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ENTICE – Environment and Nature Training Institute for Conservation Education
Illinois Prairies 101

Part I

Geology

Many factors interact to determine the vegetation of any site, regardless of size. Bedrock geology, glacial history, soils, moisture, climate, grazing animals, and fire have combined to directly influence the distribution of prairies and forests within Illinois. With a different climate, glacial history or fire history, the vegetation of Illinois would have been vastly different from that observed and described by the French explorers when they arrived in the late 1600s.

Some of these factors, such as bedrock, are largely obscured in Illinois by a thick layer of till deposited by the action of glaciers many thousands of years ago. The only places where bedrock is exposed are along the deeply incised valleys of the Illinois, Mississippi, Ohio and Wabash rivers and their tributaries, or along fault lines at various locations throughout the state.

The bedrock of Illinois resulted from the deposition of marine organisms during the Paleozoic and Mesozoic eras in the period 65 to 570 million years ago. Bedrock from these two geologic time periods differs not just in age, but also in location and thickness. Paleozoic bedrock, the most widely distributed, is present throughout much of Illinois. Its maximum thickness is approximately 14,000 feet compared to the maximum thickness of only 500 feet for Mesozoic era bedrock present in southern Illinois.

The most common and probably best-known type of bedrock in Illinois is limestone, a sedimentary rock formed at the bottom of ancient seas mostly by the deposition of shells, coral skeletons, and secretions from certain types of algae. These organisms had the ability to extract calcium from seawater and used it to secrete shells, as in clams and snails, and the branching structures of corals. As a result, fossils of these types of marine life are often present in limestone.

One of the most common limestones in Illinois is St. Louis Limestone, named after St. Louis, Missouri. It is present in most of the state, and its exposures form the bluffs along the Illinois and Mississippi rivers, plus the Ohio River in Hardin County. Its greatest thickness of 500 feet occurs in southern Illinois. It becomes increasingly thinner in northern Illinois where it is only about 200 feet thick.

St. Louis limestone is readily dissolved by weak acids formed in rain, causing land where this limestone lies close to the surface to be characterized by abundant sinkholes. These sinkholes sometimes form ponds whose waters feed into underground streams in cave systems. Land having sinkholes is known as karst topography. These regions of Illinois, such as Monroe County, often support a unique assemblage of animals, and are the only places where extensive cave systems are present in Illinois. One unique animal known from this area is the Illinois cave amphipod.

Burlington limestone is another limestone exposed along the Mississippi River bluffs, beginning at Quincy in Adams County and continuing to Alton in Madison County. Unlike St. Louis limestone, which extends across the entire state, Burlington limestone is found mostly in the northwestern Illinois where its thickness varies from 25 to 200 feet. Like St. Louis limestone, it is known to contain abundant fossils, especially those from a group of animals related to starfish, known as crinoids.

The bedrock of Illinois also contains layers of sandstone. One of these, St. Peter's Sandstone, consists of medium-sized, weakly cemented grains of quartz. This sandstone underlies most of Illinois and is named after the St. Peter's River in Minnesota. It is considered to be marine sand that was once the shore of an ancient sea. Though usually overlain with limestone throughout Illinois, it is exposed along the Illinois and Mississippi rivers and is prominent at well-known sites such as Starved Rock State Park. Its thickness varies from only a few to nearly 700 feet with an average of 100 to 200 hundred feet. It is very valuable because it is exceptionally pure, making it ideal for glass making. The thickest deposits are in northern Illinois where it is quarried extensively.

Dolomite, another sedimentary rock that superficially resembles limestone, consists of magnesium carbonate instead of calcium carbonate. Dolomite bedrock is close to the soil surface near Joliet in Will County, and outcrops are present at Galena and along the Apple River in Jo Daviess County. Some unusual plant communities formed on the soils that developed from dolomite, and rare plant species, such as bird's-eye primrose, grow on the dolomite cliffs of the Apple River canyon.

Glaciation

Based upon surface features found within the state, evidence for at least four glacial periods is present in Illinois. Evidence of the earliest known, or Nebraskan, glaciation is scarce, due to the cumulative effects of subsequent glaciers. However, it is known that Nebraskan glaciers entered Illinois from the west and northwest and probably covered much of the land surface west of the Illinois River. This statement is based on the presence of weathered glacial till, of appropriate age and mineral composition, in Adams, Fulton and Jo Daviess counties in Illinois.

