

Who Are the Users?

Humans are the most diverse users of natural resources. Natural resources provide food, water and shelter necessary for survival. Natural resources provide a variety of other products such as energy and recreation.

The use of resources can be consumptive or nonconsumptive. Consumptive use of a resource uses it up or degrades it to the point it can no longer be used for the same purpose. Renewable resources can be consumed. Hunting a deer and using it for food is a consumptive use. Nonrenewable resources can be consumed. Burning natural gas to heat your home is a consumptive use. Causing severe and irreversible water pollution is a consumptive use.

Nonconsumptive use leaves the resource intact. Examples are bird watching, sketching, photography and hiking. Education research and recreation are common nonconsumptive uses. Using light from the sun to illuminate your house or taking a photograph of a bird are nonconsumptive uses. Catching a fish and returning it to the water or using water for canoeing are nonconsumptive uses.

Sometimes use of a resource is clearly consumptive or nonconsumptive. In other instances, a seemingly nonconsumptive use may indirectly impact the resource. A wetland may provide critical nesting habitat for an endangered bird, but increased human use may cause the bird to abandon its nesting young.

Resources must be used responsibly. Even seemingly harmless uses may damage resources. For example, a hiking and biking trail may lead to soil compaction, causing root damage to trees or erosion and loss of soil. Attracting visitors to a wetland area to view and photograph a rare plant has educational value but may result in the degradation of the habitat.

Many resources are managed to allow multiple uses. A forest can be managed to allow timber harvest. The same management plan can provide vegetative cover to reduce erosion and provide wildlife habitat. The forest also has aesthetic values and provides recreational opportunities. A lake can be managed to provide recreational opportunities, water for irrigation and wildlife habitat. A hydroelectric plant creates energy from a river system and provides boating and fishing opportunities and drinking water for downstream communities.

For Native Americans, the Illinois River and its watershed were one of the world's best places to live. From the rich prairie soils grew tall, healthy maize. Hardwood forests seemed limitless. With the settler came a different way of life, a way of taking more from the land than was needed to survive. Plentiful supplies of resources and an open market resulted in over harvest. The environment could only bear a certain level of harvest. With continued over harvest, early commercial fisherman and market hunters worked themselves out of jobs. Given time and protection, populations of most resources have stabilized.

The forestry industry is an important part of Illinois' economy. More than 2,000 businesses are involved in the forestry industry in Illinois, resulting in nearly \$30 billion in annual sales. More than 150 species of trees found in Illinois can be harvested for timber. Furniture, decorative trim, flooring and veneer are made from oak. Tool handles and handmade bows are made of hickory. Maple makes wood flooring, and cottonwood is used for fine stationary. Walnut is used to produce furniture.

During the 19th and early 20th centuries, commercial fishing was economically important in Illinois. By 1908, fish harvest in the Illinois River amounted to 23 million pounds, generating \$700,000 for the local economy and creating many jobs. Similarly, 2,600 "clammers" harvested mussels in Illinois during the same era. Over harvest of fishes and mussels resulted in a decline in the industry in the 1930s. Today, commercial fishing no longer is an economically important industry.

Turn-of-the-century market hunting also suffered the effects of over harvest. By 1914, after decades of relentless "Arkansas shooting," or shooting into rafts of ducks and geese as they rested during migration, some species began to disappear. This practice led to a ban on hunting wood ducks in 1914 and a ban on market hunting in 1918. Since then, the wood duck and the giant Canada goose have made remarkable comebacks. The ban on market hunting has not offset the loss of habitat, however.

Many people find enjoyment in outdoor activities. Seventy percent of the adult population of Illinois participates in pleasure walking. Forty percent of the population bicycle, 27 percent fish, 7 percent hunt and 1 percent trap. All outdoor activities depend on healthy natural resources.

Species Management

Approximately 200 species of nesting birds, 57 species of mammals, more than 200 species of fishes, 94 species of amphibians and reptiles, hundreds of invertebrates and more than 3,000 species of vascular plants can be found in Illinois. Techniques to manage these species vary depending on the numbers of individuals in the populations and desirability of the species for food or other economic benefit to humans.

Maintaining species diversity is important to a healthy environment. Organisms have aesthetic, recreational, tourism, ecological and economic values. Ninety percent of the significant food plants today were domesticated from wild tropical plants. Medicines derived from plants are used by a large percentage of the world's population. About half of prescription and nonprescription drugs are derived from wild organisms.

Species have four basic requirements for life: water, food, cover and space in the proper amounts and arrangements. Water requirements vary by species. Water may be absorbed, obtained by drinking or ingested indirectly from foods consumed. Foods may be available in different quantities at different times of the year. Foods consumed by animals may be classified as preferred (used as long as available), staple (used to maintain body weight), emergency (cannot sustain body weight for long periods) or stuffing (no

nutritional value, only provides bulk). The type of cover required by a species at any time can differ. Wildlife need cover to conceal themselves while traveling and to escape from predators and climatic conditions. Cover requirements may be seasonal, such as the cover needed during the reproductive season, for hibernation or while molting. Cover is also needed while resting, loafing, sleeping or roosting. The space required by each species is also highly variable and will reflect their needs for water, food and cover.

When determining how to manage a species, biologists strive to maintain healthy habitats and species populations while providing opportunities for recreational and commercial uses of the resource. Consideration must be given to the food, water, cover and space requirements of each species. The species assessment includes an evaluation of the effects a management practice will have on other natural resources. Consideration for land uses and economic feasibility of the practice are also included.

Some species management practices can be directly attributed to a habitat management practice. The goal of habitat management is to enhance or improve the habitat. Even if an area is managed for a particular species, many other species benefit. Other species management practices such as bag limits or length limits (fishes) are designed to spread the harvest among people to prevent over harvest. Some practices improve habitats and increase the amount of food and cover available. Propagation, direct seeding, regeneration, rejuvenation, transplanting and reduction of competition are habitat management practices.

Species management is a multi-staged process. The first stage requires conducting an inventory to determine the number, abundance, health and distribution of a species or habitat. An inventory of a fixed population, such as trees or herbaceous vegetation, can be relatively easy to conduct. An inventory of live, moving species, such as Canada geese, is more difficult. A large-scale inventory, such as a statewide inventory of white-tailed deer or white oaks, can be difficult, labor intensive and costly.

