MN DEPT OF NATURAL RESOURCES
QH541.2 .E972 1992
- Explore Minnesota's state parks :
3 0318 00018 1628

# EXPLORE KILEN WOODS STATE PARK

an educator's
field trip guide

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(Funding for document digitization was provided, in part, by a grant from the Minnesota Historical & Cultural Heritage Program.)

# EXPLORE MINNESOTA'S STATE PARKS

## Field Activities for Grades K-12

Outcome-Based Activities
Developed to meet the State of Minnesota
Goals for Environmental Education

for use at

# Kilen Woods State Park

Developed for
The Minnesota Department of Natural Resources
Visitor Services for the Divison of Parks


Project Administrator: Bobbie Gallup
Project Coordinator: Pam Landers
Teacher Writers
Rosemary Shaffer
Jo Zaiser
Ken Perry
Bob Groneberg
Dr. John Coulter

Park Reviewers
Roger Heimgartner
Bob Beck
Layout and Typesetting
Paul Kozak

June 1992


**Funds for this project provided by visitor purchases in State Park Nature Stores.**



LIBRARY
Dept. of Natural Resources
500 Lafayette Road
St. Paul, MN 55155-4021

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The rolling plains through which the river runs were left behind over 15,000 years ago when the glacial ice, several thousand feet thick, receded. This was prairie pothole country, dotted with shallow lakes and thousands of small wetlands from the meltwater. The Des Moines River drained the glacial waters away to the east to join the Mississippi.

## Habitat Types

The park, situated on the bank of the river flowing through the prairies, provides a diverse habitat for wildlife. The river, itself, is home to walleyes, northerns, catfish and bullheads. Beaver, muskrat, mink, and raccoons live among the cottonwood and ash trees in the floodplain of the river bottom. Woodducks, herons and kingfishers are among the waterbirds that depend upon the river.

The bur oaks of the oak savanna growing on the slopes above the river provide a harvest of acorns that are a major food supply for deer, squirrels, woodpeckers, and rodents such as the thirteen-lined ground squirrel. Wild plums and hawthorns are interspersed among the prairie grasses, providing additional food.

Prairie grasses start down the ravines cut by runoff from the prairies to the river. Typical prairie plants such as big bluestem, Indian grass, blazing-stars and purple coneflowers are home to animals such as jumping mice, jackrabbits, and a collage of colorful butterflies.

On the sides of the ravines, water that falls on the prairies above seeps out. The dampness provides a unique growing opportunity for sedges, unusual grasses and rare flowers.

At the top of the river bluffs farther away from the river where the land begins to flatten out, the prairie begins. Once the land of the buffalo and the antelope, only remnants of the seven foot prairie grasses, Butterfly Milkweed, grey headed coneflower and other dominate prairie plants remain. The once-vast prairie with its wetlands and lakes has been drained and plowed to provide agricultural products.

## Human Sojourners

From 10,000 or so years ago to the present an array of different people have moved across the southwestern prairie, each inhabiting it for a time. The earliest people for which any evidence has been found were the ones who left the rock paintings (the Jeffers petroglyphs). These people hunted both large and small game, and shifted their small camps seasonally to use foods abundant in different places. They ate wild plums and roasted acorns found in the oak savanna.

The Dakota peoples followed about 500 A.D. They lived in the protected river valleys of southwestern Minnesota during the winter and hunted buffalo, first on foot, and later on horseback, on the prairies in the summer. Deer and elk were valued prey animals as well. They ate roots and herbs growing wild on the prairie, such as prairie turnips, and gathered water lily and arrowhead roots from the marshes. They supplemented the wild foods with corn, squash and pumpkins raised in gardens.

Trappers, traders and adventurers of western European tradition crossed southwestern Minnesota beginning in the 1700's. In 1851 the Dakota were put on reservations along the Minnesota River so settlers could move in and farm the prairie, bringing major changes to the countryside. Plow and oxen broke the prairie sod, and agricultural crops replaced the diverse prairie life. The settlers used the river valley for shelter and for wood, dividing the wooded areas into lots.

Now the park is an island of wildness in a sea of fields of crops. Its prairie remnants can give only a small hint of the vast diversity that once was here.

The park was authorized by the legislature in 1945 and most of the land purchased from Agil Kilen for whom the park was named. Twentyone settler woodlots were included.

### Reference

**The Streams and Rivers of Minnesota,** Waters, Thomas E., University of Minnesota Press, Minneapolis MN 1977.

## THE FIELD TRIP ACTIVITIES:

### What Are They About and How Are They Organized?

The field trip activities are:

- outcome based,
- interdisciplinary,
- hands-on,
- environmental education activities,
- for grades K through 12.

They are designed to be:

- integrated into the current curriculum being taught at any school.

They are based on:

- the goals mandated by the legislature in 1990 for environmental education,

and follow:

- the guidelines of the Minnesota Department of Education.

In the Environmental Education Act of 1990, the legislature set goals for environmental education in Minnesota and required the Department of Education to strongly encourage every school district to integrate environmental education into current curricula.

### Master State Goal For Environmental Education

One of the legislature's goals states that :

*Learners should understand the cause-and-effect relationship between human behaviors and attitudes and the environment.*

This the summary goal toward which all the park's environmental education activities are ultimately aimed. It is the interaction between humans and the rest of the environment that is causing the vast changes being made on this planet. An understanding of the cause-and-effect relationship is the foundation necessary for making critical decisions about how we choose to live.

## Interdisciplinary Nature of Environmental Education

By its very nature, environmental education must be interdisciplinary because to explore an environmental issue you must ask these four questions:

1. What is the basic scientific data or knowledge needed about the issue?

2. How are humans interacting with this natural phenomenon?

3. Does this interaction have good or bad consequences? What are they?

4. What can we do about it?

Asking these four questions provides a way to think through any environmental issue. It is apparent that no single educational discipline will provide all the answers. We can look to science for the basic data about an issue (for instance, what kinds of chemicals are in polluted air and what are their effects?) but to understand why air pollution exists and persists we must know about human economic systems and how they work. To make suggestions about what to do about air pollution we must not only know how, for instance, to make car exhaust cleaner (a scientific task) but we must also know something about how our political system works to see that it is done.

As we move through an exploration of an environmental issue, therefore, we are moving through four contexts in which learning takes place;

1. **Natural** (What is the basic scientific data or knowledge needed about the issue?)

2. **Social** (How are humans interacting with this natural phenomenon?)

3. **Valuing** (Does this interaction have good or bad consequences? What are they?)

4. **Action context** (What can we do about it?)

The Minnesota Department of Education requires that these four context be part of any curriculum that purports to be environmental education.

## How to Use These Contexts with This Guide

In this guide there are field trip activities for each grade block (K-3, 4-6, 7-9, 10-12) that address these four questions on some issue of importance. Though each activity should be able to stand on its own, if all the activities are done by a given grade block, they will take the students through all four contexts and form a coherent exploration of an environmental issue.

## Integrated Design

The content of these activities was outlined by individuals currently teaching who are familiar with subjects currently required or taught at their grade levels.
The subject areas covered are noted at the beginning of each activity and in the summary sheet at the beginning of each grade block section. TO OBTAIN THE MOST FROM YOUR FIELD TRIP go over the activities and plan them to fit into your scope and sequence.

## Outcome-Based Environmental Education

The activities are designed to meet the requirements of outcome-based education, in cooperation with the efforts of the Minnesota Department of Education.

All activities have outcomes that were written to contribute to the environmental education goal of Kilen Woods State Park. That goal is:

## Kilen Woods State Park Goal for Environmental Education

Through experiences at Kilen Woods State Park, people will learn to understand the biological concept of diversity, and its value to species survival. They will understand how human impacts affect diversity, and become committed to sustaining and restoring diversity in our global environment.

All activities have assessment ideas for individual student progress.

# FIELD TRIP PRACTICALITIES

The better planned your field trip, the more successful and enjoyable it will be.

## Pre-trip planning for Curriculum Integration

Make sure you know what you will be doing when you arrive at the park.

Use the planning aids in the activities section to choose activities that complement what you are doing with your students in the classroom.

If activities have suggested pre- and post-field trip components, plan classroom time to carry them out.

Make sure you plan enough time for logistics, breaks, and lunch so you can be realistic about the time you have to devote to activities.

## Pre-trip Organization and Coordination with Park Personnel

Contact your park personnel to let them know you want to bring your students to the park. The telephone number is 507-662-6258.

Tell them which activities you want to do. Go over your proposed agenda with them.

Work with them to select times and locations.

Check with your park personnel to see that any materials you will need and that they can supply will be available that day.

Visit the park before the actual field trip to check teaching locations and times for reaching them. See if you need to reach the teaching sites by vehicle or whether you can walk to them.

Make a note of safety precautions that need to be taken.

Make arrangements for students with special physical or emotional needs.

Find out what the park rules are and get copies for classroom use.

## Field Trip Preparation

- ☐ Plan your transportation and make arrangements for it. Buses owned by the school district can enter the park without cost. Buses chartered by the district must buy a $4 daily permit. Private cars need a daily or annual permit.

- ☐ Send permission slips home with the students.

- ☐ Make arrangements for additional help from parents, volunteers or teaching assistants. A recommended minimum is one adult per 5 students for grades K-3, one adult per 8 students for grades 4-6. Beyond grade 6, plan for at least 2 adults per class.

- ☐ Plan for emergencies and share these plans with your helpers.

- ☐ Gather any materials you will need to take with you. (Don't forget a first-aid kit).

- ☐ Let students know what materials they will need to bring (for instance, notepads, pens or pencils, clipboards)

- ☐ Inform students about lunch arrangements. There are no food facilities at the park, so individual brown bags may be the most logical solution. Make sure you know how students will dispose of trash (you might challenge them to see how ecologically responsible they can be in planning their lunches).

- ☐ Inform students about wearing sensible clothing and walking shoes or boots. Ask them to be prepared for rain, snow or other inclement weather.

- ☐ Discuss the agenda with the students so they know what they will be doing and why.

- ☐ Assign jobs to students, such as making sure no one leaves litter, materials are carried, etc.

- ☐ Have alternative activities if the weather turns cold, very windy, or wet. Portions of some of the activities can be done in the interpretive center.

## On Arrival

Check in with the park personnel, and collect materials they are to supply.

Allow time for finding the bathrooms before you start.

Make sure students know and follow the park rules.

Be clear about your own rules before you start.
At the school before the trip explain your rules about paying attention.

## Teaching Tips

Most of the activities require that students work in teams. This technique provides students an opportunity to hone their social skills while they are investigating issues, and involves all of them in the work.

## At the End of the Trip

☐ Fill out the field trip evaluation and return it to the park personnel.

☐ Carry out any follow-up activities in the classroom.

# ACTIVITIES SUMMARY

**All Environmental Education Activities for the State Parks Should Contribute to the Following Mission Statement and Goals:**

Parks and Recreation Mission Statement for Environmental Education:

*The mission of environmental education in Minnesota state parks is to develop a population that is aware of and interested in the environment and its associated issues and which has the knowledge, skills, attitudes, motivation, and commitment to work individually and collectively toward sustaining a healthy environment.*

*The Minnesota Department of Natural Resources, Division of Parks and Recreation, seeks to accomplish the Environmental Education goals by providing first-hand, resource-based education and recreational experiences which develop ethical stewardship of the natural and cultural identity of Minnesota.*

State Goal:

*Learners should understand the cause-and-effect relationship between human behaviors and attitudes and the environment.*

## The Following Is An Environmental Education Activity Summary For Kilen Woods State Park

## Park Master Environmental Education Goal

*Through experiences at Kilen Woods State Park, people will learn to understand the biological concept of diversity, and its value to species survival. They will understand how human impacts affect diversity, and become committed to sustaining and restoring diversity in our global environment.*

## Number of Activities Addressing Additional State Environmental Education Goals (from 1989 legislature)

(4) 1. Learners should understand ecological systems

(5) 2. Learners should be provided with experiences that will assist in the development of personal appreciation, sensitivity, and stewardship for the environment.

(1) 3. Learners should analyze, develop, and use problem-solving skills to understand the decision-making processes of individuals, institutions, and nations regarding environmental issues.

(2) 4. Learners should evaluate alternative responses to environmental concerns or issues before deciding on a course of action or no action.

(5) 5. Learners should understand the potential complementary nature of multiple uses of the environment.

(1) 6. Learners should be provided the information needed to make informed decisions about actions to take on environmental issues.

## Number of Activities/Grade Level (number of activities)

(4) K-3
(3) 4-6
(3) 7-9
(4) 10-12
(1) post-secondary

## Number of Field Trip Activities Addressing Contexts: (from MN Department of Education)

(5) Natural: ( basic scientific data or knowledge)
(6) Social: (how humans interact with this natural phenomenon)
(4) Valuing: (does this interaction have good or bad consequences? What are they?)
(4) Action: (what can we do about it?)

## Number of Activities per Subject Areas Covered

(10) science
(8) social studies
(1) math
(7) language arts
(2) art
(1 ) media and communications

## Number of Activities per Season

(12) Summer
(14) Fall
(0) Winter*
(14) Spring
*Some activities can easily be adapted to a winter experience.

## Number of Activities/Skills Incorporated

*Thinking:*
(11) analysis
(11) application
(6) classification
(3) public speaking
(3) computation

(10) description
(13) discussion
(1) media construction
(2) drawing
(6) evaluation
(4) generalization
(10) observation
(9) inference
(1) interview
(0) invention
(3) problem solving
(5) listening
(8) listing
(3) mapping
(1) reading
(5) reporting
(4) research
(2) synthesis
(6) visualization
(2) writing
(8) comparing similarities & differences
(0) psychomotor development

*Social:*

(7) small group work

# ACTIVITY FOCUS AND BACKGROUND: DIVERSITY

## Kilen Woods State Park Goal for Environmental Education

*Through experiences at Kilen Woods State Park, people will learn to understand the biological concept of diversity, and its value to species survival. They will understand how human impacts affect diversity, and become committed to sustaining and restoring diversity in our global environment.*

Why did Kilen Woods State Park choose this goal as the one above all others they wanted to achieve with their environmental education field trip program for schools?

**It is because the vast diversity of plant and animal species is one of the most important mechanisms for the maintenance of life on earth.**

The word "diverse" means taking many forms.

A mechanism is defined by the dictionary as "the means by which an effect is produced or a purpose is accomplished."

Why is all this diversity so important to the survival of life? There are two answers to that question.

First, as environments change (and they are always changing) a wide variety of species genetic material makes gradual change in life forms possible. Such gradual change tends to avoid major sudden losses and allows life forms to grow in number. This is as true for humans as any other species.

Second, each species, no matter how small or strange, may have a role to play in the functioning of the life support systems on which we all depend. Every time one is removed, the support systems (the atmosphere, our water supply, the soil in which things grow) are a little poorer and work less well - sometimes **much** less well - for the human species - and in ways we often do not understand enough to even attempt to fix, even if we could.

Let's look at the first answer. How does diversity make gradual change possible? Each species carries within its cells the genes that make that species what it is and create the many small differences between individuals. All the genes in a species are called the gene pool. This is a pool of resources upon which the species can draw. These small differences between individuals provide the options the species has for responding to environmental change.