Kansan glaciers entered Illinois from the northwest and northeast. Ice that advanced into Illinois from the west appears to have been diverted by rocks of Cretaceous age in present-day Pike and Calhoun counties, creating two separate lobes. The glaciers from the eastern advance spread south to Franklin and Randolph counties, west to St. Louis and north to La Salle County. Except for areas in Adams and Pike counties, Kansan glacial till is covered by till of the Illinoisan glaciers.

Ice from the Illinoisan glacial period of 125,000 years ago covered approximately 90 percent of Illinois, and advanced within 10 miles of where Carbondale now stands, representing the southernmost extension of glaciation in the northern hemisphere. The exposed area of Illinoisan glaciation in the southern third of the state, an area known as the Southern Till Plain, is characterized by a gently rolling topography, unlike the nearly flat terrain of Wisconsinan glaciation to the north. Moraines are poorly developed in the Southern Till Plain, causing them to be difficult to distinguish on the landscape.

At their maximum extent, the Illinoisan glaciers reached the northern slopes of the Shawnee Hills in southern Illinois. These glaciers were widespread, and only the southern tip of the state plus portions of present day Calhoun, Pike, Jo Daviess and Randolph counties were not covered with ice. Consequently, these unglaciated areas tend to have a much more varied topography compared to the glaciated remainder of the state.

The most recent, or Wisconsinan glaciation, which ended approximately 14,500 years ago, includes the area north of Shelbyville and east of Peoria northward to the Wisconsin/Illinois line. Ice during this glacial period advanced and retreated several times during alternating warm and cold seasons, creating a well-developed system of moraines or ridges. The southernmost or Shelbyville Moraine, named after Shelbyville in Shelby County, represents the southern terminus of Wisconsinan glaciation in Illinois.

Loess

Loess is fine-grained silt deposited during the ice age by westerly winds. It is a fine "rock flour" that was carried by glacial melt-waters and deposited in valleys as the waters receded. Strong winds blew the silt onto the uplands, and the thickness of loess tends to be greatest near the bluffs along the rivers and progressively thinner toward the east away from the streams. Peoria loess is a surface deposit that gets its name from the city of Peoria, where exposures can be observed along the Illinois River valley. Peoria loess ranges from a few feet to 100 feet in thickness, with the area of greatest thickness being along the Illinois River valley. Thick deposits of loess tend to be calcareous, but noncalcareous where the deposits are thin. Loess occurs on the uplands and valley walls of most of Illinois, except within the area of Wisconsinan or most recent glaciation.

Warm weather toward the end of the Wisconsinan glaciation caused glaciers to melt. Initially, water was held in place by moraines, but the force of the water grew too great, and it broke these earthen dams and cascaded down the Kankakee River on its way toward the Illinois River during a flood known today as the Kankakee Torrent. This flood caused incisement of bedrock within the upper Illinois River valley, considerable widening of the Illinois valley below Hennepin, and extensive scouring of bedrock within the Kankakee River valley.

The effects of flooding were not limited to the Illinois River valley. As the floodwaters receded, they left tremendous volumes of sand and gravel behind. Deposits of sand can be found today along the Green, Kankakee, Illinois and Mississippi rivers and the shores of Lake Michigan. The sand consists of medium-sized grains that overlay coarser sand and gravel. These sand deposits were reworked by strong winds, creating a dune and swale topography known as Parkland Sand. Though most of the areas of Parkland sand are in northern Illinois, this sand is also present along the Wabash River in southern Illinois and the shores of Lake Michigan. These sand and gravel deposits are at least 100 and possibly 200 feet thick in parts of some counties.

The majority of the sand dunes are now stabilized by vegetation, but actively moving dunes are present in some sand areas. Though most of the dunes are 20 to 40 feet high, some are 80 to 100 feet in height. In some locations wind action has caused the dune to migrate onto the uplands as much as two or three miles.

Climate

After the glaciers were gone, the climate cooled and a boreal forest, similar to that found in northern climates today, covered much of the state. Nevertheless, the climate gradually became warmer and drier, causing the vegetation to change. Oaks and hickories replaced the pines and spruces about 12,000 to 15,000 years ago. This time period is when prairie began to make significant eastward expansions. About 8,300 years ago, during a prolonged hot, dry era known as the xerothermic period, tallgrass prairie became a major vegetation type in Illinois.

Illinois has a continental climate characterized by cold winters and hot summers. Due to Illinois' length of 400 miles, the climate varies considerably from north to south in both temperature and precipitation.

Average annual precipitation ranges from approximately 32 inches in the north to nearly 47 inches in the southern tip of the state. The average January temperature in the north is 22^0F compared to 36^0F in the southern counties. The average July temperature in the north is 73^0F compared to 80^0F in the south. The average length of the growing season varies from 160 days in the north to more than 200 days in the extreme south.