In some instances, a census, or count of the number of species in a given area, is taken. A count of the total population is an absolute census. A relative census shows increases or decreases in the population. In other instances, an estimate of the population is made. Estimates are scientific extrapolations of the number present in a population based on a census of a small portion of the population. Comparing results of a census or an estimate from previous sampling periods or other habitat areas will provide trends to show if the population is increasing, static or decreasing. Common sampling techniques used by fisheries managers are electroshocking, seining or gill netting a body of water. Spring bird counts, dove "coo" counts and prairie-chicken "booming" counts are some techniques used to sample birds. Mammal populations may be determined through numerous methods, including track counts or aerial inventories of large game (deer).

Studies of individuals may be made to evaluate the health of a population. Hunting, fishing or trapping seasons provide opportunities to examine individuals. Individuals harvested may be examined for the presence of diseases or parasites. The amount of body

fat of individuals may indicate their resistance to disease and parasites and ability to survive harsh weather conditions.

After collecting detailed information on the population, its health and the quality of the habitat, the biologist develops a management plan. In some instances information may be unavailable or unreliable. The training and experience of the biologist becomes crucial. Management plans include information on site topography and the species present. In addition, knowledge of the anticipated resource users (hunters, anglers, birders) must be considered and plans made to accommodate or schedule potentially conflicting uses.

Following any management practice, additional inventories must be conducted to determine if the practice has resulted in the desired objective.

Nongame, Endangered and Threatened Species

The term "nongame" refers to those animals that have not traditionally been harvested by humans for food and clothing. Nongame animals range from hawks, owls and songbirds to bats, deer mice, snakes, toads, most turtles and frogs and many species of fishes.

A threatened species is any species likely to become endangered in the foreseeable future. Illinois listed 51 animal species as threatened in 2004. An endangered species is one that is in danger of extinction. In 2004, Illinois listed 93 animal species as endangered. In 2004, Illinois listed 263 endangered and 76 threatened plant species.

Species become endangered or threatened for a variety of reasons. Some populations decline as a result of chemical or other pollutants introduced into their habitat. Often, the simultaneous clearing of critical habitat and introduction of an exotic species may alter habitats significantly and cause a population level to decline. Historically, indiscriminate and unregulated harvest by hunting, fishing and trapping caused decline of some species such as the passenger pigeon. Regulations have been enacted to address the problems of over harvest of game species. Today, however, some species such as butterflies and plants are indiscriminately collected.

Endangered and threatened species often have small populations, specific habitat requirements and a limited range. While a population may be small in Illinois, warranting protection, habitat conditions in adjacent states may be adequate to ensure a healthy population. For example, the eastern wood rat is an endangered species in Illinois. It is found only in a few locations in southern Illinois, which is the northernmost extent of its range.

Extinction is a natural process. With increases in human populations and demands for natural resources, the extinction process has shifted from one that is gradual, allowing for replacement of species, to one that is rapid, without filling empty niches.

Genetic factors often play a role in the management of endangered species. While reintroduction is one approach to helping endangered species, managers must first

consider the genetics of the species to determine how closely related the reintroduced organisms are to the ones that still occur there. In most cases, it's best for them to be as genetically similar as possible. However, in some instances, a population of endangered species has been so isolated for so long it is considered "inbred." It then may be necessary to introduce individuals from another location to get greater genetic diversity. In Illinois, this process was done to help the greater prairie-chicken. Prairie-chickens from other states were brought to Illinois to boost our small population of this endangered bird.

The primary objectives in managing nongame and endangered/threatened species are to maintain the biological diversity of a habitat, protect the population from further harm, increase numbers and prevent extinction or extirpation of the species. Management practices may include prescribed fire, large-scale timber cutting, removal of exotic species, flooding an historic wetland, restricting human use for an area or taking no action.

Game Species - Fish and Wildlife

The term "game" refers to those animals that have been traditionally harvested by humans for food and clothing. Some birds, mammals, fishes, turtles and frogs may be classified as game species. Like all natural sciences, wildlife and fisheries management methods are based on principles and theories that follow repeated observation and experimentation.

Common Examples of Illinois Game Species

BIRDS: ring-necked pheasant, northern bobwhite, wood duck, mallard, Canada goose, wild turkey

MAMMALS: white-tailed deer, fox and gray squirrel, raccoon, red and gray fox, coyote, beaver, muskrat

FISHES: bluegill, largemouth bass, channel catfish, northern pike, yellow perch

TURTLES: common snapping turtle

FROGS: bullfrog

Wildlife and fisheries biologists must rely on theories they have proven through experimentation and on observation. For example, biologists are often asked by landowners to manage a field or pond for a specific type of animal population. Theories that work in one habitat may not work in another. Every system is different. Two basic wildlife management theories include habitat management to provide an opportunity for a population to increase and population management to harvest the surplus.

"Setting back" the succession of the land by burning, mowing or plowing is one commonly used method of habitat management. This method not only reduces

competition between native prairie plants, like little bluestem, and exotic species, like fescue, but also fertilizes the soil. With a better chance to grow, native prairie plants can provide food and cover for native wildlife species, like cottontails and northern bobwhite.

Similarly, exotic tree species, like black locust, produce little or no food or cover for native forest wildlife. Wildlife biologists often recommend a habitat management method known as "timber stand improvement." This process usually involves removing nonnative species and planting native species, like cedar, oak and walnut. Once established and mature, the native species will provide food and cover for white-tailed deer, wild turkeys and a host of other animals.

If these habitat methods are successful, population management may begin. One common population management method is deer harvest. Since their natural predators have been extirpated in Illinois, deer herds must be kept in check or face disease and starvation. Biologists manage deer populations by controlling harvest. The number of hunters allowed to receive a deer hunting permit is strictly controlled. Not only does this practice control the number of deer legally killed each year, but it can limit the number of hunters allowed to hunt in a specific area.

At deer check stations, teeth in the lower jaw are examined to determine the age of each deer. From this information biologists can determine if the deer population is younger or older than previous years. This can be critical in determining the number of deer hunting permits issued the following year. At the deer check station, biologists may also collect blood and/or other tissue samples to determine the health of the deer.

Management practices used for consumable species of fishes, birds and mammals revolve around removing a surplus of animals through harvest to control the number of animals that could result in problems, such as depredation or disease.

Mortality can affect a population in two ways. Compensatory mortality is the number of individuals that die each year from old age, predation, disease, starvation or other factors. Additive mortality results from factors introduced into the population that significantly raise the mortality rate above the normal range. If a population on a given site is very small, hunting may become an additive mortality factor.

Some wildlife populations have complex predator-prey relationships. Nesting hen (female) turkeys are vulnerable to attack from coyotes, foxes, bobcats and great horned owls. Once hatched, the young turkeys (poults) are vulnerable until they are able, at 10-12 days of age, to fly to the lower branches of trees. Adult gobblers (males) are rarely preyed upon. In a simpler form, when cottontail populations are high, coyote numbers usually rise due to the abundance of this preferred food. When coyote numbers are high, cottontail populations will start to decline because more cottontails are caught and eaten.