For example, when England was primarily agricultural, a small moth lived in the farm pastures. Most of these moths were white, as were flowers in the field. Their white color allowed them to escape detection by the birds and other animals that ate them. Some of the moths had some brown coloration on their white wings. These moths were more easily seen and eaten by birds, so their numbers were low, but some brown genes remained in the pool. When England became industrialized, fields near towns became covered with soot and other airborne particulates. The white flowers began to die out, and the white moths became more conspicuous to their predators. Predators began to have a feast on white moths. The moths with more brown on their wings now had a better chance to survive, because they were less easily seen. These were the moths that lived to reproduce, and pass on the genes that caused the brown color to their offspring. Because the brown genes were in the gene pool, even though in former times they were a detriment, as the environment changed they became an asset to the species. Because there were enough moths with different color genes in their genetic makeup, the species survived. However, the species was changed because the percentage of brown genes in the pool was much greater than before and most of the moths now hatched were brown.

The example shows that diverse genes in the gene pool provide options for change as the environment changes. Those genes that may have been slightly detrimental in one environment can become helpful in another. The more options a species has in its gene pool, the better it is able to cope with change. Diversity provides stability.

This is true for humans as well as other plants and animals. As we, ourselves, change our environment by doing such things as filling our air with chemicals, gases and soot, we are seeing increases in such problems as respiratory diseases and cancers, including skin cancer. Some people carry genes that make them more resistant to the effects of air pollution; some people are more likely to become ill because they are less resistant. The less resistant ones are less likely to survive well and produce children. If the change in air quality is slow enough (a key point) the more resistant individuals will survive better and produce children who are more likely to be more resistant themselves.

The advantages of diversity apply between species as well as within them. In a community (such as a prairie or forest) many species live and are interdependent on each other. If a crisis occurs such as a disease or a particularly hard spell of weather, some of the plants will be affected, but not all of them,

at least to the same degree. Some of the plants will die out, or be lowered in numbers, but not all. The community itself will survive and perform its functions, even though it is now changed because the mix of plants or the percentages of certain plants is changed. Again, diversity provides stability in a community.

Contrast the community of many plants to one containing only one plant (a monoculture). Many communities in the east and midwest regions of the United States had planted hundreds and thousands of elm trees all over their towns because elms are such beautiful and functional shade trees. In the 1950's, a fungus carried by a beetle came to the east coast of the United States and attacked the elm trees. The fungus, called the Dutch elm disease, killed all the elms, year by year, across the country, leaving communities totally bare, because these towns had only planted one species of tree. Now many communities have learned to plant a mix of ornamental and shade trees to avoid this problem in the future.

A farmer's field of corn containing only one plant presents a similar opportunity for insects or disease. Should disease hit (such as the corn blight that came up from the midwest some years ago) farmers will suffer major losses, because most of the plants will be affected and either die or produce no ears. In addition, because the plants are close together, instead of being scattered as they would in a diverse community, a disease can spread very fast The farmer has no options in that field in case disaster strikes. The field of corn is very unstable - it can be wiped out all at once. In fact, farm fields have been called cafeterias for bugs. Cultures that rely on just a few domesticated plants for their entire food supply are putting themselves at great risk.
The question of the speed of environmental change is very important. If changes in the environment are slow, species and communities have more time to adapt. The longer the life cycle and the more time needed to produce the next generation, the slower the environmental changes need to be. Fast changes in the environment do not allow time for these adaptations that take generations to occur.

Let's take a look at the second reason that diversity is important. Most species have some role to play in the functioning of the systems that support all life. Paul Erlich calls these "ecosystems services"* He says "All organisms are functional parts of ecosystems. And, ecosystems, which are knitted together by flows of energy and cycles of materials, can be thought of as the life-support apparatus of our planet." When species are lost, so are their functions and the life support systems change. The support systems may still support life - but it might not be ours!

The benefits afforded to the human species by other species in ecosystems include maintaining the mix of gases in the atmosphere so that humans can live and breathe. Oxygen is in the atmosphere as a product of the photosynthesis of bacteria and green plants. Until there were enough green plants living on earth to provide enough oxygen, there was nothing for animals as we know them to breathe. As the green plants and their photosynthetic processes increased, the abundance of oxygen in the atmosphere allowed the ozone layer to develop. This layer protects organisms from ultraviolet radiation. Until that happened, life had to hide underwater.

Forests and other ecosystems help to maintain the mix of gases in the atmosphere that control climate. The decimation of forests on a grand scale appears to be a contributing factor in climate change including global warming.

A mix of plants and animals help to regulate water flow so that instead of a steady round of floods

and droughts, water is held when it is abundant, and metered out during dry periods. Our swamps, bogs and marshes perform this valuable function, as do forests which prevent water from cascading down the sides of slopes.

Our crops are grown on soils that are kept loose, productive and fertile by a whole underground system of fungi, tiny plants and small animals. These small workers digest wastes and recycle nutrients. These diverse small forms of life in soils are among the most critical to preserve, yet they are severely harmed by acid, pesticides, and heavy metals (metals that can be dissolved in water and are often by-products of our industrialized society).

Erlich refers to these approximately 30 million living species as our "storehouse of capital". When we eliminate species we are spending our capital instead of using the interest they provide us in the course of their lives.

We have many problems for which plants and animals may be the answer. Yet we know little about most of these For instance, the world's population is approaching six billion. Famine is common in third world countries today. There are about 350,000 different types of plants. About 80,000 of them may have food value. Only 150 of these have been grown by humans on a large scale, and only three (corn, rice, and wheat) now produce about 2/3 of the world's grain. We need the time and the opportunity to find others that may produce more than these three and be less environmentally expensive to grow.

Wild corn plants originally came from Mexico. A rare relative of the corn plant has recently been discovered there that is a perennial instead of an annual. If it can be cross-bred with modern corn, adding new genes to the corn gene pool, it may produce corn that only has to be planted once instead of every year.

Half of the world's medicines are plant-derived. Most come from 41 plants, and only 5 of these are native to the United States. We are dependent on other countries to provide the plants for most of our medicines. In the United States this represents about $20 billion. Most of the world's plant species exist in the tropical rain forests, and huge numbers of these have never been studied for their medicinal and other values.

Animals also hold the key to many medical problems. Animals that hibernate have the ability to slow their bodily functions to a fraction of their normal rates. Researchers have been studying black bears to determine how this is done so that their findings can be used to reduce the risk in surgical procedures and to help cure osteoporosis and liver degeneration. The American Buffalo does not contract cancer. Answers to how and why they do not may help humans fend off this growing disease. Bee venom is used to treat arthritis, and Brazilian snake venom helps to control high blood pressure. The possibilities for learning from other species is enor-

mous, and the studies have just begun.

Other products can be derived either from the plants and animals themselves, or from knowledge about other species. As fossil fuels become more scarce and their by-products, such as carbon dioxide, more harmful, plant derived fuels may be come more important. Rayon comes from renewable plant resources. The desert plant ,Jojoba, produces a high quality lubricant that could replace that from the endangered sperm whale. Woodpeckers can teach us how to design better crash helmets, since they experience tremendous shocks to their heads when drilling for insects, yet suffer no injury to head, neck or spine. Firefly light is created from a chemical reaction with oxygen. The light is very efficient, yet uses little heat or energy. Scientists studying this insect may help find a way to move our lighting systems away from inefficient fossil fuels.

You may ask, "If we have so many species, what's the fuss if we lose a few?" And why should we care about a few spotted owls or an insignificant minnow like the snail darter? The answer to that is that individual species do not exist in isolation. Each is tied in a web of interdependencies to other life forms. If one species goes extinct, it could be telling us that the entire ecosystem is in danger. Because species are so intricately interrelated, it is never clear which, if any, are expendable. An example is the elimination of large predators in the rain forests. All over the globe humans have sought to destroy or reduce the numbers of large predators that are perceived as physical threats or competitors for prey species. In the rain forest, if the pumas and jaguars are gone from a community, their prey such as the peccary, paca and agouti increase. The prey's main food source is the large seeds from the forest trees that fall to the ground. They eat so many seeds that the large trees are not replanted and the small seeded plants increase, causing a drastic change in the make-up of the community. Very often our own manipulations have consequences we never intended.
For many natural communities, we do not know how much needs to be maintained in order for the community to sustain itself. If an area is protected, but it is too small to support some of the plants and animals that make up part of the community, some of the plant and animal life will decline.
The options for the future are many - as long as the species remain to provide them.

What, then, is the status of species diversity in our world today? At the moment, we are not helping it.

So far, humans have identified about 1.4 million different species. Some estimates suggest that there are between 5 million and 30 million species living now on earth yet to be named. Species do and have come and gone from earth with some regularity. In fact, massive die-outs of many species have occurred several times, the last being the fall of the dinosaurs after a reign of 165 million years. Life goes on each time; but the kinds of species that carry it on are vastly changed. Yet none of the die-offs that have gone before are of the magnitude we are experiencing today, in large part because of human manipulation of the earth's resources. From the ice age to the last 200 years of human dominance, only 3 species were lost per 100 years. Now, however, the rate of extinction is hugely increased. One million plants and animals may disappear in the next 30 years, a loss of 2 to 3 species per hour. Half of the world' species may be lost in the next 100 years.

What are we doing to cause such change? We are causing habitat loss as human populations grow by building on and domesticating much of the earth's surface; we are commercially exploiting species, deliberately exterminating species that we fear, and polluting land, water and air, so that even areas very remote from human habitation are affected. We aid this extinction by preferring neat, simple monocultures such as fields of corn and lawns over diverse and complicated communities such as

prairies and forests.

An example of massive habitat loss is the cutting and burning of the tropical rain forests, which contain over 60 percent of the species diversity on earth, much of which has yet to be catalogued. The oceans are another example. Roger Payne, who has studied whales for over 20 years, is seeing an increase of diseases in the marine mammals and a great increase in tendencies to beach themselves and die. He is hypothesizing that ocean dumping of wastes and chemicals is destroying the immune systems of these animals so they are suffering from AIDS-like diseases. In recent days the results of studies have been announced that indicate although the United States and Canada had made an agreement over 20 years ago to stop the dumping of toxic materials into the Great Lakes, the fish, birds and mammals of these lakes are still exhibiting high contamination levels, low birth rates and high numbers of genetic deformations. Humans are advised to eat very sparingly of fish in most of the Great Lakes, and pregnant women are advised not to eat them at all.

What can be done to prevent this massive erosion of species diversity?

We can **protect** the diversity that still exists in a variety of ways:

We need to change our own way of perceiving so that we recognize the value of diverse prairie or forest or river bottom hardwood stand instead of classifying it as wasteland, and therefore available for exploitation.

We need to change our life-styles to allow for more diversity; in the U.S. where we have 5 % of the world's population and yet use 40% of the world's resources, we need to learn to value cutting back on material goods, reusing and recycling. We need to learn to recognize and buy products that do the least damage to the habitats of plants and animals.

We can help to educate others. We can be examples to others by the way we live our lives. We can do things to demonstrate our values, for instance, by creating a patch of prairie in our own backyards. We can let our lawmakers know that we support legislation that protects diversity, such as the Endangered Species Act.

We can help to **restore** diversity by recreating habitat ourselves, aiding others that do as well, and supporting legislation that provides direction and funding.

## Habitats of Kilen Woods State Park.

### *Floodplain Hardwood Forest*

A forest around a river is a product of that river and its history. The river valley itself is formed as the river's flow cuts deeper into the soil each year. The valley may appear much wider than the current river, especially in southern Minnesota, for these rivers were once the outlet for the melting

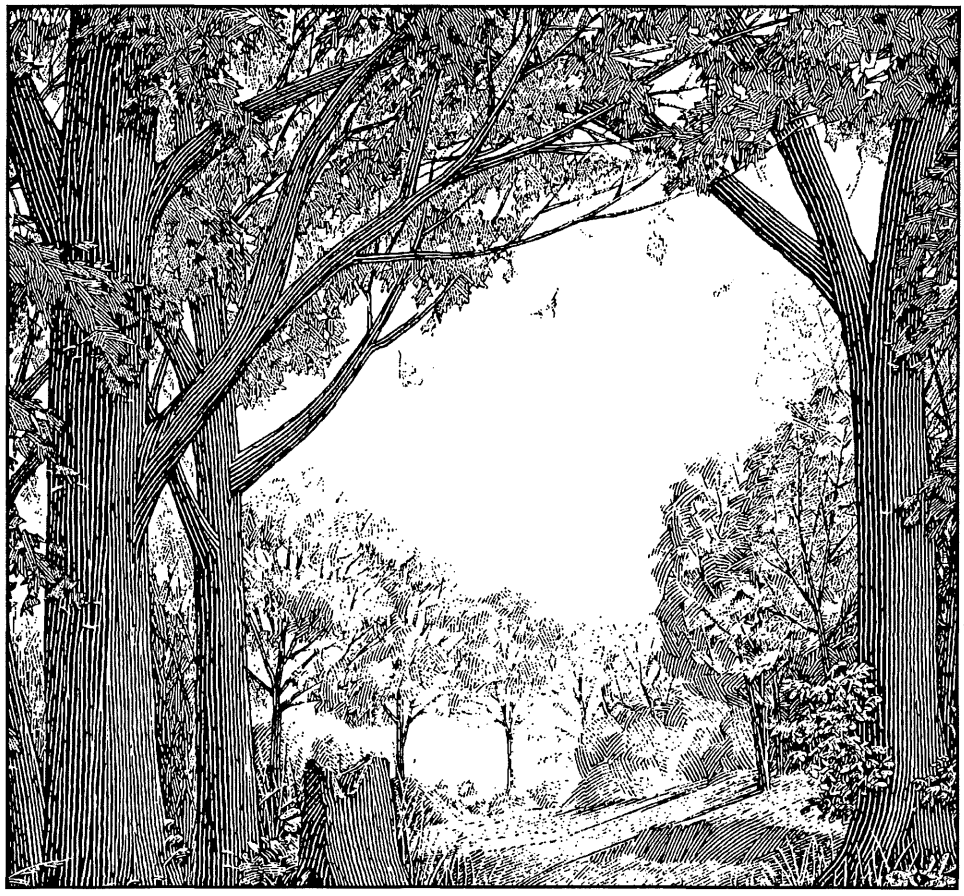
of the ice of the great glaciers. As the glaciers have disappeared, the rivers have shrunk to the size that can be maintained by the annual rains and snows falling on the ground. Rivers flood annually with spring melting of snow, often inundating the banks. The level of flooding depends on the amount of moisture falling that winter. This annual flooding spreads a blanket of rich, fertilizing soil over the valley, in the same manner as the great Nile replenishes its banks in the Near East. The trees along the banks slow the flow of the water so the erosion impact of the rushing water is toned down for downstream plant, animal and human communities.

The trees, like willows and green ash, that grow close to the shore, have adapted to periodic flooding. When their roots have been underwater for awhile, they form new ones containing air pockets that are above the flood. Little openings in their bark expand to let air move more easily into the tree. They also have the capability of respiring ("breathing") without oxygen for awhile.

Along each side of the river is a bank of coarse gravels that the river deposits each time it overflows. These form natural "levees" that help keep the river in its banks and allow trees to grow that need higher, drier ground. Cottonwoods grow along these levees. In the cottonwoods' shade are small silver maple, boxelder, American elm, ash, and hackberry, which will take over when the cottonwoods die.