The climate of Illinois is influenced by three air masses. The coldest and driest air originates in Canada and is most frequent in winter. Warm, very humid air originates from the Gulf of Mexico during summer, resulting in the humid days of July and August. Dry, warm air from the Pacific Ocean influences our weather pattern during the fall.

Illinois is subject to considerable climatic variability, including periodic and frequently severe droughts. Reconstruction of past climatic conditions in Iowa, Illinois and Missouri using tree ring analysis indicates very severe droughts in the 1890s plus the dust bowl years of the 1930s. The five driest decades, in the last 300 years, were: 1) 1816-1825; 2) 1735-1744; 3) 1696-1705; 4) 1931-1940; and 5) 1791-1800. This information indicates that severe droughts, lasting for a decade, were a relatively common phenomenon for Illinois and other Midwestern states.

The climate of Illinois at the time European settlers arrived was one capable of supporting forest. Many scientists believe the prairie would have disappeared long before the pioneers arrived if the Native Americans had not burned the grasslands. These fires, set on a nearly annual basis, maintained the prairies and prevented the invasion by trees. Native Americans set these fires for a variety of reasons, including bison hunting. The prairie ecosystem was modified and shaped by climate, fire, soils, topography, geology, glacial history, grazing and time. There are many prairie types within the prairie biome, and each has its own distinctive plants and animals. The same concept applies to Illinois and the variety of prairies found within the state.

Government Land Office Surveys

Long before Illinois became a state, plans were already being developed on how the land would be divided. Pioneers were pushing westward across Ohio and Kentucky and would soon be entering the Illinois Territory, so it was essential that a land system be in place to sell the federally owned lands in a systematic manner. A systematic land survey method was greatly needed. The old systems used in the eastern part of the country were irregular and difficult to follow when trying to determine boundaries of tracts of land. The record keeping had also been poor. Despite the best intentions of those involved, many records had been lost.

If the surveys in Illinois went as planned, these problems would be solved. The new system would be mathematically designed and much easier to understand and follow compared to methods used in eastern states. All surveyors were required to use standard-sized notebooks to record their work and observations and to prepare the maps that showed the vegetation of the landscape at the time of the survey. These records of the vegetation have become very important to scientists who study vegetation because they are the earliest, most comprehensive records of the original vegetation of Illinois. These records continue to be used by surveyors to determine boundaries for land parcels.

Public or Government Land Office Surveys

In 1784 the Continental Congress appointed a commission whose purpose was the disposal of lands in Illinois, known then as the Western Territory. Thomas Jefferson, chairperson of this newly formed commission, proposed implementation of a new survey system that would survey land before

settlement, develop a mathematically designed national survey system, and create the section, or one square mile, as the standard unit of all future land surveys.

This new survey system would divide land into townships, each six miles square. Parcels would be further divided by lines running north and south and east to west at one-mile intervals, thus dividing the six-square mile area into 36 equal parts or sections, each consisting of 640 acres that were numbered from one to 36. Land was not to be sold until it had been surveyed, and all land sale documents had to refer to the township, range and section according to the directions of the survey. All lines would be measured with a chain, and all section corners were to be marked. This new method of land surveying was approved by an act of the Continental Congress in May 1785.

Surveys did not begin in Illinois until 1804. Illinois was still regarded as the frontier and was not yet a state. Pioneers would be arriving soon, so this survey was designed to assess the quality of the land to facilitate purchases. Contracts were awarded to surveyors, and they were instructed to record their observations of the vegetation along each section line, rate the quality of soils, make note of the boundaries of forests and prairies, mark locations of streams or bodies of water and record locations of salt licks, caves or unusual geological features. All notes were to be recorded in a standard field notebook that eventually would be used to construct township plats or maps that showed the locations of these features.

Little formal training was required for the job of deputy surveyor. Although some individuals had prior surveying experience, many simply read a book on surveying, grabbed their compass and chain and went to work. Despite the minimal amount of training, most surveys were well done. Most surveyors also maintained a high degree of integrity and worked long hours at their job. In fact, some surveyors were so diligent that they resurveyed lines that had not been done correctly.