In a lake, crappies have cyclic population highs, which usually follow a peak in numbers of their prey. After several years, prey numbers usually decline, and the crappie population crashes. A typical aquatic food chain starts with plankton, or microscopic life,

which are fed on by aquatic insects which in turn are eaten by small fishes. Large predatory species will in turn feed on the small fishes. At some point in their life cycle, all fishes compete for the same food. When young, they feed on zooplankton. As they grow, the predatory fishes switch food sources and begin to prey on smaller fish.

In nature many organisms survive by producing large numbers of young. Any organism that serves the role as a prey species produces numerous young so that some can survive to reproduce and continue the species. Species such as common carp and northern pike lay their eggs and leave, providing no protection for their young. The lack of parental protection means that the likelihood of survival for these fishes increases with the production of large numbers of eggs. On the other hand, members of the sunfish family, including the largemouth bass, produce smaller numbers of eggs and actually protect their young until they are about one inch long. When the young are large enough to function on their own, the parents often become predators, chasing and feeding on their own young. By dispersing their young in this manner, parents ensure that many will survive.

In a closed system, like a pond, too many bluegill may result from lack of largemouth bass to feed on them. With large numbers present, bluegill become stunted and do not grow well. A large population of bluegill can affect the bass population by eating their eggs. This situation represents a system out of balance and, possibly, destroyed. To correct the problem, the stunted, overpopulated bluegill must be removed. In righting the imbalanced system, consideration must be given to the impact the proposed action will have. For instance, if other species are introduced into the equation, the predatory-prey relationship can become more complicated. The addition of crappies or walleye, also predators, places them in competition with bass for the same food items. Introducing bullheads to the system may result in a disrupted feeding cycle as bullheads root up vegetation and muddy the water.

Management of game and fish populations through regulation of hunting and fishing is often successful, especially if only one or two species are involved. Canada goose hunting was strictly regulated from the late 1960s to the mid-1980s. Since then, these migratory birds have recovered to the point where annual harvest is an important management technique.

One fisheries management technique is to limit the number of fishes harvested through regulated timing and length of the fishing season. Establishing a minimum-sized fish that may be taken and setting a catch quota are other fisheries management techniques. Protecting or creating a spawning site or escape cover can ensure that populations are naturally sustaining. Managing surrounding land uses may prevent excessive runoff into a body of water. From this runoff, chemicals or excessive sediment could be introduced to the water system.

Chemicals may be intentionally introduced to a water system to fertilize nutrient-poor lakes. Chemicals also may prevent excessive growth of aquatic plants which would result

in oxygen depletion and a fish die-off. Introduction of desired species from fishes raised in a nursery may be used to stock unpopulated waters.

Woodland Plant Species Management

Management of individual woodland plant species is an uncommon practice in Illinois. In rare instances, management of an individual species, such as white pine or walnut, may occur. In these cases a single species is planted and managed for a harvestable product. In some instances the tree is harvested for the wood. Pine plantations may be managed for production of Christmas trees or wood fiber. Other species are left standing and the fruit (walnut seed) is harvested annually.

Forestry practices in Illinois focus on management of total forest ownership. Multiple species are considered in the development of management strategies. In effect, forestry management practices focus on the ecosystem which will include consideration of individual species' requirements. Other management plans may recommend maintaining a closed forest canopy required by tree species that are shade tolerant. Hard maples thrive in a shady environment. Some species of songbirds, such as red-eyed vireos, scarlet tanagers and the ovenbird, require large blocks of closed canopy forest for nesting and feeding.

Soil types and locations govern the type of species that will grow well in a specific location and must be considered in management plans. Each forest species has specific requirements that must be met for survival. White oak trees, an unplanted species requiring soils that drain well, will not thrive in bottomland wet soil. Black tupelo trees require an extremely wet soil, while blackjack oak trees require a sandy soil.

Over the years, fire has been viewed as a negative force on the forest community. However, fire in prescribed conditions can be a very effective management tool to control or manage forest species. As an example, fire can be used to control an undesirable species (silver maple) invading an oak-hickory forest. Fire can also be used to stimulate species growth, such with the bur oak that is commonly found in prairie savannas.

Forest trees are a renewable natural resource. Proper management of the trees within the forest will provide a continuous source of recreation, wildlife habitat, esthetics, wood fiber and watershed protection. Even though an individual tree may be harvested or die, the forest will continue to thrive. A growing forest produces adequate seed for reproduction and food for wildlife, takes in carbon dioxide to clean air and produces oxygen. An over mature forest will start producing less seed, use less carbon dioxide and produce less oxygen.

Exotic Species Management

An exotic species is one that has been introduced to an area outside its native range. Control of exotic species may not be desired, where the species provides sufficient benefits. In other instances, control may not be possible, given the extent of the

population and the type and expense of control techniques proven effective. When control of an exotic species is determined to be effective and necessary, techniques may include quarantine or eradication. Biological control may also be used, such as introduction of a virus, bacteria or insect that is detrimental and specific to the exotic species or the use of some type of a sex attractant or sterilant.

Exotic Species in Illinois

Here are just a few examples of exotic species found in Illinois.

zebra mussel, Japanese beetle, gypsy moth, rainbow trout, goldfish, common carp, house sparrow, rock dove, European starling, ring-necked pheasant, house mouse, Norway rat, autumn olive, purple loosestrife, Japanese honeysuckle, kudzu, round goby

ILLINOIS' NATURAL DIVISIONS AND BIODIVERSITY

What Are Natural Divisions?

The natural divisions concept is a classification system of natural environments and biotic communities based on the bedrock, glacial history, topography, soils and distribution of organisms. Each natural division contains its own similar landscapes, climate, soils and bedrock, for instance limestone or sandstone, and supports similar vegetation and wildlife. In general, the more natural divisions in an area, the more species diversity. Illinois has 14 natural divisions, which provide a great variety of habitats. Some species live in only one or a few of the natural divisions while others are more unspecialized in their needs and can survive in many different habitats. Over time, species adapt to the specific physical conditions in the habitats where they live and evolve complex interrelationships that help them survive.

What Is Biodiversity?

Biodiversity is the variety of life on earth. There are several ways to describe biodiversity.

Species diversity includes all living things from the tiniest bacterium to the large white-tailed deer and white oak tree. It has been estimated that the number of species on earth is somewhere between 10 million and 100 million.