On further up the slope is a maple, elm and ash forest, which has already taken over from the cottonwoods. Some of the trees are quite large. It is often possible to see marks of mud and debris in the trees from the last flood. If the river floods this high, it slows and deposits finer silts and clays that have previously been suspended in the water. Here, annual plants will flourish between floods.

As the valley becomes higher and drier, it meets the western prairie on its bluffs. In this transition area between forest and prairie is the oak savanna, populated by widely dispersed bur oak trees under which grow the prairie grasses.



Floodplains are a rich area for wildlife. They have all the advantages of a wetland area such as readily available water habitat, edible aquatic plants, drinking water, rich soil filled with earthworms and little pools where salamanders, frogs, and

snakes can live. The large floodplain trees supply cavities and limbs for nesting and protection, and seeds and nuts for food.

There is an element of danger, however, for any animal inhabiting an area that is periodically under water. The ones that live here either swim well or can move to higher ground, whether that is further up the slope or up a tree. Some thrive on temporary water, such as migrating waterfowl that can dunk for acorns and seeds on the bottom of the submerged forest floor. Herons fish along the side of the river no matter where the river is.

The rich silts the river deposits nourish a tasty array of grasses, herbs and mushrooms. These are welcome menu items for rabbits, white-tailed deer, mice and other mammals. Shrubs that can live next to the flooding river, such as willow, provide nesting areas for songbirds like warblers and finches. The trees killed by the flooding are a boon to cavity nesters such as raccoons, wood ducks, flying squirrels, owls and woodpeckers. The dead limbs are favorable perching spots for kingfishers, flycatchers and hawks to search out and launch themselves on their prey.

In a flat agricultural area, a river valley is an oasis in a sea of monotonous landscape. The wild, dense vegetation becomes a refuge for animals that have no place else to go, and a sheltered spot to spend the winter.

## Animal of the Floodplain Hardwood Forest:

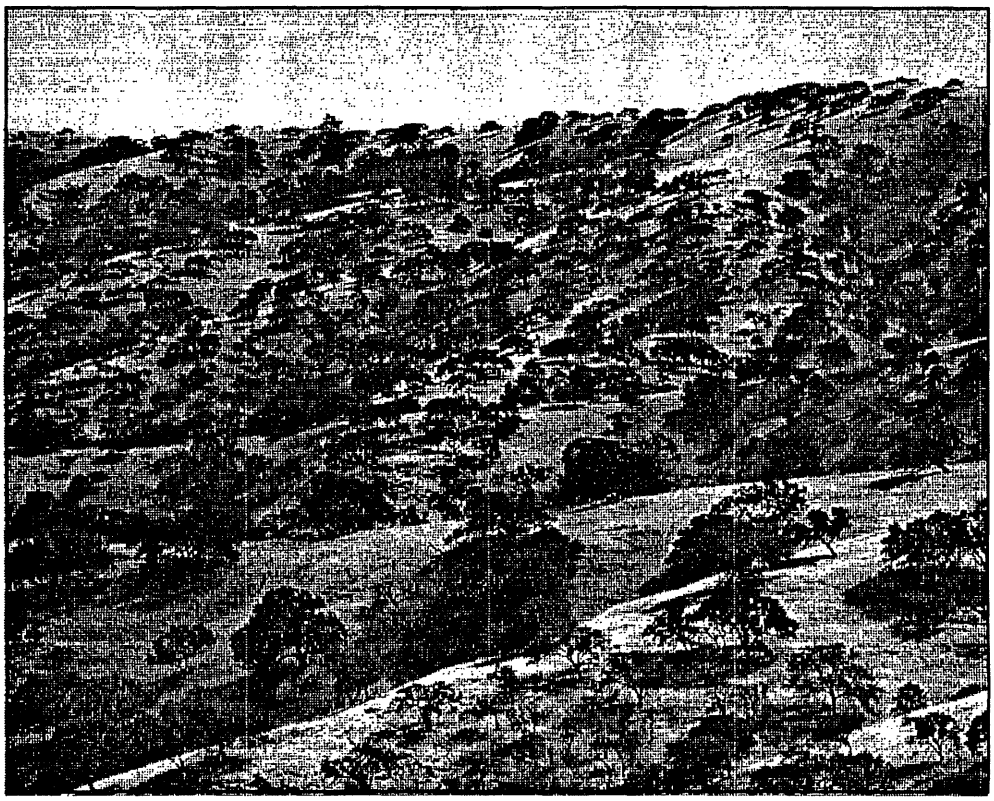
| *Animals* | *Feeds on* |
|---|---|
| Cooper's Hawk | small animals and birds |
| Red-shouldered Hawk | rodents, rabbits, snakes, birds, lizards |
| Big Brown Bat | insects |
| Belted Kingfisher | fish, crayfish, mussels, frogs, lizards |
| Barred Owl | rabbits, rats, squirrels, birds, cray fish, frogs, large insects |
| Warbling Vireo | insects |
| Northern Oriole | nectar |
| American Redstart | insects |
| Redheaded Woodpecker | insects, oak, corn, wild cherry, blackberry, elderberry, apple, grape |
| Redbellied Woodpecker | oak, grape, corn, cherry, dogwood, insects |
| Wood Thrush | insects, dogwood, wild cherry, grape, blackberry, elderberry |

| | |
|---|---|
| Northern Flying Squirrel | insects, oak, hackberry, maple sap |
| Raccoon | oak, corn, grape, frogs, crayfish, grasshoppers, large insects,pokeweed, grape, hackberry, |
| Veery | insects, snails, elderberry, blackberry, pokeweed, strawberry |
| Gray Tree Frog | insects |
| Spring Peeper | insects |
| Wood frog | insects |
| Great Blue Heron | fish, crustaceans, amphibians, insects |
| Wood Duck | pondweed, burreed, smartweed sedge, duckweed, oak, grape |
| Common Goldeneye | aquatic bugs, caddisfly larvae, dragonfly and dam selfly nymphs, fly larvae, Mayflies, beetles, ants, pondweed, wild celery |
| Mink | freshwater mussel, muskrats, mice, fish, marsh birds |
| River Otter | fish, crayfish, water beetles, frogs |
| Wood Turtle | insects, fruit, moss, mushrooms, mollusks, tadpoles, fish |
| Beaver | aspen and willow twigs, water lilies |
| Rabbit | sumac, basswood, dogwood, apple |
| Muskrats | cattail, bulrush, burreed, pondweed, arrowhead, corn |
| Opossums | terrestrial and aquatic invertebrates, especially insects, small cold - and warmblooded vertebrates, bird eggs and young, grapes, acorns, apples, corn, oats, strawberries |

### *Oak Savanna*

A savanna is a grassy area sprinkled with mature but often stunted trees. These savannas occur along the border between the forests of the east and the prairies of the west. In the transition area, soils are coarse, gravelly glacial outwash. They are usually of low fertility, with little organic content compared with forest and prairie soils. Kilen Woods State Park is a good example of that border transition.

The oak savanna along the tops of the river valley bluffs is a product of the interrelationship of fire, water, and the prairie. The land is close enough to the river that it is wetter than the surrounding prairie, so trees can grow. Often they occur in a wet prairie area where small marshes and wet meadows occur. Frequent fires are a reality of life on the prairie. Indians set fires in the spring and fall that swept huge areas. Lightening could also touch off wildfires. The oaks are more fire resistant than most species, so though fire limits their growth, it does not kill them entirely, as it does other trees. The fire does burn off the young shoots and saplings advancing into the prairie and leaves behind ashes that fertilize the prairie grasses which sprout up under the oaks. The frequent fires usually are of low intensity; the shade under the trees inhibits the growth of thick prairie grasses, and wind blows the oak leaves away so there is less fuel to burn. The oak savanna, then, acts as a buffer between the prairie fires and the river valley. Cattle grazing, firewood cutting, and hay mowing can often serve the same function as fire (but without leaving the fertilizing ashes.) The major threat to an oak savanna is supersession of fire. A few years without fire might lead to the growth of dense thickets of fire intolerant species with scrub oak rising up among herbaceous plants. Oak grubs are the roots of burned-off oaks that sprout again as soon as the season is favorable.



Settlers tried to farm the oak savannas, attracted because clearing was not needed. However, the soil is so poor and the oak roots so tough that these farms were abandoned in a short while. They remain rarely cultivated today. Other operations that take place in oak savanna include borrow pits and sand-mining operations such as those along the Minnesota River Valley near Morton. However, oak savanna is often attractive to people for homesites, because it occurs in scenic areas with water nearby. The savannas have also been used for industrial development because of the low agricultural value. In the gravelly soil, roads, septic systems and water supply systems are easy to build.

The oak savanna, as any edge, is an area of great wildlife diversity. Prairie species and woodland species find an amplified supply of food in an area with plant cover for protection. The oak trees themselves produce a food supply for wildlife that is unsurpassed in importance for many species. Acorns are a good and abundant staple. Their greatest value is in winter when other foods are scarce.

## Animal of the Oak Savanna

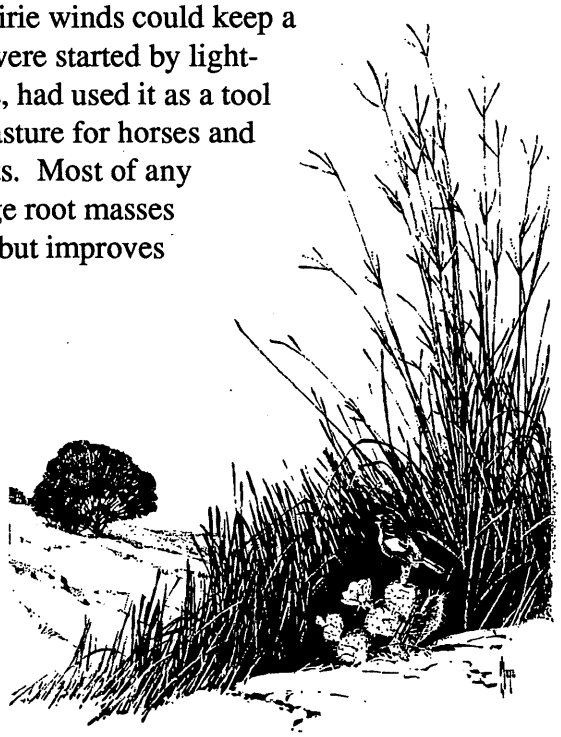
| Animal | Feeds on |
|---|---|
| Rabbit | sumac, basswood, dogwood, apple |
| Raccoon | oak, corn, grape, frogs, crayfish, grasshoppers, large insects, pokeweed, grape, hackberry |
| Squirrel | acorns, maple, hornbeam, pine, dogwood, fungus, spruce cherry, blackberry, elm |
| Pocket Gopher | foliage, stems, seeds and underground parts of a great variety of plants |
| Ground Squirrel | ragweed, knotweed, bristlegrass, sunflower, clover, wheat, needlegerass, pricklypear, russian thistle |
| Meadow Mouse | corn, barley, wheat, oats, clover, alfalfa, broomsedge, bulrush, dock, strawberry, buttercup, goldenrod, ragweed, sunflower, willow, maple, popular, oak, apple |
| Deer | fir, cedar, aspen, pine, alder, willow, bunchberry, maple, ferns (for an expanded list see teaching activity "Just One") |
| Coyote | jack rabbits, ground squirrels, mice, other rodents (the coyote will eat almost any small vertebrate or invertebrate) |
| Badger | prairie dogs, ground squirrels, pocket gophers, rabbits, mice, insects, lizards, grouse |
| Prairie Deer Mice | large insects, snails, centipedes, seeds, fruits, and roots of tubers |
| Masked Shrew and Short-tailed Shrew | earthworms, beetles, caterpillars, ants, flies, snails, grasshoppers, spiders, mice |
| Prairie Mole | grubs, insect larvae, earthworms, underground parts of plants |
| Woodchuck | clover, grasses, vegetables, soybeans, alfalfa |
| Fox Squirrel | corn, acorns, elm, wheat, blackberry, grape, fungus, blueberry, maple, hazelnut, mulberry, dogwood, apple, basswood, cherry |
| Red Fox | mice, rabbits, other small animals, birds, lizards, snakes, large insects |
| Striped Skunks | grasshoppers, grubs, crickets, beetles, wasps, spiders, toads, frogs, lizards, mice, gophers, eggs of turtles and birds |

## *Prairie*

The word prairie comes from the French word for meadow. In all its inadequacy, it was the only word Western Europeans had to describe the vast grasslands covering 400,000 square miles of the midwest from Indiana to Manitoba in the north to Texas in the south. These original grasslands are now mostly gone, sacrificed to the plow because of the richness of the soil they had created. With the prairie went its two partners, fire and the grazing animals, a triumvirate whose members each owed existence to the others. In Kilen Woods State Park a few remnants of the original prairie remain, a token of what once was.

A huge diversity of wildlife thrived in the prairie. Now, even the small remnants left in the state shelter 80 species of mammals, 300 species of birds and thousands of species of insects, including some endangered butterflies. A prairie may contain 300 kinds of flowering plants. The most common plants are grasses intermixed with many broadleaf herbs. From spring to fall, about 15 species flower each week. This flowering pattern may have evolved so that the plants could share equally in the services of insect pollinators.

The prairie owes its existence to frequent fires, regular drought and the continual grazing of the native hoofed mammals. Fires were most important in maintaining and rejuvenating the prairie. The strong prairie winds could keep a fire raging over thousands of square miles. These fires were started by lightning or by native Americans who, from Paleolithic times, had used it as a tool to drive wild game. Later they found that it improved pasture for horses and drew buffalo who came to graze on the new young shoots. Most of any prairie plant is below the surface. Prairie plants have huge root masses spreading out in all directions so fire does not kill them, but improves their growing conditions by killing off the competition of trees and shrubs. The fires burn off the dead litter, so new shoots have ample access to light, and the sun can warm the soil for the new growth. In addition, fires speed up decomposition of dead material and therefore make nutrients quickly available to new plants.



The grazing animals, such as buffalo and pronghorn antelope, served the prairie in many ways while taking their sustenance from it. They changed the vegetation height and density with their feeding, therefore creating diverse habitats for many species. Grazing removed plant material so it did not accumulate in a smothering mat on the soil. The droppings of the animals enriched the soil by recycling the nitrogen in the plants back into the ground. Their sharp hooves continually turned and tilled the soil, keeping it loose and full of air. Seeds falling under their hooves were planted into the ground by their heavy weight. Smaller grazing animals, such as the ground burrowing gophers, prairie dogs and badgers were prairie cultivators as well, moving and turning enormous amounts of dirt as they dug their intricate burrows.

Because only a few prairie remnants are left in Minnesota, many of the original inhabitants are gone, especially those that need large home ranges, such as the greater prairie chicken. Prairies are now

sanctuaries for one-third of Minnesota's rare species. Saving these last prairies may provide us with important services. Protecting native plants will help retain a pool of genetic material that could produce chemicals useful as foods, fuels, or medicines. They can help us develop new disease-resistant and drought-resistant strains of agricultural crops. For instance, one prairie plant, eastern grama grass, contains three times as much protein as corn. Some prairie plants can improve soil fertility by re-supplying organic matter. This could lead to more productivity without heavy use of pesticides and fertilizers. Prairie hay is cheap to produce and very drought resistant.