To accommodate the large volume of land sales, Federal Government Land Offices were established. The first office opened at Shawneetown on the Ohio River on February 12, 1812. Kaskaskia and Edwardsville followed in 1816, Vandalia and Palestine in 1820, Springfield in 1822, Danville and Quincy in 1831, Chicago and Galena in 1834, and Dixon in 1840. The first property was sold at the Shawneetown office in 1814. Initially, settlers could purchase land for $2.00 an acre under an installment plan in minimum lots of 160 acres. This system did not work well because some individuals never paid for their land. Some thought the price was too high, so the price per acre was reduced from $2.00 to $1.25, and the minimum acreage that could be purchased was decreased from 160 to 80 acres.

The surveyor's contracts stated that they were to develop plats or maps for each township, supervise the rest of the crew and keep neat and accurate notes for each mile surveyed. The plats showed the locations of forests, prairies, creeks, rivers, sloughs, Native American trails and habitations, and other human-made objects such as roads. The field notes included observations on soils (rated as first-, second- and third-rate in quality) and the vegetation. Three major types of vegetation commonly recognized by the surveyors were forest, prairie and barrens, the latter being areas that grew only grass and a few stunted trees. The opinions of surveyors frequently differed on what constituted good land. Surveyor Angus Langham, the surveyor of the Sugar Creek area near Springfield, believed that the best or "first-rate" lands grew large, noble trees like oaks, walnuts, and maples. He considered grassy areas like prairies to be barrens, indicating poor soil. It is also likely that it indicated his connection to Kentucky where grasslands were commonly called barrens. His thinking, which was accepted by many of the early pioneers, greatly affected the pattern of settlement along Sugar Creek because all of the timbered lands were settled long before the prairies.

The surveyors were also responsible for the accuracy and care of the surveying equipment, including the magnetic compass. Some deputy surveyors used the stars to help determine the accuracy of their compasses, as this example shows: "Last night at 7:00. 17th March 1834 at the corn to sections 33 and 34, Range 10 East, Township 32 North, I ascertained the variation of the needle by polar observation to be 6^{o} 25' East, H. W. Beckwith."

The job of another crew member, the axeman, was to mark or blaze trees in forests along the path of the section lines and corners so these locations could be found by settlers. Generally, young, healthy, long-lived trees like white oaks were chosen as "bearing" or "witness" trees to mark the section corners. Sometimes initials were blazed into these bearing trees to mark a specific boundary.

The jobs of the chainmen were to ensure accurate measurements of the survey lines. The standard of measurement was a chain, consisting of 100 links, that was 66 feet long. Frequently used chains were compared to a standard chain to ensure the accuracy of the measurements. In the field notes, the deputy surveyor often wrote, "measuring chain compared with the standard chain and found to be the correct length."

The number of miles surveyed determined the salaries of the deputy surveyors. During the early years, the going rate was $2.50 per mile. The money earned not only paid the surveyor's salary, but also the salaries of all of the other crew members, who earned $16.00 per month, and the food and other supplies. However, the surveyor had to cover all expenses out of his pocket because he was not paid until all work was done and the plats and field notes were turned in to the Surveyor General's office.

The system of blazing trees to mark section lines worked well until the surveyors encountered the open prairies where there were no trees. The contracts for many of these treeless prairies specified that mounds be built and a post placed in the center of each mound to mark the sections. Sometimes large stones or two quarts of charcoal were placed in the soil before the mounds were constructed. Surveyors relied on the stones and charcoal to prove the authenticity of a mound. The mounds consisted mainly of prairie sod cut and stacked, with each successive layer offset inward, until the appropriate slope and height were reached. Mounds at township corners were five feet square at the base, two feet square at the top and three feet high. Mounds at the section corners were four feet square at the base, two feet square at the top and two and one-half feet high. Mounds at the quarter-section corners were three and one-half feet square at the base, one and one-half feet square at the top and two feet high. Thousands of these mounds were constructed in the prairie counties of eastern Illinois.

The job of the Government Land Surveyor was not an easy one. He had to endure hot summers and cold winters. The summers brought hordes of biting flies and mosquitoes. During the first years of the surveys, the crews were involved in a number of clashes with Native Americans.

The surveying crew also had to wade through vast swamps and marshes as they traveled the section lines. These wetlands hindered the progress of the survey and made for some highly uncomfortable work. There were extensive seasonal and permanent marshes and sloughs throughout the prairie regions, but the work had to be completed regardless of the time of year. This task would be unpleasant in any month, but especially so during late winter.

Throughout much of the state, the surveyors encountered squatters, families who had settled the land before the surveys were completed. Squatters were blamed by surveyors for trying to delay survey work long enough to obtain money to purchase the land at public auction. Other squatters were blamed for

cutting down blazed trees and destroying posts and mounds that marked the section corners, making it difficult for prospective buyers to obtain information that must be included on the land sale document.