Biodiversity is also the word used to describe the habitats that house all life forms and the interconnections that tie living things together. It includes the variety within species, which is determined by the genes.

Genetic diversity makes every living thing unique. Each species is like a book of genetic information, containing billions of genetic letters that give it a particular code of life. Its traits are the result of coded messages in the genes that are passed from one generation to

the next. When a species becomes extinct, all the information is lost. Genetic diversity is a safeguard against future problems like disease or natural disasters.

Biodiversity can also refer to the many communities that exist side by side.

According to the world's leading scientific and environmental experts, loss of biodiversity is one of the most urgent environmental problems facing the planet. Habitat loss, introduced species, pollution, population growth and over consumption are the main threats to biodiversity. As human populations grow, they exert increasing pressure on natural resources, pressure that is endangering species and ecosystems around the world. The extinction of each additional species brings the irreversible loss of unique genetic codes and the potential loss of medicines, foods, products and jobs. At the same time, degradation of natural systems threatens the very services, such as water purification and nutrient recycling, that support all life on earth. The natural rate of extinction is about one species per 1,000 years. It is estimated that today, three species become extinct every hour.

Biodiversity and the Natural Divisions

Some people believe that Illinois is a state with little more diversity than corn and soybeans. However, Illinois actually has a surprising variety of organisms. Nearly 54,000 species have been identified in Illinois so far. The rich diversity of life in our state is due to a good variety of habitat types provided by the 14 natural divisions. Further separation of the divisions based on specific habitats within them creates 33 sections. Each of the sections contains its own characteristic organisms, thus increasing the variety of species found in the state.

The people of Illinois are significant controllers of the landscape and its diversity. Clearing of forests, plowing of prairies, draining of wetlands, urban development, highway construction and other human activities have drastically reduced the diversity of habitats in Illinois and the overall biodiversity of the state. When people alter habitats they kill or force out organisms that live in them, upset ecological relationships and reduce the ecosystem's ability to perform services like flood control, water purification and nutrient recycling. Some of the habitats that originally occurred in our state can be found in nature preserves, state parks, conservation areas and other protected sites that shelter the state's biological diversity. Some habitats are very small and rare because of extensive urban and agricultural development in Illinois during the past 150 years. As land use changed, the number of species and the population sizes of most declined.

We can help protect biodiversity. Scientists are working together to conduct biological inventories to find out more about the diversity of life throughout the world. Scientists are also working to understand the connections among living things so that we can better comprehend what we need to protect. But protecting biodiversity involves all of us. Many scientists and conservationists believe that the future of the earth's biodiversity depends on moral values and on biophilia, or love of life, an inborn human love for other organisms. Thus, human appreciation of organisms provides the strongest hope for

preserving the biodiversity that makes our earth unique. Because each species contains unique biological and genetic information, conservation of species may be critical to the future quality of our lives. All living species are significant, many in unknown but, perhaps, vitally important ways. We must value biodiversity for its own sake.

Geology and the Living Landscape

Various geologic factors influence the types of plants that can grow in any one area. These factors include the depth of the soil, the availability of minerals in the soil and the topography of the surface.

Soils develop in the earth materials present at the surface. Relatively thick soils have developed in the unconsolidated wind-blown silt (loess) that covers much of Illinois. Harder bedrock surfaces, where little unconsolidated material is present, generally show little soil development.

The rock and sediment that make up the original, or "parent," material in which a soil develops contribute to the mineral content of the soil. Bedrock varies in composition around Illinois from limestone or dolomite to shale or sandstone. Composition of the unconsolidated deposits at the surface varies from clay and silt to sand and gravel. As soils develop, the parent materials are weathered, releasing nutrients which may be used by plants. The minerals found in soils may inhibit the growth of certain plants and encourage the growth of others.

The topography of the land surface affects how well an area drains. Hills are generally drier than low areas because water runs off of them easier. The materials present at the surface also affect how well an area drains. Soils with a high percentage of clay content retain water (have low permeability) and so are poorly drained. Silty soils have a higher permeability and dry out much quicker than clay-rich soils. Sand and gravel deposits have the highest permeability and are considered well-drained because water flows through them easily.

The Geologic History of Illinois

From about 540 million to 320 million years ago, ancient oceans covered what is now Illinois, and thick layers of sand, sea shells and mud were deposited on the bottom. Beginning about 320 million years ago, the oceans gave way to river deltas and swamps in which mud, organic plant materials, sand and silt were deposited. These ancient ocean, delta and swamp deposits gradually compacted and hardened to form the bedrock that is buried throughout much of Illinois.

The land that would become Illinois was exposed to weathering from about 300 million years ago to about one million years ago. For the next 12,000 years, the great Ice Age altered the surface of Illinois. Ice covered the bedrock in nearly all of Illinois at some point. The glaciers ground across the surface, filling valleys with unconsolidated materials and flattening areas of higher relief. In some places the glaciers left clay, silt, sand and gravel in long, rolling hills or ridges (moraines) that stretched as much as 50 to 100 miles across the landscape.

As the glaciers melted, they poured out billions of tons of water. These meltwaters carved new valleys and deposited broad layers of sand and gravel in some areas. Huge deposits of sand, left in some parts of west-central, northwestern and northeastern Illinois, were blown into hills, forming great sand dune fields. In northeastern Illinois, along the Illinois River, the flooding meltwaters stripped the land of surface deposits of clay and sand. Dolomite, formed in the ancient oceans, was exposed by these floods and is now the bedrock that can be seen at the surface. The glacial meltwaters also deposited large amounts of silt in the river valleys. The silt was picked up from the valley floors and blown by wind across land, leaving thick deposits of loess on nearby hills and thinner deposits eastward from the river bluffs.

It was this combination of geological processes that created the present, relatively young landscape of Illinois. Soils began forming as plants grew in the newly deposited surface materials left by the glaciers, water and wind. The land became dominated by prairies.

Habitats

Even though Illinois has nearly 100 habitat types, these fit nicely into three categories: prairies, woodlands and wetlands. In general, the more habitats present, the more species diversity. Over time, species adapt to the specific physical conditions in the habitats where they live and evolve complex interrelationships that help them survive.