Kilen Woods is located on the Coteau des Prairies, or prairie plateau that ranges from southwestern Minnesota to eastern South Dakota. It is logical, therefore, that the prairies in these parts of both states are very similar. They are the western, arid, mixed grass prairies. Blue grama and buffalograss are common, as are western wheatgrass, green needlegrass, big bluestem and little bluestem, threadleaf sedge, and needleleaf sedge. Some of the common broadleaves are scarlet globemallow, American vetch, prickly pear, fringed sagewort and scurfpeas.

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# River Residents

K - 3

**Summary:** Children look for evidence of interrelated plant and animal life in the Des Moines river valley.
**Outcome:** The learners will identify what there is in the river valley that makes it a good home for certain animals.
**Time needed:** 1 hour at park
**Group size:** Class of 24: 1 adult per 12 students
**Context:** Natural
**Location:** Field trip - Creek by the campground, or river by bridge (bus can drive to both) Pre- and post activities in the classroom.
**Subject:** Science, art
**Skills:** Thinking - classification, description, discussion, drawing, listing, observation, visualization
**Season:** Fall, spring, summer
**Assessment Ideas:** The learner will draw a picture of an animal in its habitat with at least one plant or animal on which it feeds or which it needs for shelter. The picture will be assessed with an E (Excellent), S (satisfactory), or a U (unsatisfactory) and added to his her portfolio.

## State Environmental Education Goal

Learners should understand ecological systems

## Materials

- pre-activity - nature magazines
- paper
- pencils
- clipboards
- animal flashcards*
- list of plants and animals living in the river valley*
- assessment activity - large sheet of construction paper per child
- crayons

(*to be supplied by park)

## Procedure

Tell the students that they will find plants and animals or evidence of them that live in the river valley and at least one plant or animal on which the ones they found depend.

1. Classroom pre-activity: Tell the children that they are going to find out how plants and animals depend on each other and their environment to live.

2. Define the word "diversity"; (see the background materials for this set of activities). Relate it to the many different fruits and vegetables in the grocery store produce section. We need many different fruits and vegetables to keep us healthy because each contributes different vitamins and minerals. Similarly, plants and animals depend on each other in many different ways to keep them healthy.

3. Classroom pre-activity: Use the list of river valley plants and animals in the background description. Ask the students to cut from magazines or draw pictures of the plants and animals they expect to see at Kilen Woods and bring these to school to share with the class.

4. Field Trip: Give each child a flashcard with a picture of a plant or animal on it and pictures on the back of a couple of plants or animals on which it depends for food, shelter, or help with spreading their own kind. Ask them to see if they can find evidence of their animal or plant. Once they have found the animal or plant, see if they can find evidence of an animal or plant on which it depends. Make a list of the plants and animals they find.

5. Gather in a circle and discuss why these animals live where they do and not up on the fields around the river. What does the river valley have to offer them in the form of food, water, and shelter?

## Extensions

Add the Project Wild Activity "Beautiful Basics".

# Dakota Visitors

K - 3

**Summary:** Students investigate Dakota village life and, using samples to provoke the imagination, suggest ways that plants and animals were used by the Dakota. They are asked to determine the extent of the impact of such uses.
**Outcome:** The learners will understand what effect the Indians had on the diversity in the river valley.
Time needed: 30-45 minutes
**Group size:** Class of 24 students: 1 adult per 12 students.
**Context:** Social
**Location:** Flood plain by the bridge over the river on cty. rd. #19
**Subject:** Social studies
**Skills:** Thinking - analysis, application, description, discussion, inference, listening, listing, observation, reporting, visualization; Social - small group work
**Season:** Spring, summer, fall
**Assessment Ideas:** Choose three students at random by drawing names from a box or jar. Ask the students to name at least two ways the Dakota used plants and animals in the river valley and whether these uses had a lasting impact. Assess the answers with an E (excellent), S (satisfactory), or U (unsatisfactory), and document.

## State Environmental Education Goal

Learners should understand the potential complementary nature of multiple uses of the environment.

## Materials

- pictures or video of Dakota life*
- mussel shell*
- piece of buffalo hide*
- small animal skin (e.g. raccoon, beaver, otter)*
- bone*
- dried berries on a stick*
- round river rock*
- long stick*

(*supplied by the park)

## Procedure

Tell students they will be learning how the Dakota Indians used the river valley for a place to live.
Pre-activity: classroom or at site.

1. Show pictures or video of Dakota life in southwestern Minnesota (e.g. plant gathering and buffalo hunting, living in tepees, using dogs for draft work.)

2. Ask students to look around at the river valley and see if they can tell that anyone ever lived here in a small village.

3. Give students copies of pictures of Dakota life from the Minnesota Historical Society's **Dakota Indians Coloring Book.** Divide students into teams and give each team one of the objects the park has supplied; a mussel shell, small animal skin, long stick, dried berries on a stick, round river rock, piece of buffalo hide. Ask students to use their pictures to tell the rest of the class all the ways their item might be used by the Dakota.

4. Ask students what would eventually happen to all these things if they no longer wanted or could use them and if they were left on the ground.

5. Ask students if native Americans living in the river valley appear to have left any permanent damage in plants, animals or terrain.

## Extensions

1. Use a large sheet and some poles to set up a tepee big enough for the class to sit in while they do the activity. Have them help set it up and take it down. Ask them to look to see if the tepee left any permanent sign or damage on the land.

2, Serve maple sugar candy as a treat, or maple syrup snow cones made from shaved ice.

## Background

The Dakota Indians who lived along the river valleys of southwestern Minnesota originally came from the northern forests where they lived a life similar to the Ojibwe, building bark lodges and hunting bear and moose. Like the Ojibwe, they harvested wild rice and collected maple sugar. Dogs were their only draft animals at the time. The dogs were harnessed to toboggans in winter and carried packs in the summer. Slowly the Dakota began to move westward from the forests to the plains, probably to hunt the buffalo that grazed the prairies. Some of the more western Dakota obtained horses, and became the horse-back-riding buffalo hunters that have become the popular image of the native American. Not all acquired horses, though; their life styles did not change as drastically as those who had begun the western migration. They continued to use some of the foods they had left behind in the north and made long journeys to obtain these.

They continued to build fairly permanent bark lodges for the spring and summer. In the summer the women planted gardens to raise corn, squash and pumpkins using their stone and bone tools. The gardens were located in the river valleys where the soil was tillable The prairie soils, though rich, were buried beneath a mass of prairie grass roots that were too tough to cut through. The Dakota supplemented their agricultural produce with berries, roots (like prairie turnips) and wild plums, and shellfish from the rivers. The men hunted small animals and birds and fished the rivers. In the late summer they traveled north to hunt for waterfowl and gather wild rice. They came south again in the fall to follow the buffalo for three months. During their travels they lived in the very portable skin tepees. During the deep winter they lived in their bark villages along the southern Minnesota rivers. In March and April they again moved out for a short time to trap muskrats for the fur trade and to make maple sugar.

## Some Possible Uses (students will come up with many more ideas)

mussel shell - spoon, bowl, dipper
piece of buffalo hide - bedding, saddle pad, winter robe, headdress, shields, hair made into cord, netting, stuffing and padding
small animal skin (e.g. raccoon, beaver, otter)- mittens, hats, trading item)
bone - scraper, axe, awl, hoe, toboggan
dried berries on a stick - food, dye
round river rock - cooking rock (rocks were also used for arrow points, scrapers and blades, but these were chert or flint, usually, which fractures into a sharp edge)
long stick - tepee pole, maple sugar stirrer, ice skimmer for ice fishing, drying racks, frame for bark houses, travois poles for horses or dogs (a travois is a pair of poles with a hide stretched between. The poles are fastened over the dog or horse's back and the ends drag on the ground. The hide fastened in between is loaded with items to carry on long journeys.)

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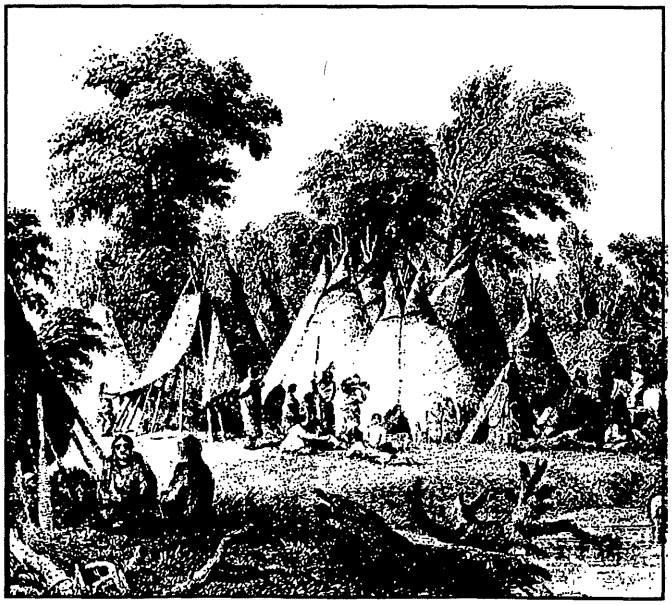


# The Diversity Story

K - 3

**Summary:** The students will write a story-script for a video made at Kilen Woods State Park on how diversity helps sustain the area.
**Outcome:** Learners will communicate the value of diversity.
**Time needed:** Field trip time (see activities chosen) and 30 minutes of class time
**Group size:** Class of 24; 1 adult per 12 students
**Context:** Action
**Location:** River valley and classroom
**Subject:** Science, social studies, language arts, media
**Skills:** Thinking - application, discussion, listening, observation, media construction
**Season:** Spring, summer, fall
**Assessment Ideas:** Three randomly chosen students will be asked to explain why plants and animals are important to each other. The answers can be assessed with an E (excellent), S (satisfactory), or U (unsatisfactory) and documented by the teacher.

## State Environmental Education Goal

Learners should be provided with experiences that will assist in the development of personal appreciation, sensitivity, and stewardship for the environment.

## Materials

- videotape and camera
- VCR and monitor
- overhead projector or large writing chart
- markers

## Procedure

Tell the students that they will be making a videotape about why plants and animals are important to each other.

1. A parent or volunteer will accompany the students on the field trip and will videotape the students involved in the River Residents activity.

2. In the classroom, the students will write a script to go with the videotape explaining why the plants and animals found are important to each other. It may be necessary to obtain the help of the school media specialist.
   a. Students view the videotape
   b. All students contribute to a script explaining the videotape; for example each student could choose one plant or animal to explain, or two students could take a plant and animal that are dependent on each other and explain the relationship of their natural "buddies".
   c. The script can be dubbed onto the videotape by the media specialist as the class is watching it. Different students can take turns reading parts or the teacher can read the script. It can also be taped onto a cassette, and the specialist can dub it in. (The videotape player needs to have a plug-in labeled "audio input" to accommodate a microphone).

3. The class will show the videotape to other classes.

## Extensions

1. The videotape can be shown to the school board, parents, legislators, and anyone important to supporting field trips, environmental education, state parks or environmental legislation.

2. A copy of the videotape can be donated to the park for showing to visitors.

3. Do the Project Wild activity called "Good Buddies".

## Variation

Accompanying volunteers or parents can take color prints and the students can mount these in a scrapbook with captions, to be used as a display at parents' night or other public presentations.

# Who Needs Whom?

4 - 6

**Summary:** Students will identify some of the animals that now live and used to live in the river valley, making and using plaster casts of their footprints. They will identify some of the ways that plants depend on animals for survival and well-being.
**Outcome:** Learners will understand the large number of plants and animals it takes to maintain healthy ecosystems and some of the ways in which they are interrelated. Time needed: 2-3 hours
**Group size:** Class of 24: divide into small groups of 2-3 per animal track
**Context:** Natural
**Location:** Bait post (Ask the park manager if one has been set up. If not, go to the mud flats on the river below the interpretive center.) A brushy area nearby.
**Subject:** Science, language arts, art
**Skills:** Thinking - analysis, application, classification, comparing similarities and differences, description, discussion, inference, listening, listing, observation, visualization
**Season:** Spring, late summer, fall
**Assessment Ideas:** Select three students at random. Ask them how particular animals (choose 1 example for each student) can help plants. Ask them what effect the elimination of this animal would have on its environment. Assess the answers with an E (excellent), S (satisfactory), or U (unsatisfactory), and document.

## State Environmental Education Goal

Learners should understand ecological systems.

## Materials

- plaster of Paris
- ice cream buckets
- liquid soap
- brush
- masking tape
- cardboard strips to encircle the track
- laminated instructions for making plaster casts* (or use the activity "Tracks!" from the Project Wild elementary manual)
- track identification sheets*
- pre-made plaster casts of buffalo, wolf, bear, puma*
- plant and animal interdependence chart*
- 2 foot square piece of wool for each team (or an old sock turned inside out)
- Use chart*
- check list of park animals and foods they eat*

(*supplied by park)

## Procedure

Tell the students you are going to find out how plants and animals depend on each other.

1. At the bait post or on the mud flats, check the sand or mud to see what tracks are there. Divide students into groups of 2-3 per track and make plaster casts of the tracks using the instructions provided.

2. Identify the animals that left the tracks using identification sheets. Make a list of all the animals the students have identified. Ask the students why these animals are here. Can they find food, water, shelter and space? What food does each animal need? Ask them to find out from the check list. How many of these eat plant food? How many of these animals eat other animals that eat plant food?

3. Who used to be here? Hand out plaster casts of buffalo, elk, bear, wolf, and cougar. Have students identify these with the identification cards. Add these to the lists. What do they eat? Obtain this information from the check list.

4. We know that animals need plants, but do plants need animals? In what ways? Ask the students how they think each of the following animal habits can help keep the plants healthy.

   Form students into teams.

   a. Have one student on the team go through a brushy area holding the piece of wool (or old sock) in front of him/her. How many different kinds of seeds stick to the wool? Will these seeds stick to animals traveling

through?

b. Can the students find twigs bitten by rabbits or deer? Rabbits will sharply slice the twigs on the diagonal. Deer will leave rough ends.
c. Have the students look for fresh mounds of dirt that may be at the entrance to burrows or gopher holes. Have the students look at the plaster casts of the sharp hooves of deer, elk, and buffalo.
d. Can the students find droppings of deer or other animals?

5. If these animals disappear, what can happen to the plants? List the animals you have found across the top and put an x in the boxes that indicate what function that animal can perform for the plants. If you eliminate any animal, what happens to the plants?