Considering the enormity of the task, the surveyors did an outstanding job. Their efforts still live throughout the state today. Roads were commonly placed along the boundaries of sections, creating the checkerboard pattern on the land that is so characteristic of the Illinois countryside. Sometimes roads make a jog in one direction before connecting with or crossing another road, corresponding to where a surveyor made a correction amidst the tall prairie grasses in order to connect with the next line.

The Public Land Surveys were completed in 1856. Land surveyors still use these records, but they are also of great importance to those interested in the natural history of the state. The characterizations of the vegetation represent the earliest and most comprehensive information on the vegetation of the state. Scientists and managers continue to use survey records to help guide land management and restoration.

The Natural Divisions of Illinois

Illinois, from north to south, is nearly 400 miles long and 200 miles wide. Based upon soils, bedrock, topography, glacial history and the distribution of plants and animals, the state can be divided into 14 natural divisions, which can be further subdivided into 33 sections. Each section has its own unique combination of bedrock geology, plants and animals, topography, glacial history and soils.

Wisconsin Driftless Region

The extreme northwestern part of Illinois, including Jo Daviess and Carroll counties, is part of a much larger area that extends into Iowa, Minnesota and Wisconsin that was not covered by any of the glaciers of the Pleistocene era. Consequently, this part of Illinois is characterized by rugged topography and exposures of bedrock unlike other regions of the state. It was known as the lead region during pioneer times. The county seat of Galena takes its name from the lead ore once mined here.

This division is well known for its outcrops of dolomite, shale and prominent “mounds” or hills that have remained due to the presence of more erosion-resistant dolomite. One of these, Charles Mound, is the highest point in Illinois at 1,257 feet. Small caves are present in the dolomite and old “crevice mines,” dating to pioneer times, are present in the dolomite cliffs.

Though forests were most common in this rugged region, dry prairies present on the uplands contain pasque flower and Wilcox’s panic grass, two species representative of the Great Plains. The common grass species in these prairies are little bluestem and side-oats grama.

Rock River Hill Country

This natural division encompasses the area drained by the Rock River. The topography is rolling, and prairie once occupied much of the level uplands. Forest was present along the streams and areas of greater topographic variation. This division was glaciated during the early stages of the Illinoian and Wisconsinan glacial periods.

Though forest was a major land cover within the division, prairie was present on the uplands, and big bluestem, Indian grass and prairie dropseed were common grasses in the prairies. The dry prairies also contained pasque flower, Wilcox’s panic grass and June grass which are regarded as plant species typical of the prairies of the western plains. Wet prairies containing slough or cord grass and bluejoint grass were also present.

Northeastern Morainal Division
This is the area covered by the last glaciers of the Wisconsinan glacial period, the most recent glaciation in Illinois. A thick layer of glacial drift covers the land, and moraines, eskers, kames and glacial lakes are common, accounting for much of the variation in topography characteristic of the division. Due to glacial activity, wetlands abound, including bogs, a wetland type not found elsewhere in Illinois. Bogs contain many distinctive plants such as pitcher plants, cranberry, leatherleaf and dwarf birch. Fens, or plant communities associated with an alkaline water source, are also present in this division.

Approximately 60 percent of this division was prairie about the year 1820. Dry prairie, present on gravelly moraines, was dominated by little bluestem and side-oats grama. A number of distinctive plants occur in the prairies and wetlands of the division, including sweet fern, speckled alder, small-fringed gentian and yellow fringed orchid. This division is the only area in Illinois where fens are present.

Grand Prairie Division
This division in the east-central part of the state is an extensive plain that gave Illinois the nickname, the Prairie State, plus its reputation of being rather flat and monotonous. The principal plant community of this division was prairie with forest restricted to borders of streams or areas of rugged topography. Due to its flatness, drainage was poor and many marshes and potholes were present that were havens for waterfowl and other aquatic animals.

The prairies contain big bluestem, Indian grass, prairie dropseed, rattlesnake master, leadplant, prairie dock and compass plant. The sand prairies of the Green River Lowlands and the Kankakee Sand Region contain little bluestem, goat's rue, June grass, porcupine grass and prickly pear cactus.

Several sections are present in this natural division. The Grand Prairie Section was covered by the last glaciers of the Wisconsinan glacial period. Mesic black soil prairie was the most common plant community type, although wet and dry prairie communities were also present. Numerous marshes and prairie potholes supported tremendous numbers of waterfowl and other waterbirds.

The Springfield Section occurs on older Illinoian drift and has much better drainage compared to the Grand Prairie Section. This section was mostly prairie prior to the arrival of European man. Loess hill prairies are present on the bluffs along the lower part of the Sangamon River.