Early European settlers of the land that became Illinois were concerned with surviving in the prairies and forests. Resources appeared unlimited. They navigated and explored, logged, farmed, fished, hunted, scavenged for edible plants and constructed. Unfortunately, there is a limit to what may be taken from and done to the land. Illinois had an estimated 21.6 million acres of prairie (about 61 percent of the land area in the state) in 1820. All but nine of what are now the counties in the state contained some prairie habitat. By the year 1900, most of the prairies had been converted to agricultural or urban uses. By 1976, 39 of Illinois' 102 counties had no high-quality prairie remaining and of those counties with high-quality prairie, 28 contained five or less acres. Illinois prairies currently cover about 6,100 acres. Only approximately 0.01 percent of the state's original prairie acreage, about 2,350 acres, is considered high-quality prairie. The remaining prairie lands have been disturbed in some manner. All prairie parcels of land in Illinois tend to be small. Eighty-three percent of the existing Illinois prairies are smaller than 10 acres in size, and of these prairies, 30 percent are less than one acre. The loss of prairie habitat and fragmentation of the remaining prairies has generated a corresponding loss in the natural biodiversity that prairies contain. The small, closed populations of prairie organisms that exist in Illinois today are the types that tend to result in the loss of genetic variation over time. These inbred populations can result in organisms that are no longer capable of reproducing and sustaining their own kind in an area. The greater prairie-chicken in Illinois is an example of such an organism.

Illinois' Natural Divisions

KEY:

* = Illinois endangered

** = Illinois endangered and federally endangered

*** = Illinois threatened

**** = Illinois threatened and federally threatened

Typical = species commonly found in this natural division and which may also be found in other Illinois natural divisions

Characteristic = species found only in this Illinois natural division or in one similar in composition

Wisconsin Driftless Division

Found in northwestern Illinois, this area is part of a larger region that extends into Wisconsin, Iowa and Minnesota. It has rugged terrain because it has not been covered by glaciers. Rolling hills and wooded ridges are characteristic land forms, including the highest elevation in Illinois at 1,257 feet above sea level. Canyons, ravines, bluffs and palisades are present. Much of the area was originally covered by forests. With the coldest climate in the state, many organisms living here are typical of areas found further north in the United States. Algific slopes are a unique feature of this division. They exist on north-facing rocky slopes that retain ice under ground most of the year. In Illinois, there are fewer than a dozen algific slopes. The cold microclimate created supports many rare species. Even on a warm summer day, the cold from the ice trapped below the surface may be felt in these areas. When the air temperature is 90degrees Fahrenheit, the surface temperature of an algific slope is 42 degrees Fahrenheit.

Sections: There are no sections in this division.

Percent of Total Illinois Area: 1.0

Places to Visit: Apple River Canyon State Park in Jo Daviess County and Mississippi Palisades State Park in Carroll County

Typical Plants: black oak, red oak, white oak, sugar maple, American basswood, green ash, white pine

Characteristic Plants: northern paper birch, mountain clematis*, birds-eye primrose*, jeweled shooting star, cliff goldenrod***, moschatel*

Typical Animals: bullfrog, tiger salamander, scarlet tanager, wood thrush, cliff swallow, fox squirrel, woodchuck

Characteristic Animals: Iowa amphipod*, Iowa Pleistocene snail**

Rock River Hill Country Division

Description: This division encompasses the Rock River watershed in northwestern Illinois and contains the Freeport and Oregon sections. Low hills are present, which historically supported the growth of prairies on the uplands and woodlands along the streams. Sandstone outcrop areas along the Rock River sustain distinctive plant species. Limestone and dolomite environments are also present in this division. This area was covered by glaciers.

Sections

Freeport Section: The Freeport Section includes most of the Rock River Hill Country Division. It is characterized by rolling hills and the presence of dolomite and limestone bedrock. Limestone caves are present.

Oregon Section: The Oregon Section has sandstone bedrock and distinctive plants, including ground pine, rusty woodsia and oak fern. These plants are more commonly found in areas farther north in the United States.

Percent of Total Illinois Area: 4.3

Places to Visit: Castle Rock State Park and White Pines Forest State Park, both in Ogle County

Typical Plants: black oak, red oak, white oak, bur oak, wild black cherry, sugar maple, American basswood, slippery elm, white pine, Canada yew, silver maple, Indian grass, big bluestem, prairie dropseed, cordgrass, cattail, sedges, bunchberry*

Characteristic Plants: oak fern*, ground pine*, rusty woodsia*

Typical Animals: spring peeper, central newt, Blanding's turtle***, western fox snake, red milk snake, smooth green snake, American woodcock, red-bellied woodpecker, turkey vulture, coyote, beaver, muskrat

Characteristic Animals: blue-spotted salamander, pickerel frog, western hognose snake***

Northeastern Morainal Division

Description: This glaciated section of the state has beach sands, dunes, sedge marshes and peatlands. Peatlands have acidic conditions created by lack of drainage and

accumulation of layers of peat. These wetlands support uniquely adapted plants. The bed of glacial Lake Chicago and the shore of Lake Michigan are also part of this environment. The rolling topography in this region is the result of moraines (long ridges of glacial debris) and kames (cone-shaped mounds of glacial debris). Moraines form where the advance of glacial ice was balanced by its melting. At this place, thick piles of rock dust, silt, gravel, sand and boulders were deposited and covered with sand and gravel from streams of meltwater. Moraine Hills State Park in McHenry County contains small "kettle holes" left by blocks of melting glacial ice.

Sections

Morainal Section: This section contains the moraines and related geologic features resulting from late advances in the Wisconsinian glaciation period. Most of Illinois' glacial lakes and peatlands are found here.

Lake Michigan Dunes Section: The Lake Michigan Dunes Section is distinctive for its unique plants that grow on the dunes and beaches. Plant succession from shifting sand to stabilized sand results in a variety of species. Beach grass, trailing juniper and bearberry are three examples.

Chicago Lake Plain Section: This flat, poorly-drained area is composed of the lake bed sediments of glacial Lake Chicago. Long ridges of shore-deposited sands are conspicuous features. A few natural lakes exist near Calumet City. The original vegetation of this section was prairie and marsh with scrub-oak forests on sandy ridges.

Winnebago Drift Section: The Winnebago Drift Section includes gravel hill prairies that once extended along the east bluffs of the Rock River valley into Wisconsin. The section has fairly good drainage. Wet prairies contain many plant species which are more common in prairies further west of Illinois.