## Extensions

1. Ask the students to find a burdock plant. Go to it and read the poem "What the Burdock Was Good For" (author unknown)

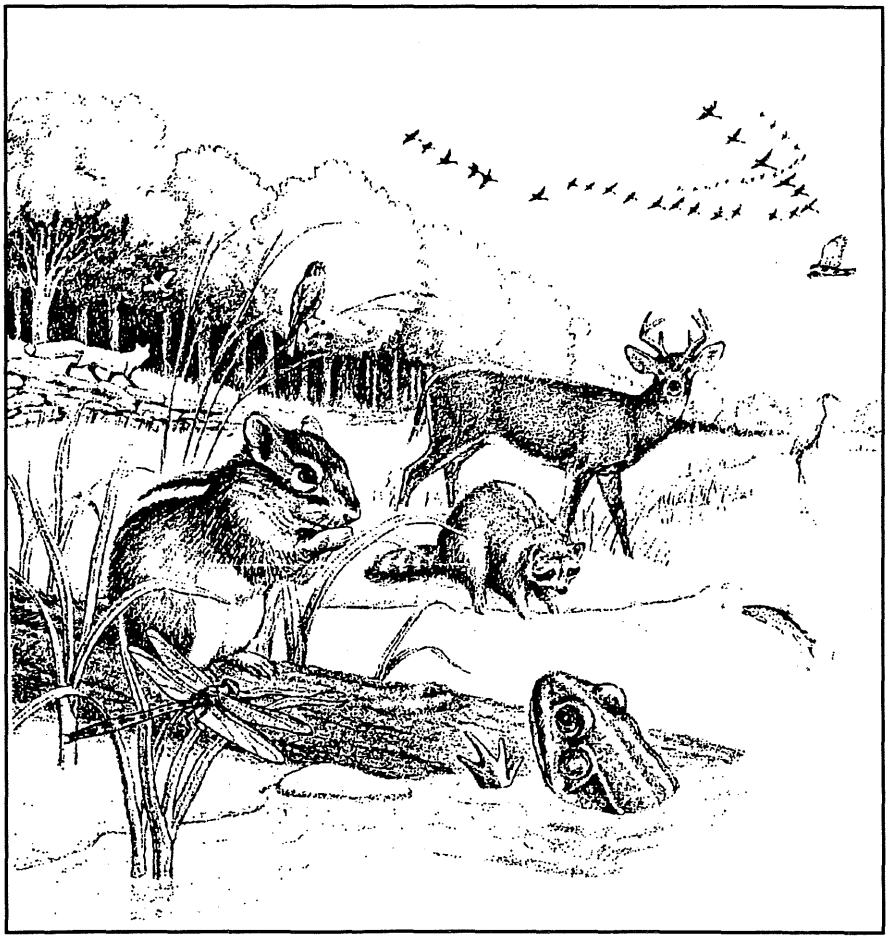
2. Look at the seeds that ride on fur. How many different shapes do they have, to make it easy to be picked up and carried? Make a drawing of their shapes.

3. Do the activity "Seed Need" from Project Wild.

## Background

Plants benefit from animals in many ways. Animals pick up seeds that stick to their hair or fur as they brush by the plants. They carry these seeds along with them and distribute the seeds far and wide. Some time in their travels they then brush or shake the seeds off. The pruning that animals, such as rabbits and deer, do while they browse is good for plants if the animals are not too hungry and do not take too much. The pruning takes off dead branches and causes the plant to put out new growth. Digging animals like gophers are the tillers of the prairie, breaking up and turning over the soil so that seeds will find a soft bed in which to grow. The hooves of the larger grazing animals can perform the same function for the soil. In addition, seeds on the ground can be pushed in deep and planted by these hooves. Seeds eaten by animals can be carried and deposited in their droppings. Droppings also help to fertilize the soil.

Though many animals share some habits, each time one animal is eliminated, the job is not done quite as well and the river valley is a little poorer. No single animal can do all the jobs. The more animals eliminated, the poorer the habitat. Conversely, the more species living together and supporting each other, the richer and healthier the environment. This richness is called biological diversity.



## USE CHART

| USE TO PLANTS | ANIMAL TYPES (examples) | | | | | |
|---|---|---|---|---|---|---|
| | Rabbit | Deer | Gopher | Buffalo | etc. | etc. |
| Seed Disperser | | | | | | |
| Seed Planter | | | | | | |
| Fertilizer | | | | | | |
| Pruner | | | | | | |
| Soil Tiller | | | | | | |

### WHAT THE BURDOCK WAS GOOD FOR

*(author unknown)*

*"Good for nothing," the farmer said,*
*As he made a sweep at the burdock's head;*
*But then, it was best, no doubt,*
*To come some day and root her out.*
*So he lowered his scythe, and went his way,*
*To seed his corn, or gather his hay;*
*And the weed grew safe and strong and tall,*
*Close by the side of the garden wall.*

*"Good for home," cried the little toad,*
*As he hopped up out of the dusty road.*
*He had just been having a dreadful fright,-*
*The boy who gave it was yet in sight.*
*Here it was cool, and dark, and green,*
*The safest kind of a leafy screen.*
*The toad was happy: "For," said he,*
*"The burdock was plainly meant for me."*

*"Good for a prop," the spider thought,*
*And to and fro with care he wrought,*
*Till he fastened it well to an evergreen*
*And spun his cables fine between.*
*"Twas a beautiful bridge,- a triumph of skill,*
*The flies came 'round as idlers will;*
*The spider lurked in his corner dim;*
*The more that came the better for him.*

*"Good for play," said a child, perplexed*
*To know what frolic was coming next;*
*So she gathered the burrs that all despised,*
*And her city playmates were quite surprised*
*To see what a beautiful basket or chair*
*Could be made, with a little time and care.*
*They ranged their treasures about with pride,*
*And played all day by the burdock's side.*

*Nothing is lost in this world of ours;*
*Honey comes from the idle flowers;*
*The weed which we pass in utter scorn,*
*May save a life by another morn;*
*Wonders await us at every turn.*
*We must be silent and gladly learn,*
*No room for recklessness or abuse,*
*Since even a burdock has its use.*

# Slip-Slidin' Away

4 - 6

**Summary:** Using the plaster casts of animal footprints, their own observations of farming activity, and a map of the river passing through cities and countryside, the students will assess the effect humans have had on the river valley.
**Outcome:** Learners will understand the impact of agriculture and industry on biodiversity in the park.
**Time needed:** 1 hour
**Group Size:** Class of 24, 1 adult per 12 students
**Context:** Social, valuing
**Location:** Drainage ditch (talk to park manager for directions), bluff facing farm
**Subject:** Science, social studies, language arts
**Skills:** Thinking - analysis, application, classification, comparing similarities and differences, description, discussion, evaluation, generalization, inference, listening, observation, problem solving, visualization
**Season:** Spring, summer, fall
**Assessment Ideas:** Three students chosen randomly will be able to give three examples of how human activity has depleted the biodiversity in the river valley and why we should care. The answers should be assessed using E (excellent), S (satisfactory), or U (unsatisfactory).

## State Environmental Education Goal

Learners should understand the cause-and-effect relationship between human behaviors and attitudes and the environment.

## Materials

- laminated maps of the Des Moines River from the area where the rendering plant is to the park*
- plaster casts of footprints of animals that once lived here but are no longer here*
- large chart made from example that follows
- markers
- pencils
- notepaper
- clipboard

(*supplied by park)

## Procedure

Tell the students that you are going to find out how humans have affected the plant and animal life in the river valley. This could be a jigsaw; teams of students each focus on a different question, and bring their discussion back to the group.

1. Have the students look at the map of the Des Moines River with the industrial plants marked on it. What might the plants do to the river? What would this do to plants and animals in and along the river? Is this helpful or harmful to them? Is it helpful or harmful for people?

2. Have the students look at the plaster casts of the animals that are no longer here. Why do the students think they are no longer here? (answers can include deliberate elimination as for the buffalo and puma, loss of food, shelter or space - as with the antelope,) Is it helpful or harmful to people that these animals are no longer here? (If they are puzzled about the answer to this question, do the activity, "Who Needs Whom?)

3. Have the students look at the drainage ditch. Ask them where it is coming from and what it might be carrying. Is this good or bad for the plants and animals? Is it helpful or harmful for people?

4. Ask the students to look at the farm field in the flood plain. What has happened to the plants and animals that used to live there? Is this helpful or harmful for the plants and animals? (How about deer and raccoons?) Is it helpful or harmful for people?

5. Ask the students to help you make a list of the things that might be done to make some of the harmful impacts less harmful while keeping what is helpful to plants, animals and people.

## Extensions

1. Do research projects on how farming practices have changed in the last 50 to 100 years along the Des Moines River.

2. Talk to farmers in the area, or ask them to come to the park to speak to the class or come to the classroom before or after the visit.

3. Find a speaker on sustainable agriculture.

4. Test water quality at various points above and below outlets into the river.

## Variation

Have the class create a series of pictures called "The Changing Countryside" including the river valley 100 years ago, today, and 50 years in the future. The future picture could depict changes for the better or changes for the worse. Option: Check with other nearby schools to see if they are creating their own pictures. Do a joint showing at the park or in a local mall.

## Background

As long as humans exist on the earth, they will affect it in a variety of ways. The sheer numbers of people now living (over 5 billion) mean that we cannot go back to the simple hunting and gathering lifestyle that had the least (but by no means minimal) impact. Agriculture and industrialization are here to stay. As we become wiser, however, about the value of other life forms, we become more aware of the need to look at the human activities we have taken for granted for so long. We need to see what harmful effects they are having; we need to reevaluate the need to do some of the things we do (Do we need so much of everything? Do we need triple-wrapped plastic packages? Do we need to eat the same old things we have always eaten?) For those activities that are essential we need to find ways to carry them out that have the least harmful effect on a healthy diversity of plant and animal species.

In our example here, in the past, industrial plants have dumped harmful chemicals and other pollutants in the rivers, taken up water, heated it as it was used to cool parts of the plant, and released it back into the stream, created noise, sent harmful wastes into the air, and used tremendous amounts of energy inefficiently. As we have become aware of the harmful effects of air and water pollution on people and animals, companies are volunteering or being required to change their operations to lessen these effects.

When we lose animal and plant species we are losing important interdependent parts of the ecosystem, and species that may be of value to humans in ways we have yet to discover.

Agriculture as it has been practiced has carried with it its own problems: clearing fields eliminates the food and shelter that other plants and animals need. Some animals do benefit from planted fields, such as deer and raccoons that eat the corn. This, however, makes them a nuisance to the farmers. Fertilizers and pesticides can run into the water from fields and drain tiles and become toxic to species in and around the river. Water flowing through piles of animal waste, as in a feed lot, can carry nutrients into the water that can cause the river to become clogged with algae and sediment, making it an inhospitable place for plants and animals.

Our society is slowly finding and even more slowly learning to use alternative methods that can eliminate or lessen some of these effects. We need to search for the proper balance between meeting the needs of humans and meeting the needs of other plants and animals to maintain the diversity that in the long run is positive for humans as well. This may mean giving up some of the things we take for granted or spending time and money on finding alternatives, such as plastics made from vegetable oil instead of petroleum. Vegetable oil plastics decompose harmlessly in the environment, and plants are a renewable resource. We can search for alternative crops that produce more on an acre and require fewer pesticides and herbicides. For this we need to preserve as many wild plants as possible so we have them as possibilities for domestication. Maybe we need to domesticate different animals that do not produce so much waste as cattle. The options are out there if we value finding them enough to support the research with money and effort.

**GAIN AND LOSS CHART (mark an "ok" in the box if there is an effect and it is ok. Mark an x in the box if there is an effect and its harmful.)**

| EFFECTS OF REALITIES | REALITIES | | | | |
|---|---|---|---|---|---|
| | industrial plants | loss of animals | field run-off | farm field | feedlot |
| chemicals in the water | | | | | |
| can't perform functions for other plants and animals | | | | | |
| replaces many plants & animals with one | | | | | |
| makes things for humans | | | | | |
| grows food for humans | | | | | |
| makes more room and less danger for farm animals | | | | | |
| animal waste washes into the water | | | | | |

# Putting Things Back

4 - 6

**Summary:** The students will actively participate in a project to help restore biological diversity in the park.
**Outcome:** The students will undertake restoration projects to help restore biological diversity.
**Time needed:** As arranged
**Group size:** As arranged
**Context:** Action
**Location:** As arranged
**Subject:** As arranged; language arts
**Skills:** Thinking - writing - rest will depend on project
**Season:** Fall, spring
**Assessment Ideas:** The student will write a letter to the local newspaper editor explaining his or her work at the park and why it was undertaken. The letter will be assessed with an E (excellent) S (satisfactory) or U (unsatisfactory) and added to the student's portfolio.

## State Environmental Education Goal

Learners should be provided with experiences that will assist in the development of personal appreciation, sensitivity, and stewardship for the environment.

## Materials

- To be provided by the park
- camera and film

## Procedure

Tell the students they are going to have a chance to bring plants and animals back to the park **(but contact the park manager before you tell them!)**

1. Well before the field trip (e.g. in the fall for a spring field trip), contact the park manager to ask what projects the students might undertake: discuss options to determine if they are appropriate for student ages and abilities. These projects should clearly help to enhance the biological diversity of the park.

2. The park manager will see that the project is organized and all materials are available; the teacher will help determine that this project is appropriate for the students' abilities.

3. Either the teacher or the park manager should explain to the students what they are to do and the effect it will have on biological diversity in the park.

4. A volunteer or parent should take color slides or pictures of the project as it progresses.

5. The park manager should send a follow-up report to the class on the effect of the project.

## Extensions

1. The class can use the pictures or slides to put together a display board or slide-show for parents, school board and/or legislators.

2. The pictures can be added to the students' record as evidence of group participation, initiative, or other skills on which the student is being assessed.

3. The class can do their own follow-up assessment of the progress of the project.

# Little Differences Mean Alot

7 - 9

**Summary:** The students will compare the components of a microclimate and the plants that live in it using some standard tests and visual observation.
**Outcome:** The learner will understand how very different species can live side by side because habitats can vary within a small space.
**Time needed:** 2-3 hours
**Group size:** Class of 20 to 28
**Context:** Natural
**Location:** Oak savanna, creek ravines, wet meadow
**Subject:** Science
**Skills:** Thinking - mapping, analysis, application, classification, comparing similarities and differences, computation, description, discussion, generalization, inference, observation, reporting, research, synthesis. Social - small group work.
**Season:** Early fall, late spring, summer
**Assessment Ideas:** The learners will be able to identify how the floral components change between the bluff areas, the creek ravines and the wet meadow. Assess the answers with an E (excellent), S (satisfactory), or U (unsatisfactory) and document these.

## State Environmental Education Goal

Learners should understand ecological systems.