The Western Section was also mostly prairie and is also located on Illinoian drift.

The Green River Lowland Section occurs in the broad valley of the Green River, which was formed by glacial meltwaters. This section is known for its extensive sand flats and dunes, marshes and wet prairies. Scrub oak forests, consisting of black and blackjack oak, occur on the sand ridges.

The Kankakee River Sand Area Section was a mixture of marsh and prairie before European settlement, but scrub oak forest is present on ridges at dry, sandy areas. This extensive area of sand was deposited by the Kankakee Torrent toward the end of the Wisconsinan glacial period. The primrose violet and Carey's smartweed are known from Illinois only from this section. The clear, sandy bottom streams contain the weed shiner, iron color shiner and least darter.

Upper Mississippi River and Illinois River Bottomlands Division
This division is comprised of the floodplains of these two rivers, including the Mississippi River south to its confluence with the Missouri River. Both of these floodplains are broad and relatively level due to the

action of glacial floodwaters. Although a considerable amount of this division was once forested, marshes and prairies were also present.

The extensive tracts of prairie present in these floodplains prior to European settlement contained big bluestem and Indian grass, while cord grass and blue joint grass were dominant on the wetter sites. These bottomlands also contained considerable numbers of ponds and lakes, most of which have been drained and cultivated.

Illinois River and Mississippi River Sand Areas Division
The sand deposits along the Mississippi and Illinois rivers support a type of prairie more typical of western states. The topography of the division is gently rolling and is often characterized by dune and swale topography. The sand dunes are usually stabilized by vegetation, but areas of actively moving sand, known as blowouts, are present in the areas.

Dry sand prairie is the most common type found in the division. Common grasses in this prairie are little bluestem, June grass and hairy panic grass while sand love grass is more common in disturbed areas. Common wildflowers are goat's rue, eastern prickly pear cactus, western ragweed, sand primrose and spotted mint.

Some of the distinctive plants and animals found in this division include the silvery bladderpod, Patterson's bindweed, Illinois mud turtle, Illinois chorus frog and western hog-nosed snake. These areas are also the primary nesting sites for lark sparrows in Illinois.

Western Forest-Prairie Division
The part of Illinois known as the Western Forest-Prairie Division is present in the west central part of the state on land covered by Illinoian and Kansan glaciers. Because of the greater age of the glacial drift, the terrain is more dissected, and forest was the prevailing vegetation at the time of arrival of the European pioneers. However, relatively large expanses of prairie were present on the flat uplands.

Near Carlinville are some glacial drift hill prairies that contain rare plants, including the large ground plum. The vegetation of these prairies consists of big bluestem, Indian grass, little bluestem, rattlesnake master and other wildflowers. Five-lined and broad-headed skinks are present in this division, as is the ornate box turtle.

Middle Mississippi Border Division
This is a narrow band of relatively rugged terrain along the Mississippi River from Rock Island County south to St. Clair County. The prominent bedrock is limestone, and outcrops are common along the bluffs. Deep loess deposits are also present, often capping the bedrock and contributing to the growth of hill prairie vegetation, which is a common feature of the bluff line.

The prairies within this division are limited to the bluff slopes. The most common plants of these hill prairies are little bluestem, purple prairie clover, side-oats gramas, flowering spurge and scurf pea. Stick leaf, a distinctive herbaceous plant found in the western states, is present on the limestone ledges of this division.

Southern Till Plain Division
The large region south of the Shelbyville Moraine and the watersheds of Macoupin Creek and the Sangamon River is known as the Southern Till Plain. It is a dissected area known for its poor soils and the

prevalence of a woodland community called post oak flatwoods. Outcrops of bedrock, limestone, shale and sandstone are known from the southern part of this division, and bedrock is close to the soil surface in the northern part.

Although this region was completely covered by the Illinoian glaciers, glacial landforms are known only from the northwestern part. Ridges associated with glaciation are present along the Kaskaskia River, but large prominent moraines are not present.

The northern section of this natural division is a relatively flat area drained by the Kaskaskia River that was mostly prairie prior to European settlement, but post-oak flatwoods were present on the uplands. Prairie was present on about 40 percent of the land surface at the time of European settlement about 1820. This prairie was similar in many ways to the Grand Prairie to the north because big bluestem, Indian grass and little bluestem were common grasses. Unlike the prairie region of the north, wet prairie was not common. Royal catchfly, a wildflower, was mostly restricted to this division. The distinctive fauna and flora for this division include the northern fence lizard, ground skink and five-lined skink. This region is the only place where wild populations of greater prairie-chickens remain in Illinois.