Percent of Total Illinois Area: 6.9

Places to Visit: Illinois Beach State Park in Lake County, Moraine Hills State Park in McHenry County and Volo Bog State Natural Area in Lake County

Typical Plants: little bluestem, prairie dropseed, big bluestem, blueberry, skunk cabbage, great angelica, blue iris, silver maple, sugar maple, swamp white oak, bur oak, white oak, black oak, red oak, shagbark hickory, gray dogwood

Characteristic Plants: leatherleaf***, large cranberry*, pitcher-plant*, round-leaved sundew*, tamarack***, round-lobed hepatica, ill-scented trillium*

Typical Animals: mottled sculpin, Ozark minnow, Blanding's turtle***, six-lined racerunner, greater yellowlegs, yellow-headed blackbird*, dunlin, sora, oldsquaw, white-tailed deer

Characteristic Animals: Hine's emerald dragonfly**, lake chub, ninespine stickleback, banded killifish***, blackchin shiner***, pugnose shiner*, blue-spotted salamander, spotted turtle*, sandhill crane***, common tern*, black tern*, golden-winged warbler, Nashville warbler

Grand Prairie Division

Description: Found in central and northern Illinois, this natural division is the largest in Illinois and historically included tallgrass prairie, marshes, prairie potholes and forests along the streams. The Grand Prairie was glaciated and has flat landscapes, loess (a silt deposited by wind) soil and poor natural drainage. Today, most of this land is used for agriculture, with prairie communities being among the rarest in Illinois.

Sections

Grand Prairie Section: This section includes the part of Illinois that was affected by the late stages of the Wisconsinian glaciation, that is outside the Northeastern Morainal Division and that does not include outwash and sand areas. The Shelbyville and Bloomington moraines form the boundaries of this section. Black-soil prairie, marshes and prairie potholes are common in this poorly-drained area. The Kankakee mallow is found in the section, growing only on an island in the Kankakee River.

Springfield Section: The Springfield Section is part of the area covered by the Illinoian glaciation. Prairies grew on this land in presettlement times. It has better drainage than the younger Grand Prairie Section. Deep loess (a wind-blown silt) deposits support dry hill prairies along the lower Sangamon River. Large areas of floodplain forest grow in the valley of the lower Sangamon River and its tributaries.

Western Section: The Western Section was covered by the Illinoian glaciation. This well-drained land was predominantly prairie in presettlement times.

Green River Lowland Section: The valley of the Green River and the lower Rock River was formed by glacial meltwaters. Much glacial outwash was deposited, and sand flats and dunes developed. The section originally had many marshes and wet prairies. Scrub-oak forests grew on the sandy ridges, and floodplain forests were present along the rivers. Sand prairies were found on the sand flats and dunes. Most of this section has been disturbed by grazing, cultivation and drainage.

Kankakee Sand Area Section: The sand of the Kankakee Sand Area Section was deposited by the Kankakee Flood during the later stages of the Wisconsinian glaciation. Sand prairie and marsh were the predominant vegetation of this section before the land was drained for cultivation. Scrub-oak forests exist on drier sites. The primrose violet is restricted to this section in Illinois. The clear, well-vegetated, sand-bottomed streams contain fishes like the weed shiner, ironcolor shiner and least darter.

Percent of Total Illinois Area: 36.1

Places to Visit: Goose Lake Prairie State Park in Grundy County and Funk's Grove Nature Preserve in McLean County

Typical Plants: white oak, bur oak, black oak, shagbark hickory, sugar maple, silver maple, slippery elm, big bluestem, prairie dropseed, little bluestem, Indian grass, purple prairie clover, yellow star grass, goldenrods, New England aster

Characteristic Plants: leadplant, coneflowers, prairie dock, compass plant, Culver's root, rattlesnake master, prairie violet, queen-of-the-prairie*

Typical Animals: mottled sculpin, Blanding's turtle***, smooth green snake, western fox snake, lined snake***, northern harrier*, least bittern***, Virginia rail, Franklin's ground squirrel***, thirteen-lined ground squirrel, badger

Characteristic Animals: snuffbox mussel*, eryngium stem borer moth*, greater redhorse*, Kirtland's snake***, Henslow's sparrow***, upland sandpiper*, grasshopper sparrow, short-eared owl*

Upper Mississippi River and Illinois River Bottomlands Division

Description: The rivers, bottomlands and backwater lakes of the Mississippi River, above its confluence with the Missouri River, and the Illinois River south of La Salle are included in this division. The broad floodplains and gravel terraces support forests, prairies, rivers and lakes. Oxbow lakes occur throughout this division. Springs are common in the gravel terraces. The bottomland forests are exposed to extended flooding. The majority of the area was glaciated.

Sections

Illinois River Section: The Illinois Section of this division is characterized by its backwater lakes and forest vegetation. Spring bogs exist along the river bluffs.

Mississippi River Section: The Mississippi River Section is made of several, separated bottomlands along the Mississippi River, from the Wisconsin border to Calhoun County. Most of the prairies of this section have been drained for agriculture. Forests are found along the river inside levees and on river islands.

Percent of Total Illinois Area: 3.3

Places to Visit: Marshall State Fish and Wildlife Area in Marshall County and Anderson Lake Conservation Area in Fulton County

Typical Plants: green ash, pecan, pin oak, bur oak, honey locust, black walnut, hickories, silver maple, sycamore, river birch, black willow, swamp privet, sugarberry, black ash

Characteristic Plants: decurrent false aster****, small burhead*

Typical Animals: smooth softshell turtle, eastern hognose snake, canvasback, redhead, pied-billed grebe, bald eagle***, double-crested cormorant, red fox, beaver, white-tailed deer

Characteristic Animals: Higgins' eye mussel**, lake sturgeon*, Mississippi kite*, osprey*

Illinois River and Mississippi River Sand Areas Division

Description: The sand areas division consists of the sand deposits left by glacial meltwater floods in the bottomlands of the Illinois and Mississippi rivers and the dunes on bluffs in Jo Daviess County. Dry sand prairie, dunes and scrub oak forests are the main communities in this division. Some plants and animals found here are more typical inhabitants of the shortgrass prairies found to the west of Illinois. This division was glaciated.

Sections

Illinois River Section: This section differs from the Mississippi River Section by the absence of several plant and animal species.

Mississippi River Section: This section has several plant and animal species which are absent from the Illinois River Section including false heather and rock spikemoss. Both of these plants form large mats that stabilize dune blowouts.

Percent of Total Illinois Area: 1.2

Places to Visit: Sand Prairie-Scrub Oak Nature Preserve in Mason County and the Big River State Forest in Henderson County

Typical Plants: prickly pear cactus, little bluestem, Indian grass, sand primrose, porcupine grass, blackjack oak, black oak, mockernut hickory

Characteristic Plants: silvery bladderpod*, false heather*, umbrella sedge***, Patterson's bindweed*

Typical Animals: six-lined racerunner, ovenbird, veery, upland sandpiper*, western meadowlark, grasshopper sparrow, dickcissel, sedge wren, common yellowthroat, badger, plains pocket gopher, Franklin's ground squirrel***

Characteristic Animals: regal fritillary***, bullsnake, Illinois chorus frog***, western hognose snake***, Illinois mud turtle*, lark sparrow

Western Forest-Prairie Division

Description: Located in west central Illinois, this glacial plain historically had prairies on the flat uplands and forests elsewhere. Outcrops of sandstone, limestone and shale are common in some areas. This division has a good drainage system with forested ravines between flat prairies.