## Materials

- summer trail maps*
- topographic maps of the park or trail maps*
- sling psychrometers* (temperature and relative humidity measures)
- water bottle (to moisten cotton wick on psychrometer)*
- plant identification guide*
- pencils
- paper
- clipboards
- micro-climate chart*

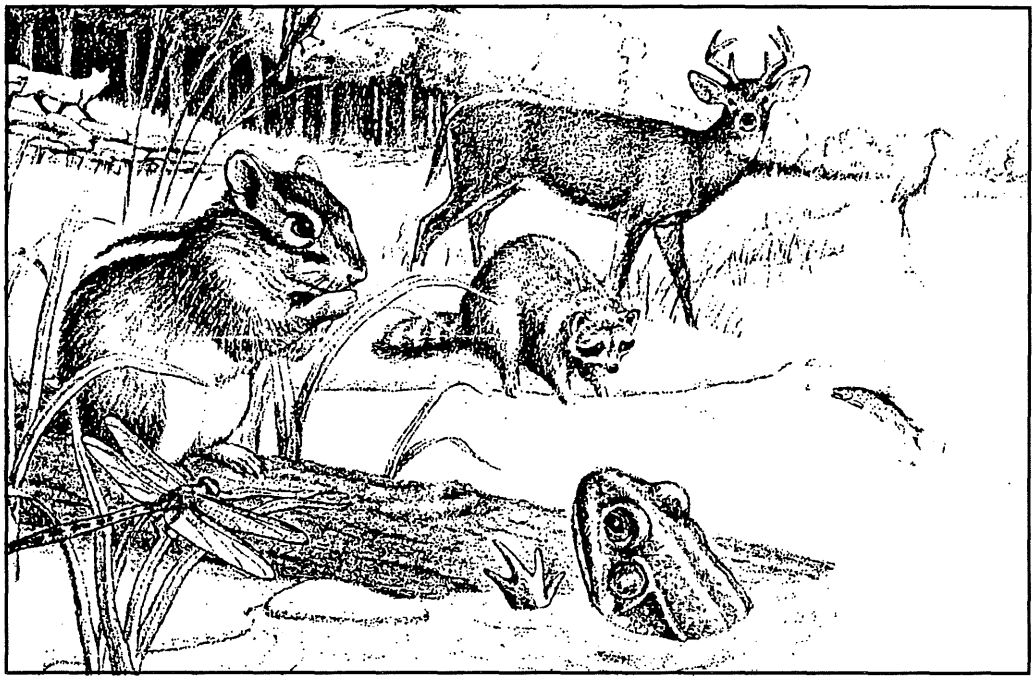
(*supplied by the park)

## Procedure

Tell the students that they will be identifying microclimates - small areas of differing characteristics within a more general habitat type - and comparing the plants that these microclimates support.

1. At the interpretive center divide the students into teams of two. Give them topographic maps of the park. Ask them to outline and identify on the maps the ravine areas (identified by close contour lines), the more open areas on the bluff edge and the wet meadow.
2. Travel to the oak savanna on the bluffs. Ask the students to write a description of the area from visual observation. Include such characteristics as general height, spacing and color of plants, level or hilly terrain, animal species or evidence of animals observed, visible moisture. Ask the students to make a list of the tree and understory species, using their park plant identification guides.
3. Have the students feel the soil to determine if it is wet, damp or dry. Using their equipment, they should test for air temperature, relative humidity and soil temperature. Test for air temperature and relative humidity at chest height. Add these findings to their chart.
4. Have the students plot these monitoring sites on the contour map to correlate to elevation and add the elevation figures to their chart.
5. Travel to the Rock Creek Trail. Repeat steps 2, 3, and 4 in this ravine area.
6. Move to the wet meadow. Repeat steps 2,3, and 4 here.
7. Bring the students together to compare their findings. Ask students to describe their visual impression of the two areas. Compare the readings on their charts. How are they different? Are the plants that grow in each area

different or the same? Are there any that were the same? How many of the total that were identified?



## Extensions

Keep these summary charts through the years to plot changes in the microclimates.

## Variation

Do these same tests on the adjacent prairie beyond the oak savanna tree line.

## Background

Climate is the average taken of the wind, temperature, and moisture in an area over several years combined with its soil type and elevation. Small differences in any of these within a limited geographic area can make big differences in the plants and animals the area can support. Plants will be different on opposite sides of a lake depending on which side is exposed to the sun first and how the prevailing winds blow; if the terrain is flat and therefore fully exposed to the sun it will have different plants than a shaded side of a hill a few feet away. An inch or two more of moisture a year from a spring or seep will mean that plants growing near these will be different from drier lands a little farther removed. These variations within a larger climactic area are called microclimates. They increase the possibilities for diverse plant life to exist in a small area and therefore the opportunities for diverse wildlife as well. Specific conditions support specific plants; in turn these support specific animals.

# MICROCLIMATE COMPARISON CHART

**Team names:**_____

**Date**_____**Time**_____

| **Characteristics** | **Ravine** | **Bluff Area** |
|---|---|---|
| elevation | | |
| description of terrain | | |
| plant density | | |
| plant height | | |
| animal species | | |
| tree species | | |
| understory species | | |
| visible moisture | | |
| soil temperature | | |
| soil moisture | | |
| air temperature | | |
| relative humidity | | |
| sky condition | | |
| wind direction | | |
| wind speed (approximate) | | |

# Oak Savanna, Oh Don't You Cry For Me!

7 - 9

**Summary:** Students will analyze the relationship of the oak savanna to the river corridor and suggest ways humans can use the oak savanna without disrupting that relationship.
**Outcome:** Learners will learn how to manage a renewable resource.
**Time needed:** 2-3 hours
**Group size:** Class of 20 - 28
**Context:** Natural, social
**Location:** Oak Savanna, any areas damaged by means of overuse (check with the park manager to find this site), interpretive center
**Subject:** Science, social studies, math
**Skills:** Thinking - analysis, application, description, discussion, evaluation, computation, listing. Social - hypothesize, prioritize
**Season:** Fall, spring
**Assessment Ideas:** Three students whose names have been chosen at random will be able to describe two ways to maintain the oak savanna while using it and give one reason why this is desirable. Assess the answers with an E (excellent), S (satisfactory), or U (unsatisfactory) and document.

## State Environmental Education Goal

Learners should understand the potential complementary nature of multiple uses of the environment.

## Materials

- information on amount of particular uses a given geographical area of oak savanna can stand before it begins to degrade.
- 8"x11"outline drawing of Bur oak
- Possible Use list
- paper
- pencils
- clipboards
- easel pad
- markers

## Procedure

Take the trail to the oak savanna. Tell the students the object is to find ways to keep the oak savanna habitat healthy and functioning while still allowing human use. Divide the students into teams of three.

1. Ask students to determine how the oak savanna contributes to the diversity of life in river corridor. (How do these trees contribute towards food, water, shelter and space for other plants and animals?) Have the teams use the diagram of the bur oak to illustrate this. The teams should share their results and create a class master list.

2. Travel to an area of overuse or damage. Discuss what might have caused the damage and how it could have been prevented.

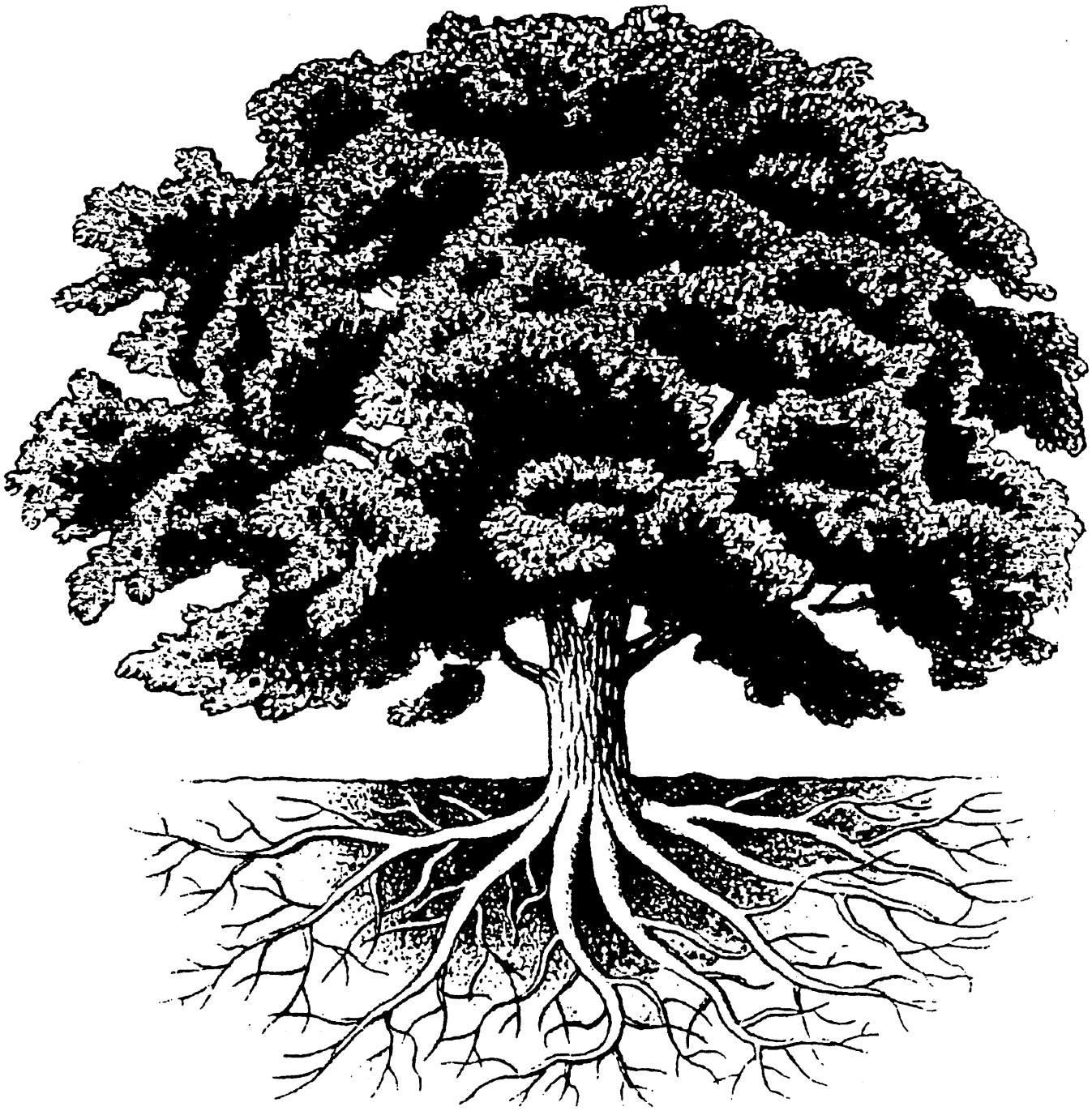
3. What uses could humans make of the oak savanna without significantly degrading the ability of the oak savanna to support a diversity of plant and animal life? Teams of students should choose from the Possible Use list those human uses that could be compatible with the oak savanna and make recommendations on how much of that use could be tolerated before the savanna loses its function as habitat.

   Those recommendations can be based on such factors as amount of permanent damage to plants and animals, amount of human contact, time of year of activity, area taken up by the activity, support systems necessary (e.g. roads, garbage service, maintenance), amount of cutting, grazing or harvesting the activity requires.

4. Ask students to contribute ideas on how the public can make sure that their recommended use limits are being followed.

## Background

See the discussion of oak savanna habitat in the introduction to this field guide.



# Possible Uses

These are uses that humans have made in the past of oak savanna areas.

| Uses | Could Be Compatible | Not very Compatible | Recommendations for Amount of Use |
|---|---|---|---|
| Hunting | | | |
| Hiking | | | |
| X-Country Skiing | | | |
| Tubing | | | |
| Residential Building | | | |
| Woodlots for firewood | | | |
| Cattle Grazing | | | |
| Gravel Pit | | | |
| Farming | | | |
| Bicycle riding | | | |
| Horseback riding | | | |
| Snowmobiling | | | |
| ATV riding | | | |

# Oak Savanna and A Lot More

7 - 9

**Summary:** Learners will examine different options for land use in the river corridor, evaluate the county zoning plan and create a plan of their own.
**Outcome:** The learner will understand how public action can be used to manage land uses.
Time needed: 1 hour
**Group size:** Class size 20 - 28
**Context:** Social, valuing, action
**Location:** Oak Savanna, interpretive center, classroom
**Subject:** Social studies
**Skills:** Thinking - analysis, application, comparing similarities and differences, discussion, evaluation, inference, mapping, problem solving, public speaking, visualization. Social - small group work.
**Season:** Spring, fall, summer
**Assessment Ideas:** Choose three students at random. Ask each to describe 3 land use options for the river corridor and give their reasons why these land uses are appropriate. Assess the answers with an E (excellent), S (satisfactory), or U (unsatisfactory) and document.

## State Environmental Education Goal

Learners should analyze, develop, and use problem-solving skills to understand the decision-making processes of individuals, institutions, and nations regarding environmental issues.

Learners should evaluate alternative responses to environmental concerns or issues before deciding on a course of action or no action.

Learners should understand the potential complementary nature of multiple uses of the environment.

## Materials

- county land use zoning map for river corridor*
- small land use map of river corridor*
- small blank maps of river corridor*
- large piece of easel pad paper
- markers
- "A Guide for Buying and Managing Shoreland" Minnesota Department of Natural Resources Division of Waters, June 1990*

(* supplied by park)

## Procedure

(This activity can build on the activity "Oak Savanna - Don't You Cry For Me" or it can be done independently). Tell the students that they will be making their own land use plan for the river valley and presenting it to authorities.

1. Government bodies such as counties have classified land into use types. Brainstorm what this oak savanna might be used for today. How do they see it being used? Assign identities to teams of two to three students each, such as farmer, homeowner, skier-hiker, entrepreneur, wildlife biologist, hunter, fisherperson. Make a list of possible uses ( for example, residential, recreation, wildlife refuge, landfill area, commercial such as gravel pit or quarry). Have each make an argument for their recommended use.

2. As a class "planning commission," develop a mission statement for their zoning commisson. (example: The valley must remain suitable habitat for both wildlife and human use, the river must remain fishable and swimmable.) Prioritize uses for the river valley. Have students generate criteria for setting those priorities, such as effect on the water, vegetation, wildlife, soils, other possible uses. These criteria must be in line with their mission statement.

3. Hand out a county land use zoning map or a portion of one showing the river corridor. How has the corridor been zoned? What were the criteria that were used? Do they agree with this?

4. Give the teams blank maps of the river corridor and ask them to create their own land use plans

based on their class criteria. Ask the teams to present their maps to the class with their justifications. On a large map of the river corridor, create a class zoning map.

3. Present their plan to the local county planning and zoning commission at their next meeting.

## Extensions

Take the class to observe a county planning and zoning meeting when a river corridor issue comes up. Later in class ask the students to analyze the action or nonaction taken and propose their own decision.

Ask the county zoning administrator to come to class and describe the zoning plan, the process by which it was created, who was involved in creating it, how they set their criteria and what information they had to use. Ask the regional Department of Natural Resources to send a person to explain the river shoreland management act and the Wild and Scenic Rivers act.

## Variation

Ask the county zoning administrator and a local DNR official to come to class to comment on the class zoning map and to bring out issues the students may have missed.

## Background

The concept of the rights of land ownership change over the years as do most other cultural traditions. People are impinging more on each other as population increases. Humans are having increasing negative impact on natural resources. As the consequences of some of our uses of natural resources become more clear, people have given the various levels of government some regulatory powers over those uses. In this way we ensure that individuals do not degrade our lands and waters for future generations.

In Minnesota, the need to protect lakes and rivers initiated the state's most major effort to have some control over land use. The legislature passed the Shoreland and Floodplain Management Act in 1969 to preserve and protect the state's waters and adjacent lands. This act required the state Department of Natural Resources to establish standards for protecting waters, such as setting buildings back away from the shoreline, regulating sewage treatment and disposal, regulating the flow of nonpoint pollution into the waterways and regulating land uses on shorelines so the uses do not impair water quality. Local units of government then were required to adopt these or stricter standards for local zoning and land use. Usually local counties and cities set up volunteer planning commissions to help them establish these standards and enforce these regulations. As cities and counties began to see the value in planning for how land is used, they extended their planning efforts to lands under their jurisdiction that were not covered by the Shoreland and Floodplain Management Act.