Wabash Border Division
This division includes the floodplain of the Wabash River and its tributaries. Some of the most magnificent forests east of the Rocky Mountains once grew in the bottoms of the Wabash River. Due to rich soils and ideal growing conditions, these trees grew to huge sizes, and some individual trees were once the largest trees east of the Rocky Mountains.

Ozark Division
This division lies in the southwestern part of the state and includes Monroe County and the glaciated ravines of Randolph County. The bedrock of the northern section is limestone, and several extensive caves and numerous sinkholes are present. Loess deposits that cap the bedrock support hill prairie vegetation that includes some rare plant species, such as Missouri coneflower, small heliotrope and stiff bedstraw. The central part of the division is underlain by sandstone, creating some unique habitats for several plant species. The large flowered rock pink and Bradley's spleenwort are known from Illinois just from this area. Many of the streams within the section are lined with outcrops of sandstone, the habitat of the large flowered rock pink.

Lower Mississippi Bottomlands Division
This division includes the Mississippi River and its floodplain from Alton south to the Thebes Gorge. The northern section of this division contained numerous prairies and marshes. Considerable amounts of forest were also present. The southern section was mostly forested.

Shawnee Hills Division
This is a forested, unglaciated area that extends across the southern part of the state from Fountain Bluff on the west to the Shawneetown Hills near the mouth of the Wabash River on the east. These hills are underlain by sandstone bedrock, or a combination of sandstone and limestone in the southern part of the division.

Numerous bluffs and ravines are present, along with many sandstone cliffs. Forests are predominant. The hills in the southern part of the division are underlain by a combination of sandstone and limestone. Sinkholes and caves are present locally in this section. Deposits of fluorspar are also present.

Coastal Plain Division
This division is an area of forested swampy bottomlands and gravel hills. The bedrock of this division is deeply buried by alluvium. Very little prairie was present in this division. The few remnants indicate that little bluestem was a common grass on these upland prairies.

Introduction to the Prairies

The prairies of Illinois lie on the eastern edge of a central North American grassland that begins near the foothills of the Rocky Mountains and continues eastward to western Indiana, with outliers in Arkansas, Ohio and Michigan. The Rocky Mountains intercept moist air masses moving eastward, resulting in a rain shadow effect at the western edge of the grasslands. Annual precipitation along this western edge ranges from 10 to 15 inches while the eastern edge may receive between 30 to 40 inches in an average year. In addition, the humidity and number of days with precipitation tends to increase eastward while the occurrence of periodic droughts tends to decrease. These variations in climate result in a gradual change in the vegetation. Short grass prairies occur along the western edge, but they blend into mixed grass prairies in the central United States. Tallgrass prairies predominate on the eastern edge of the grassland where the precipitation is greatest, like the states of Illinois, Indiana and Iowa.

The primary grasses of the short grass prairies are buffalo grass, blue grama and hairy grama. These grasses may reach heights of only 12 to 20 inches. Little bluestem grass, the wheatgrasses and the needle grasses characterize the mixed grass prairies of the central portion of the grasslands. On the eastern edge, big bluestem and Indian grass are the common species. These grasses, when in bloom, may be five to 10 feet in height.

This vast central North American grassland stretched from Indiana west to Nebraska, south to Texas and north to the Canadian Provinces of Saskatchewan and Alberta. Called the tallgrass or true prairie on its eastern edge, this grassland was not uniform throughout except for the presence of tall grasses. Though grasses were the most conspicuous component of the prairies, an abundance of wildflowers also characterized these extensive plains.

The origin of the prairies was a subject of controversy during the early history of Illinois. Some writers believed that prairies were associated with ancient lakes while others were convinced that fire had a role in their existence. It wasn't until the 20th century that Professor E. N. Transeau of The Ohio State University published a landmark document known as the "Prairie Peninsula." He explained that certain types of climate favored prairie over forest. More recent data indicates that prairie is a relatively recent ecosystem in central North America that developed following the last glacial epoch approximately 12,000 to 15,000 years ago. For Illinois, evidence indicates that prairie advanced into the state following a prolonged dry, hot period approximately 8,300 years ago.

Scientists have examined grasslands throughout the world and found a variety of climates and soils associated with them. Some have high levels of precipitation while others receive relatively little rainfall. However, there are two features shared by all grasslands: 1) a season of the year during which the vegetation becomes dry and flammable; and 2) a flat to gently rolling topography. In Illinois the season that occurs in the fall following the first killing frosts is known as Indian summer. During this two- to three-week period, the weather is mild, the humidity is low, and winds are generally from the west or southwest. The mild weather combined with the flat to gently rolling topography and the dry, flammable vegetation of the prairies provides a suitable combination for fire, a natural force characteristic of all grasslands.