Sections

Galesburg Section: The Galesburg Section is the area of the Western Forest-Prairie Division that lies north of the Illinois River valley. At the time of settlement, there were about equal amounts of forest and prairie in this section, with forests mainly along the tributaries to the Illinois River.

Carlinville Section: The Carlinville Section of the division is the land southeast of the Illinois River valley. Originally it was covered mostly by forests, with prairie accounting for about 12 percent of the area.

Percent of Total Illinois Area: 1.2

Places to Visit: Pere Marquette State Park in Jersey County

Typical Plants: black oak, red oak, post oak, white oak, American basswood, sugar maple, slippery elm, hickories, silver maple, sideoats grama, little bluestem, blazing star, purple prairie clover

Characteristic Plants: pink milkwort*, narrow-leaved green milkweed*

Typical Animals: gray treefrog, ground skink, timber rattlesnake***, prairie kingsnake, wood duck, bald eagle***, wild turkey, great blue heron, gray fox, raccoon, white-tailed deer

Characteristic Animals: spectaclecase mussel*, green frog, alligator snapping turtle*, worm snake, diamondback water snake

Middle Mississippi Border Division

Description: This narrow band of river bluffs, limestone cliffs and rugged terrain can be found along the Mississippi and lower Illinois rivers' floodplains. Limestone cliffs and outcrops are common. Hill prairies may be found on the top of south- and west-facing bluffs. Oak-hickory forests grow in the ravines and on north- and east-facing slopes. Caves and sinkholes are also found here. The Glaciated and Driftless (unglaciated) sections are part of this division.

Percent of Total Illinois Area: 4.4

Places to Visit: Pere Marquette State Park in Jersey County

Typical Plants: black oak, red oak, post oak, white oak, American basswood, sugar maple, slippery elm, hickories, silver maple, sideoats grama, little bluestem, blazing star, purple prairie clover

Characteristic Plants: pink milkwort*, narrow-leaved green milkweed*

Typical Animals: gray treefrog, ground skink, timber rattlesnake***, prairie kingsnake, wood duck, bald eagle****, wild turkey, great blue heron, gray fox, raccoon, white-tailed deer

Characteristic Animals: spectaclecase mussel*, green frog, alligator snapping turtle*, worm snake, diamondback water snake

Southern Till Plain Division

Description: This large, relatively flat area in south-central Illinois was glaciated but not by the most recent Wisconsinian glaciation, although the streams in this area were important for draining its glacial meltwaters. The clay soils support a mixture of forests and prairies.

Sections

Effingham Plain Section: The Effingham Plain Section is a relatively flat plain drained by the Kaskaskia River. It originally was mostly prairie. Post oak flatwoods are characteristic of the uplands. Sanctuaries for the greater prairie-chicken exist in this section.

Mt. Vernon Hill Country Section: The Mt. Vernon Hill Country Section has a rolling, hilly topography. Upland forests covered most of this section in presettlement times.

Percent of Total Illinois Area: 19.8

Places to Visit: Ramsey Lake State Park in Fayette County and Washington County Conservation Area in Washington County

Typical Plants: post oak, white oak, shingle oak, blackjack oak, pin oak, swamp white oak, mockernut hickory, shagbark hickory, sugar maple, silver maple, wild black cherry, willows, river birch, cottonwood, sycamore, white ash, little bluestem, Indian grass, New Jersey tea, big bluestem, coneflowers

Characteristic Plants: violet collinsia*, prairie rose gentian*

Typical Animals: tiger salamander, Fowler's toad, southern leopard frog, eastern box turtle, wood thrush, wild turkey, red-headed woodpecker, red fox, coyote, eastern chipmunk, white-tailed deer, rice rat***

Characteristic Animals: crawfish frog, ground skink, five-lined skink, broadhead skink, slimy salamander

Wabash Border Division

Description: The Wabash Border Division includes the bottomlands of the Wabash River and its tributaries, the uplands bordering the Wabash and the forests of the Vermilion and Little Vermilion rivers and Crab Apple Creek. It has eastern trees like the beech and tulip tree in the upland forests. All of this division was glaciated except for a small area in the southern part.

Sections

Bottomlands Section: The Bottomlands Section of this division encompasses the bottomland forests, sloughs, marshes and oxbow lakes in the flood plains of the Wabash River, Ohio River and their major tributaries. Bottomland forests are the main vegetation type with wet prairie and marshes associated with the sloughs.

Southern Uplands Section: The Southern Uplands Section contains the dry and mesic upland forests on the bluffs along the Wabash River. Some sandstone ravines support an unusual combination of plant species.

Vermilion River Section: The Vermilion River Section is characterized by rugged topography and the beech-maple forests in the ravines along the Vermilion River and its tributaries. The beech-maple forest represents a climax, deciduous forest type of the northeastern United States, which is found in Illinois only in the extreme eastern and southern portions.

Percent of Total Illinois Area: 4.8

Places to Visit: Beall Woods Nature Preserve in Wabash County and Kickapoo State Park in Vermilion County

Typical Plants: sweet gum, swamp cottonwood, sugar maple, silver maple, pin oak, overcup oak, Shumard oak, black oak, white oak, redbud, hop hornbeam, sycamore, black walnut, beech, tulip tree

Characteristic Plants: bloodleaf*, halbred-leaved tearthumb*

Typical Animals: gray treefrog, wood frog, longtail salamander, great horned owl, red-tailed hawk, pileated woodpecker, fox squirrel, beaver, white-tailed deer

Characteristic Animals: fanshell mussel**, wavy-rayed lampmussel*, fat pocketbook mussel**, little spectaclecase mussel***, river chub*, river redhorse***, northern madtom*, greenside darter, bluebreast darter*, harlequin darter*, redback salamander, eastern sand darter***, river cooter*

Ozark Division

Description: Found in southwestern Illinois, the Ozark Division is part of the Ozark uplift, a domelike structure of bedrock centered in the Ozark Mountains of Missouri. Hill prairies, caves, sinkholes and sandstone ravines are commonly found in the area. Many species that live here are typical of the Ozarks and are present nowhere else in Illinois. A portion of this division was glaciated.

Sections

Northern Section: The Northern Section of the Ozark Division has limestone bedrock, caves, sinkholes and a unique combination of plants and animals. Plants found only in the section include stiff bedstraw and slender heliotrope. They grow on hill prairies or exposed limestone ledges.