Setting up and enforcing these land use regulations is not an easy task for cities and counties. Many people feel that once they have purchased their property they should be allowed to do whatever they want with it, regardless of effect on neighbors or natural resources. Planning commissions and city councils, especially in rural areas, are often put in the position of having to regulate friends, relatives, business associates, customers and others with whom they have social and economic ties. The pressure to look the other way is often intense, and conflicts of interest are inevitable. The task requires these officials, who are for the most part volunteers who spend only part of their time at government work, to be knowledgeable in a wide range of legal, political and natural resource issues. Often they must rely on advice from state and federal agencies, lawyers, and consultants who present them with a staggering amount of material to read and understand. The task would be huge even for a person working full time with a professional degree in planning. For anyone interested in the future health of Minnesota's natural resources, it is well worth while to carefully follow or become involved with city and county efforts at planning and zoning. Careers in land use planning should be worth investigating as the need for planners grows.

# Prairie Life

10 - 12

**Summary:** Students, working in teams, research and make presentations on prairie plants and animals, and their interrelationships. They seek these at the prairie remnant sites at Kilen Woods State Park, and make inferences about the future of the prairie remnants.
**Outcome:** The learner will understand the complexity of interrelationships of native prairie plant and animal species.
**Time needed:** 1 hour at the park
**Group size:** Class of 20-26
**Context:** Natural
**Location:** Area near park headquarters on west side of park (or area designated by park manager - check this first)
**Subject:** Science, language arts
**Skills:** Thinking - analysis, application, classification, comparing similarities and differences, description, discussion, evaluation, generalization, inference, listing, observation, public speaking, reading, reporting, research. Social - small group work.
**Season:** Fall, spring, summer
**Assessment Ideas:** Given a particular set of prairie interrelationships, a student should be able to predict the possible result of removing one of the components. Assess the answers with an E (excellent), S (satisfactory), or U (unsatisfactory). Document for the individual.

## State Environmental Education Goal

Learners should understand ecological systems.

## Materials

- reference materials on prairie plants and animals and their relationships*
- field guides to prairie plants and animals and their signs.*
- visual aids - posters, slides, transparencies, etc. of prairie plants and animals*

(*supplied by the park)

## Procedure

Tell students they are going to teach each other about the interrelationships of prairie plants and animals.

1. Pre-field trip activity: Assign a single particular Kilen Woods prairie plant or animal to teams of two students (for instance, a particular grass, forb, ungulate, rodent, bird, reptile). The students should research the characteristics and habitat needs (food, water, shelter, space) of their assigned plants and animals, and their relationship to other prairie plants and animals. Ask each team to teach the rest of the class about their plant or animal using large visual aids - e.g. slides, transparencies, charts and pictures.
2. Assign each team to another team's plant or animal. At the park, the teams will use what they learned from the other teams to find as many of these plants and evidence of the animals of the prairie community as they can. Record these on a pre-prepared check list. Gather the students together to report on what they found and what is missing. Ask the original research teams to comment on what was found by the team assigned to their plant or animal and the habitat components on which they depend. Ask students to speculate on what the long-range future for this prairie remnant is given the completeness or the scarcity of what is found.

## Extensions

If there is time and the students can handle more, give them additional plants and animals to research.

## Background

For information on prairie plants and animals, their interrelationships and physical factors see the section on prairie in the introduction to this guide and:

- The Prairie World, Costello, David, University of Minnesota Press, Minneapolis, 1969,1981 (paperback). (excellent discussion of interrelationships of plants and animals).

- Plants of South Dakota Grasslands, Bulletin 566, Dec. 1970 South Dakota State University, Brookings (nice pictures and write-ups, good glossary)

- "Life in the Grasslands, North America" 16 mm 15 min. Plants, animals and insect life in the grasslands and the interrelationships of living things and their surroundings. Department of Natural Resources film library, cat. no. 154.

- "The Prairie" 16mm 20 min typical animal forms of the semi-arid North America prairie against a background of the dominant plant species, grasses and forbs. cat. no. 186 Department of Natural Resources film library.

- "A Prairie should be Forever" 15 min 16 mm cat no. 008, Department of Natural Resources film library.

and other references listed at the end of this guide.

# TEAM PRAIRIE CHECKLIST (ANIMAL)

TARGET SPECIES_____

| HABITAT NEEDS | PRESENT | ABSENT |
|---|---|---|
| FOOD TYPES | | |
| SHELTER | | |
| WATER | | |
| SPACE | | |

# TEAM PRAIRIE CHECKLIST (PLANT)

TARGET SPECIES_____

| HABITAT NEEDS (describe) | PRESENT | ABSENT |
|---|---|---|
| WATER (AMOUNT REGULARITY) | | |
| NUTRIENTS | | |
| SOIL TYPE | | |
| SEED DISPERSAL | | |
| SPECIAL NEEDS (e.g. fire, animal interaction, sunlight or shade) | | |

# The One and The Many

10 - 12

**Summary:** Students will compare the diversity of plants and animals in three areas in and adjacent to the park using sample plots.
**Outcome:** Learners should understand how agriculture and humans have affected the prairie and its native species.
**Time needed:** 1 1/2 hours
**Group size:** Class of 20-26 students
**Context:** Social
**Location:** Prairie remnants
**Subject:** Science, social studies
**Skills:** Thinking - analysis, classification, comparing similarities and differences, computation, description, discussion, inference, listing, observation, reporting, research
**Season:** Summer, fall, spring
**Assessment Ideas:** Three students chosen at random will be able to explain what often happens to plant and animal diversity in areas of human use. These answers will be assessed with an E (excellent), S (satisfactory), or a U (unsatisfactory) and documented.

## State Environmental Education Goal

Learners should be provided the information needed to make informed decisions about actions to take on environmental issues.

Learners should understand the potential complementary nature of multiple uses of the environment.

## Materials

- Prairie Primer identification booklet*
- plot maker - string, tape measure, plastic flags, stakes
- tally sheets with list of plants found in park*
- pencils
- clipboard
- easel pad
- markers

(*supplied by park)

## Procedure

1. Tell students they will be comparing three areas in the park to determine the amount of human impact on diversity of plant species.

2. Set up transects to investigate in three areas:
   1. a prairie remnant
   2. a park area (planted with lawn grasses)
   3. oak savanna or agricultural pasture or crop field.

   Stake out a line of specified length and measure three feet on each side. Survey within the three foot area the length of the line. (Length of lines may be varied to suit the instructor).

3. Divide students into teams and assign to the three areas. All teams should survey all three areas. If time does not allow, teams could be assigned to do one area.
   Older students should identify the plants and animal evidence they find. Beginning students might only describe and keep track of variety and numbers.

4. Students will complete tally sheets of numbers and kinds of species in each area.

5. Draw the students back together. On an easel pad, chart and compare the differences in number and kinds of species in each of the three areas. Are there any species all three areas have in common? Which ones?

6. Ask students to discuss the reasons for differences in these comparisons.

7. Ask students to select one area they liked the most and defend their selection in a class discussion. This discussion should bring out the diverse attitudes and values in current society. The discussion should be directed to how differences can be resolved for the benefit of the ecosystem and long-term survival.

## Extensions

Show the film "Everything in its Place" 16 mm 27 min. It asserts that good wildlife habitat is not only possible in agricultural areas, but also that abundant wildlife enhances human quality of life. The message of multiple land use is made by area farmers and representatives of state and federal agencies. Department of Natural Resources film library cat. no. 157.

# TEAM TRANSECT TALLY SHEET

AREA_____

| Plant Species (list) | Number counted |
|---|---|
| 1. | |
| 2. | |
| 3. | |
| 4. | |
| 5. | |
| (etc.) | |

# TRANSECT COMPARISON

| | Prairie | Park | Field |
|---|---|---|---|
| Plant Species Counted | | | |
| Dominant Plant Species | | | |

# Just One

10 - 12

**Summary:** Students will compare the value of a diverse plant community to a monoculture for supplying deer with food. They will explore the costs and benefits of a monoculture, and summarize the value of diversity.
**Outcome:** Learners will understand the monoculture process and explore and evaluate its value.
**Time needed:** 1 hour
**Group size:** Class of 20-26
**Context:** Valuing
**Location:** Corn field, interpretive center or classroom
**Subject:** Science, social studies
**Skills:** Thinking - analysis, application, comparing similarities and differences, description, discussion, evaluation, generalization, inference, listing, observation, reporting, research, synthesis. Social - small group work.
**Season:** Fall, late spring
**Assessment Ideas:** Students will write a plan for turning their lawns into a more diverse environments. The plans will be assessed using an E (excellent), S (satisfactory), or U (unsatisfactory) and the assessments documented.

## State Environmental Education Goal

Learners should be provided with experiences that will assist in the development of personal appreciation, sensitivity, and stewardship for the environment.

Learners should understand the potential complementary nature of multiple uses of the environment.

## Materials

- deer food identification list
- plant identification guides*
- easel pad
- markers
- cost-benefit chart

(*supplied by the park)

## Procedure

Tell students they will be comparing the value of a diverse supply of food to single supply.

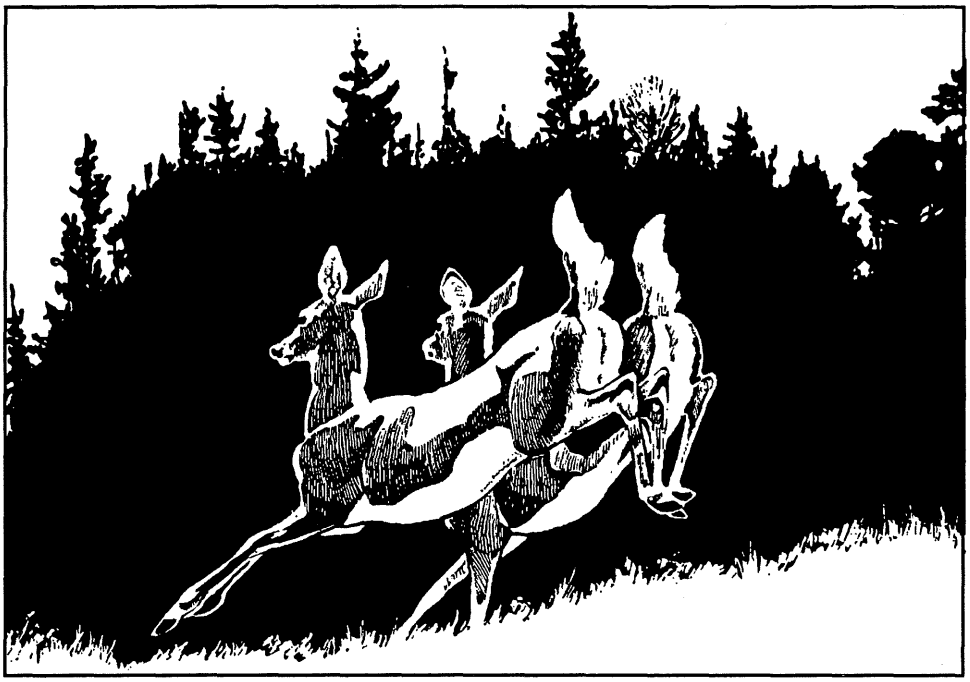
1. What do deer eat? Brainstorm a list of foods that deer eat, and compare their list with the actual foods in the accompanying list.

2. Are these plants available in and around Kilen Woods? Divide students into teams. Send teams to the river bottom, the oak savanna, and the prairie remnants. With plant identification guides, ask students to find as many of these plant foods as they can within a time limit you set. Ask them to look for evidence of deer in the park, such as tracks, droppings, and browsed plants. Twigs browsed by deer will have rough, uneven ends, unlike twigs browsed by rabbits, which are neatly bitten off on the diagonal. (Rabbits have teeth in both upper and lower jaws used for slicing plant material. Deer have teeth only on the bottom part of the front of the jaw so they rip the twigs off.)

3. List the deer food found. How many plant species did they find that are available for deer in the park area? Ask students what would happen if one of these is hit by disease. What if the environment changed? The other foods will be left to provide food for deer. This is a stable situation, that is, one that can survive well through environmental changes. Ask students what human inputs it takes to grow these plants. If humans were not here, would the plants survive?

3. Look at food plots. Ask students what would happen if deer had only corn. What would happen if disease hit the corn? The plant community would be wiped out and deer would starve. This is indicative of an unstable community, that is, one that can be disrupted easily and drastically with relatively few environmental changes.

4. Ask students what would happen if humans did not plant corn. Would it grow again next year? We know that humans have produced corn hybrids with life spans adapted to very specific lengths of growing seasons. What if the environment changed so that seasons were colder or warmer?



5. What does it take to grow the corn? Ask students working in teams of two to identify all the human inputs needed and their positive and negative consequences on the chart provided. These inputs include human time and money, pesticides, fertilizers, machinery, soil preparation, (which often kills soil organisms) cultivation (which can compact soil), initiation and maintenance of wetland drainage. Pool their ideas on a class chart on easel pad paper. They should see that it takes much more human effort to maintain a monoculture than it does a diverse community.

6. Have students help summarize the pros and cons of diversity and monoculture.

## Extensions

1. Humans have need for food but is there a more ecologically sound and less costly way of supplying it? Have students research the movement toward sustainable agriculture.

2. Bring a resource person into class to speak about sustainable agriculture

3. Give students the list of deer foods and ask them to research the plant characteristics for identification purposes before the field trip.

## Variation

Use lawns as examples of monocultures.

## Background

Deer are opportunistic in their food habits and actually will eat a huge variety. Some of these items are surprising, such as mushrooms and ferns. Up to 300 plant species have been recorded as deer food. Whitetails are widely spread in the United States, at least in part because of their ability to adapt their diet to what is available to them. In urban areas, they will eat practically any shrubs and flowers planted by humans to landscape their homes. Some foods become staples, however. These include acorns, and, in agricultural areas, corn shoots and grain. They will eat these until they are no longer available, then move on to other foods that are less preferred.

# DEER FOOD

Although up to 300 plants have been recorded as having been eaten by deer, these are some of the most prevalent in Minnesota:

| Food Items | Present in park | Absent in park |
|---|---|---|
| Grasses | | |
| Honeysuckle | | |
| Strawberries | | |
| Aquatic mosses | | |
| Mushrooms | | |
| Apples | | |
| Corn shoots | | |
| Corn | | |
| Soybeans | | |
| Melon vines | | |
| Acorns | | |
| Red cedar | | |
| Aspen twigs and buds | | |
| White pine | | |
| Willow | | |
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| Food Items | Present in park | Absent in park |
|---|---|---|
| Ground juniper | | |
| Blackberries | | |
| Sumac | | |
| Birch | | |
| Ash | | |
| Oak | | |
| Hazel brush | | |
| Dogwood | | |
| Arborvitae | | |
| Hemlock | | |
| Wintergreen | | |
| Alder | | |
| Bunchberry | | |
| Maple | | |
| Ferns | | |
| Nuts | | |
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## References


**White-tailed Deer: Ecology and Management**, Halls, Lowell K., Stackpole Books, Harrisburg, PA 17105, 1984

**American Wildlife and Plants:** A Guide to Wildlife Food Habits, Martin, Alexander C., Herbert Zim and Arnold L. Nelson, Dover Publications, New York, 10014, 1951.

