction

Slide 1- Ask an Expert

Slide 2- The Prairie

Slide 3- What is the Prairie?

- Video
- "Prairie is rolling or gently undulating and bearing most everywhere an unusually healthy growth of grasses are auspicious [for settlers]...except for the entire want of timber." — Public land surveyor David Watson describing the prairies in Swede Prairie Township of Yellow Medicine County in 1867 (MCBS, 2007).

Slide 4- Pre-European Settlement

- Before settlement by people of European descent, the predominant vegetation was tallgrass prairie and wetlands.
- 18 Million acres of prairie covered Minnesota
- Part of the largest ecosystem in North America
- Over 900 species of plants have been recorded on remaining prairies in Minnesota
- Video

Slide 5- Prairie Benefts

- Video
- Increase water quality by acting like a filter

Slide 6- Animals: Then (pre-agriculture/ settlement)

- Prairie birds Marbled Godwits, Upland Sandpipers, Sprague's Pipits, Chestnut Collared Longspurs, Bobolinks, Meadowlarks, and Kingbirds were numerous. Waterfowl covered the marshes
- Bison roamed the western areas and elk and deer were common.

Slide 7- Animals: Now

- As natural prairie habitats dwindle, so too, do the species of prairie mammals, birds, and insects.
- BIRDS Endangered
- Baird's Sparrow, Henslow's Sparrow, Sprague's Pipit, Chestnut-Collared Longspur, Piping Plover, King Rail, & the Burrowing Owl

Slide 8- Prairie Map

- Statewide, today only 180,000-200,000 acres of prairie remain. Today <u>less than</u> <u>one percent of the original expanse of Minnesota native prairie remains.</u>
- Video

Slide 9- Cropland

• DNR estimated landscape change from 1890's to 1990's that shows the conversion from prairie to cropland.

Slide 10- Grasses

- Because they develop very deep root systems, native grasses provide very good long-term erosion control.
- Native grasses are therefore desirable for stabilizing soils.
- Grow slower than their counterparts

Slide 11- Why is prairie restoration important?

• Video

Slide 12- Sources

• Roy Robison, Donald B. White, and Mary H. Meyer. University of Minnesota Extension. 2011.

http://www.extension.umn.edu/distribution/horticulture/DG3238.html

• Minnesota DNR. 2011. http://www.dnr.state.mn.us/prairierestoration/index.html