Central Section: The Central Section of this division has sandstone bedrock. Its forest and other floral components are distinctive. Bradley's spleenwort and Harvey's buttercup are species present only in this section of this division.

Southern Section: The Southern Section has significantly different bedrock, topography, glacial history, forest composition and animals from the other two sections in the division. Black spleenwort and shortleaf pine are two of the unique plants found here.

Percent of Total Illinois Area: 1.2

Places to Visit: Fults Hill Prairie Nature Preserve in Monroe County and Pine Hills in Union County

Typical Plants: post oak, red oak, black oak, Ohio buckeye, sugar maple, beech, tulip tree, black hickory, little bluestem, big bluestem, farkleberry, lowbush blueberry, celandine poppy

Characteristic Plants: shortleaf pine*, wild azalea, red buckeye, cucumber magnolia, Bradley's spleenwort*, black spleenwort*

Typical Animals: cave salamander, timber rattlesnake***, copperhead, summer tanager, red-shouldered hawk, Mississippi kite*, hooded warbler, worm-eating warbler, Kentucky warbler, bobcat, eastern wood rat*, Indiana bat**

Characteristic Animals: striped scorpion, blacktail shiner, spring cavefish, great plains rat snake*, eastern narrotwmouth toad***, coachwhip snake*, flathead snake***

Lower Mississippi River Bottomlands Division

Description: South from Alton along the Mississippi River, this area once was covered with prairies, wetlands, rivers and forests. The Mississippi River itself is muddy, and its fishes include silt-tolerant, plains species. Combined with the adjacent Pine Hills area, La Rue Swamp/Pine Hills contains 43 percent of the plant species known in Illinois. This division was generally unglaciated.

Sections

Northern Section: The Northern Section is distinguished by its forest composition, presence of wet prairies and marshes and absence of coastal plain trees. The bottomlands of the section near East St. Louis are called the "American Bottoms."

Southern Section: The bottomland forests of the Southern Section contain a greater number of tree species than those found in the Northern Section and also include some swamp species typical of the coastal plain.

Percent of Total Illinois Area: 1.0

Places to Visit: Kidd Lake Marsh in Monroe County and La Rue Swamp in Union County

Typical Plants: silver maple, honey locust, sugarberry, pecan, beech, red buckeye, pin oak, overcup oak, Shumard oak, cherrybark oak, pumpkin ash, swamp cottonwood, water locust, cattail, pickerelweed, river bulrush

Characteristic Plants: large sedge*, cynosciadium*, mock bishop's weed*, nettle***

Typical Animals: banded pygmy sunfish, bird-voiced treefrog***, green treefrog, western mud snake, cottonmouth, red-shouldered hawk, great egret, wild turkey, golden mouse***, mink

Characteristic Animals: bantam sunfish***, sturgeon chub*, plains minnow, pallid sturgeon**, Mississippi green water snake***, little blue heron*, snowy egret*, Mississippi kite*

Shawnee Hills Division

Description: This unglaciated hill country is found at the southern tip of Illinois. It was originally forested except for small, rocky openings. It is characterized by a high, east-west embankment of sandstone cliffs and a series of lower hills.

Sections

Greater Shawnee Hills Section: The Greater Shawnee Hills Section has sandstone bedrock and distinctive plants. Filmy fern and French's shooting star are unique plants in this section. French's shooting star may have grown in this area since before glacial times. Ravines and ledges along streams support plant species, like club mosses and sphagnum, which are normally found in more northern areas of the Midwest.

Lesser Shawnee Hills Section: The Lesser Shawnee Hills Section has limestone bedrock and sinkholes. The fluorspar deposits in Hardin County are world famous. Caves are common in the limestone bluffs. Wild mock orange is a distinctive plant.

Percent of Total Illinois Area: 2.5

Places to Visit: Giant City State Park in Jackson County and Wildcat Bluff at the Cache River State Natural Area in Johnson County

Typical Plants: Christmas fern, marginal fern, lady fern, Forbes' saxifrage, sideoats grama, sphagnum, club mosses, panic grass, post oak, chinkapin oak, white oak, red oak, black oak, shagbark hickory, beech, tulip tree, Ohio buckeye, sugar maple, sycamore

Characteristic Plants: French's shooting star***, filmy fern*, wild mock orange, Bradley's spleenwort*, southern grape fern***, Willdenow's sedge***, climbing milkweed***, Illinois wood sorrel*, rock chestnut oak***

Typical Animals: marbled salamander, gray treefrog, copperhead, northern fence lizard, great crested flycatcher, white-breasted nuthatch, American redstart, gray fox, coyote, bobcat, Indiana bat***

Characteristic Animals: Packard's cave amphipod*, blackspotted topminnow, spottail darter, stripetail darter, least brook lamprey***, southeastern myotis*, golden mouse***

Coastal Plain Division

Description: This unglaciated region of swampy, forested bottomlands and low hills is found at the extreme southern edge of Illinois. The uplands are composed of gravel, clay and sand hills that have a covering of loess, a silt deposited by wind. The lowlands have loam and clay soils, and swamps are present.

Sections

Cretaceous Hills Section: This section is named for the fossil beds from the Cretaceous period that are found in the rolling hills here. Also present in the hills are sands, gravels and clays.

Bottomlands Section: The Bottomlands Section encompasses bottomland forests, oxbow lakes, sloughs and rivers. This area includes the remnants of the once vast bald cypress and tupelo gum swamps along the rivers.

Percent of Total Illinois Area: 1.3

Places to Visit: Heron Pond Nature Preserve in Johnson County and Mermet Lake Conservation Area in Massac County

Typical Plants: red oak, swamp white oak, swamp chestnut oak, white oak, black oak, cherrybark oak, beech, sugar maple, tulip tree, shagbark hickory, bald cypress, sourgum, buttonbush, little bluestem, big bluestem, cinnamon fern, marsh fern, royal fern, sphagnum, pecan

Characteristic Plants: Carolina silverbell*, netted chain fern, storax***, red iris, blue jasmine*, creeping loosestrife*, white melanthera*, water elm***, Nutall's oak*

Typical Animals: cottonmouth, bald eagle***, black vulture, red-shouldered hawk, Acadian flycatcher, barred owl, bobcat, river otter, swamp rabbit, golden mouse***, rice rat***

Characteristic Animals: orange-foot pimpleback mussel**, cypress minnow*, mole salamander, spotted dusky salamander*, bird-voiced treefrog***, green treefrog, broad-banded water snake*, eastern ribbon snake***