# Costs and Benefits of Intensive Agriculture

| Input | Cost | Benefit |
|---|---|---|
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# Prairie Reborn

10 - 12

**Summary:** Students help to plan and carry out a prairie restoration project.
**Outcome:** Learners will help restore a native prairie area.
**Time needed:** 1 hour in park
**Group size:** Class of 20-26
**Context:** Action
**Location:** Park prairie areas and where restoration is needed
**Subject:** Science, language arts
**Skills:** Thinking - analysis, application, discussion, drawing, interview, listening, mapping, problem solving, public speaking, writing. Social - small group work.
**Season:** Spring, summer, fall
**Assessment Ideas:** Using the documentation (pictured and written) of the project, assess individuals in the class for their participation. Assess the documentation with an E (excellent), S (satisfactory), or U (unsatisfactory) and record the assessment. Copies of these pictures and documentation can be added to the students' portfolios.

## State Environmental Education Goal

Learners should be provided with experiences that will assist in the development of personal appreciation, sensitivity, and stewardship for the environment.

## Materials

TBA

## Procedure

The students will be given the assignment of helping to restore a prairie area.

1. The instructor should contact the Kilen Woods Park Manager **well in advance** (as much as a year) to jointly choose a project.

2. The Park Manager should either come to the class or the class can visit the park to examine the prospective project and find out what needs to be done. The Park Manager should explain exactly what is needed and why this area of the prairie is being restored. The instructor, working with the park manager, can determine the roles the students can play in the restoration, from helping to create the plan to acquiring resources to doing the actual work to documenting the project.

3. The entire project should be documented with student journals, written reports, pictures, slides, and or videotape.

4. Students should use this documentation to create a presentation for appropriate audiences; e.g. park personnel, school board, parent organizations, or county officials to promote prairie restoration.

## Extensions and variations

1. Following (or instead of) restoration work at the park, students can be assigned to check with federal, state and local agencies, and non-profit organizations such as The Nature Conservancy to find out where prairie restoration work might be needed. The class should decide which need to try to meet. This can be an ongoing project to which classes can contribute for many years.

2. The class might undertake a prairie restoration project on the school grounds for future prairie study. Aid and information from government agencies and non-profit organizations should be sought.

3. The class might help to plan and create a buffer zone around the park. (This could include helping to acquire the land).

4. The class can document its work and present it to local organizations or officials to help them understand the value of the prairie.

# An Environmental Education Experience for Pre-Service Teachers

**Post Secondary**

**Summary:** Pre-service teachers will work through, on site, a selection of the activities available for teachers and students to use at Kilen Woods State Park.

**Outcomes:** Students should:

a. experience environmental education activities suitable for their future students
b. develop a degree of confidence in conducting class in the out-of-doors, particularly at state parks.
c. familiarize the future teacher with state requirements of including EE in the curriculum.
d. know the available curriculum materials.

**Time needed:** 6 hours

**Group size:** Class of 20-26

**Location:** Classroom, Interpretive center and those specified for chosen activities. Season: Spring, summer, fall

**Assessment Ideas:**

1. Students will take some children on a field trip to Kilen Woods State Park. These can be scouts, Future Farmers of America, day-care students, or any others the student can find in the age group they will be working with that would benefit from the trip. The student should keep a journal of the field trip with comments on what worked, what did not, and any questions for future trips.
2. Students will write a teaching/resource unit to be used at the park.

## State Environmental Education Goal

Learners should be provided with experiences that will assist in the development of personal appreciation, sensitivity, and stewardship for the environment.

## Materials

Kilen Woods field trip curriculum
Model Learner Outcomes for Environmental Education (Minnesota Department of Education Publication)

## Procedure

Tell the students that they will be practicing with environmental education field trip materials and techniques.

1. Pre-field trip activity: Have students read through the booklet **Model Learner Outcomes for Environmental Education** published by the Department of Education, paying particular attention to the goals of environmental education and the contexts in which these should be taught. Explain to students that the Department of Education has promised the Minnesota legislature that it will strongly encourage all school districts to integrate environmental education into their curricula. The activities that they will be experiencing at Kilen Woods State Park are constructed to meet these goals, within these contexts, and to meet the requirements of outcome based education.

Choose one of the activities from the Kilen Woods State Park curriculum. Note that it contains a description of the outcome expected, assessment ideas, EE context within which it fits, and EE goals to which it contributes. The activities are formatted to be accountable to the state requirements.

Examine the chart at the beginning of the materials. It illustrates that all of the activities are designed to use the four contexts as a process to examine a topic or focus. One needs a basis in the science of an issue (the natural context) to understand how our society affects it, (the social context) what is good or bad about those effects from a species survival point of view (the valuing context) and what can be done about it (the action context).

Note that all the activities are written to teach some aspect of the park's main goal for environmental education. When a student has been through all the activities, K-12, he/she should

have attained this goal. For Kilen Woods the goal reads:

***Through experiences at Kilen Woods State Park, people will learn to understand the biological concept of diversity, and its value to species survival. They will understand how human impacts affect diversity, and become committed to sustaining and restoring diversity in our global environment.***

Contact the park (507-662-6258) and make arrangements for the field trip. Ask for any help needed. The instructor should make a pre-field trip visit to the park.

Discuss their own logistics for the day:

a. Choose a day when most can participate.
b. Decide on lunch arrangements - brown bags may be necessary.
c. Decide on their own transportation.
d. Dress should be for outdoor experiences.
e. Private cars and chartered school vehicles will need day or seasonal park permits.
f. Decide what materials to take, depending on the activities they will do.

At the park:

**Hour 1:** Upon arrival, take care of logistics - storage of lunches and beverages, location of rest rooms.

Orient the pre-service teachers to the park by briefly scanning the park map in the intrepretive center.

Take the students to the river valley or to a prairie remnant. The following two activities are designed to quiet the students, focus them on the task at hand, and sharpen their observation skills.

Ask them to move apart from each other, be silent and in the ensuing quiet time, write down what they hear, smell, and see. (Five minutes is sufficient time). Discuss their observations and inferences.

**Hour 2:** Suppose you were a member of the Dakota living near the river or the prairie? What would each of these native Americans see, hear, and smell? How might these differ by gender and age? (male, female, child?) What would be your duties and responsibilities for that day? How are these sensory responses for you standing here today different from theirs of 200 years ago? What are the seasonal concerns and problems in the past for the Indians in this area and for you, today? Select some future time, like 100 years from now and reconsider the previous discussion questions.

During the next few hours, work through a selection of the park activities with the students. Following each activity, discuss it from the point of view of the student as learner and the student as teacher-in-training. Ask them first, what new information did they learn from the activity? Then ask them if they think this activity would work with children; if so why? If improvements need to be made, what might those be?

**Hour 3:**

A. Do the activity named Dakota Visitors. Carry out procedures 2, 3, 4 and 5.

B. Do the activity named "Visitors of European Tradition". From the bluff view of the farm carry out suggested procedures 1 through 5. Discuss.

**Lunch - 1 hour (1/2 hour if time is a problem)**: Return to the interpretive center for lunch. This hour may include a discussion of which items people brought with them are recyclable and which will decompose.

**Hour 4:** Do the activity "Slip-Slidin' Away". Using the laminated maps of the Des Moines River and plaster casts of foot-

prints of animal residents of the area, carry out the discussion of the five procedure points.

**Hour 5:** Do the activity "Oak Savanna, and a Lot More". Carry out the role playing as is suggested with an ensuing discussion.

**Hour 6:** Do the activity named "Just One". Study the farm fields and discuss as the procedure suggests.
**Post-field trip discussion:**

Ask students what they learned about environmental education, biology, ecology, values, and social studies.

List and discuss concerns they might have as the teacher in charge on a field trip.

Questions should include:
a. How many students can they handle? How many helpers will they need?
b. What will they do about transportation? What are their options?
c. What will they do about lunch if they are staying for a day?
d. What is a reasonable amount of time for the field trip to last for optimum learning?
e. How will they control their group?
f. What will they do about inclement weather?
g. What will they do about emergencies?
h. What kinds of materials will they need and can they take?
i. Who do they need to contact at the park to set up the field trip?
j. How will they control what students will wear?
k. What is the comfort level that will most benefit learning?

Refer to the teacher's guide for the Kilen Woods State Park field trip.

Even though the students may not ultimately teach near this particular site, where else might they go?

## Extensions and variations

Research and gather additional environmental education materials.

Locate other possible sites for field trips in the area; in the state.

How would teachers find out about these?

# ADDITIONAL RESOURCES

## BOOKS AND PUBLICATIONS

**Checklist of Endangered and Threatened Animal and Plant Species of Minnesota,** Minnesota Department of Natural Resources, 500 Lafayette Road, St. Paul MN 55155.

**The Dakota,** roots, (a magazine for young people) Vol 12, No. 2, Winter 1984, Minnesota Historical Society, 1500 Mississippi Street, St. Paul MN 55101.

**Dakota Indians Coloring Book**, Kozlak, Chet, Minnesota Historical Society, 1500 Mississippi Street, St. Paul MN 55101.

**Forest Log;** an introduction to the biological community concept; lower grades; Thomas Y. Crowell, N.Y.

**The Hidden Life of the Forest**, 1-4, Schwartz, David M., Crown, New York, 1988, (Environmental Conservation Library, 300 Nicollet Mall, Minneapolis, 612-372-6570, J/QH541.5.F6K83).

**One Day in the Woods**, K-6, George, Jean Craighead, Crowell, New York, 1988 (Environmental Conservation Library, 300 Nicollet Mall, Minneapolis, J/QH105.N7G46)

**Plants of South Dakota Grasslands, A Photographic Study,** Bulletin 566, Dec. 1970,, Agricultural experiment Station, South Dakota State University, Brookings, SD 57006.

**The Prairie World**, Costello, David, University of Minnesota Press, Minneapolis, 1969, 2nd printing, 1981.

**Turtle Watch**, K-6, Acona, George, biodiversity, Macmillan, New York, 1987

**A SAND COUNTY ALMANAC**, Leopold, Aldo, Oxford University Press,New York, 1949.

## ARTICLES

**DNR REPORTS**, Individual fact sheets available at no cost from the Minnesota Department of Natural Resources, Information Center, 500 Lafayette Road, St. Paul MN 55155-4040:

**"Owls"** No.12
**"Treeless Solitude"** No. 43
**"Prescribed Burns: Managing Our "Prairie Grasslands"** No 45
**"Prairie Plants of Lac Qui Parle and "Vicinity"** No. 78

**"Our Prairie Heritage"** MINNESOTA VOLUNTEER, special section contains What is a Prairie? Explore Minnesota's Prairies, Center Color section, Early Indian Life on the Plains, Prairie Settler's Tales of the 1800's, A Weaver of Underground Stories, and Grow Your Own Backyard Prairie. July-August, 1990,Vol. 53, No. 311, Department of Natural Resources, 500 Lafayette Road, St. Paul MN 55155.

**Other articles in the Minnesota Volunteer** Department of Natural Resources, 500 Lafayette Road, St. Paul MN 55155.

**Prairie**

July-Aug. 1976
**"Reflections Round A Buffalo Rock,**
**"The Grassland Sea"**
**"This Treeless Solitude"**
**"Needle and Thread"**
**"Prairie Wildlife in the Theatre of Seasons"**

July-Aug. 1981
**"A Prairie Eulogy"**
**"Our Perishing Native Plants"**

Sept-Oct 1982
**"Why Prairies Thrive on Fire"**
**"Holding the Forest at Bay"**

Nov.-Dec. 1982
**"Invaders of the Grassland Sea"**

**Project Stewardship Minnesota**, grades 6-12, Soil and Water Stewardship Activities for Science, Social Studies, Language Arts and Agricultural Education, 1990, Office of Environmental Education, Department of Education, Centennial Buildling, 550 Cedar St., St. Paul, 55101 (contact Shirley Dougherty, 612-297-2723).

**Project Wild and Project Wild Aquatic**, Activity Guides K-6 and 7-12, Interdisciplinary teaching activities concerning wildlife, Western Regional Environmental Education Council, available through the Nongame Wildlife Program, Minnesota Department of Natural Resources, 500 Lafayette Road, St. Paul MN 55155 (contact Karen Van Norman 612-297-2423) (Requires a six hour training workshop.)

# TEACHING MATERIALS EVALUATION

State Park_____ Date_____

School or organization_____

No. of students_____ No. of adults_____

**Grade Level** K 1 2 3 4 5 6 7 8 9 10 11 12 (circle those that apply)

**The materials were clear and understandable. (circle one)** 1 2 3 4 5 6 7 8 9 10

**The materials were meaningful and useful. (circle one)** 1 2 3 4 5 6 7 8 9 10

**The teacher guide was clear and understandable. (circle one)** 1 2 3 4 5 6 7 8 9 10

**The teacher guide was meaningful and useful. (circle one)** 1 2 3 4 5 6 7 8 9 10

**The background information was clear and understandable. (circle one)** 1 2 3 4 5 6 7 8 9 10

**The background information was meaningful and useful. (circle one)** 1 2 3 4 5 6 7 8 9 10

**There was enough background information. (circle one)** 1 2 3 4 5 6 7 8 9 10

**Activities used: (check off)**

____ River Residents

____ Visitors of European Tradition

____ Who Needs Whom?

____ Putting Things Back

____ Oak Savanna, Oh Don't You Cry For Me!

____ Prairie Life

____ Just One

____ Dakota Visitors

____ The Diversity Story

____ Slip-Slidin' Away

____ Little Differences Mean A Lot

____ Oak Savanna and A Lot More

____ The One and The Many

____ Prairies Reborn

____ **I (would/would not) use these activities again.**

____ **Why?**_____

____ **Why not?**_____

Changes made in the activities:

**I extended the materials in the following ways:**

**Materials I wish I'd had:**

**Things I wish I'd done before the trip:**

**Ideas for other activities:**

**What else could the park do to help with your next trip?**

| | No | | | | | | | | | Yes |
|---|---|---|---|---|---|---|---|---|---|---|
| **The park personnel were helpful in planning the field trip (circle one)** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| **The park personnel were helpful in carrying out the field trip (circle one)** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

**What else should we know?**

# Interpretive Services

**For more information regarding other interpretive and environmental education services available from Minnesota State Parks and the Minnesota Department of Natural Resources, contact:**

## Minnesota State Parks

Minnesota Department of Natural Resources
500 Lafayette Road
St. Paul, MN 55155-4039

## DNR Information Center

**Twin Cities 296-6157**
**or toll free in Minnesota 1-800-766-6000**
**TDD* Twin Cities 296-5484**
**or toll free in Minnesota 1-800-657-3929**

*TDD = Telecommunications Device for Deaf

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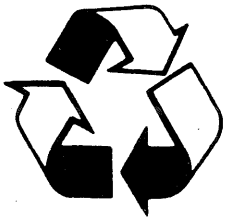

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