Fire, in combination with grazing by large herbivores such as bison, and periodic drought helped define the central North American prairie. Another feature that characterizes all prairies is dense sod. From the soil surface to a depth of six inches or more, the soil contains a dense mat of roots, rhizomes, bulbs and tubers. The roots of prairie plants extend several feet down into the soil, including some that extend over 15 feet. These long root systems enable these plants to survive drought.

Most plants in prairies are long-lived perennial herbaceous species with well-developed root systems. Each plant has an underground portion equal in volume to what is above ground. The roots of most species extend several feet down into the soil, but the roots of little bluestem grass extend over 15 feet. Purple and white prairie clovers have tap root systems that extend six feet or more into the soil. Another legume, known as scurf pea, has a taproot that extends nine feet into the soil. These taproots have many lateral roots that enable these plants to absorb available moisture within a considerable volume of soil. Such root systems enable these plants to withstand prolonged periods without precipitation.

Most prairie plant species have life spans of 10 to 20 years, but some live for a much longer time. The living tissues of woody plants are above ground, making them vulnerable to extreme heat and cold or damage by fire and animals. In contrast, the living tissues of most prairie plants are below ground, protecting them from potential physical damage. Having their living tissues below ground also protects them from drought, a relatively frequent visitor to the prairie regions.

Although several short droughts have occurred within the last 70 years, the last prolonged drought occurred during the 1930s. The drought during these years, known as the dust bowl, was so severe that even some prairie plants failed to survive.

The mesic prairies are flat or gently rolling landforms characterized by a layer of black topsoil 36 to 48 inches thick or more, depending on the locality. The black topsoil of the mesic prairies is very rich in nutrients. These soils usually have a high organic content, enabling them to retain considerable amounts of water compared to forest soils. Former mesic prairie sites that have been in continuous crop production for nearly 150 years still retain the black soil layer.

The growing season begins two to three weeks earlier in prairies than forests. The openness of prairies results in killing frosts at earlier dates compared to forests. However, many prairie species are resistant to frosts, especially the late-blooming asters, gentians and goldenrods. These species are capable of tolerating temperatures well below freezing without apparent harm to sensitive tissues.

Most prairie species are warm-season plants. They do most of their growing and flower production during the warm summer months instead of the cooler weather of early spring or fall. Scientists refer to these warm season plants as C4 species, a name that defines a particular carbon pathway in chemical processes conducted by these plants. A few prairie species are C3 or cool-season plants. June grass and porcupine grass, two grasses found in sand prairie communities, are C3 plants.

Most prairie grasses are also bunch or clump-forming species, in contrast to bluegrass or other lawn grasses that form a turf or mat. Clumps of prairie grasses enlarge as they age. Other plant species, including annuals, grow between the clumps of grass. The dominant grasses of many prairies are big bluestem and Indian grass. Other grasses, such as little bluestem, characterize other prairie types. Grasses are dominant on prairies, usually producing much more biomass than wildflowers. Pioneer stories abound concerning grasses taller than a man on horseback. That may have been the case on sites with good soils during years when the weather was perfect for growth. Otherwise, they range from four

to six feet in height. They produce an average of 3,000 to 4,000 pounds per acre, but as much as 7,000 to 9,000 pounds per acre.

The numerous wildflowers on the prairies cause it to be in continuous bloom from spring until fall. In general, spring-blooming plants are short in stature, like violets, buttercups or shooting stars. The plants of the summer tend to be mid-height, like rattlesnake master, blazing stars or white false indigo. The late summer and fall season brings the tall grasses like big bluestem and Indian grass plus tall wildflowers such as compass plant and prairie dock. As the blooms of one species begin to fade away, another species starts blooming.

The prairies also have a huge variety of animals, including large grazing herbivores, such as the American bison. These animals traveled in herds and were always moving from one locality to another. There was a great variety of birds, including ducks, geese, swans, sparrows, owls and many others. Snakes, frogs and lizards abounded, and the constant noise of insects could be heard throughout the growing season.

Some individuals wrote descriptions of the prairies while traveling to their land claims. Eliza Steele traveled through the prairies southwest of Chicago in 1840. She wrote: “When I awoke I was in the midst of a prairie. How shall I describe this scene? A world of grass and flowers stretched around me, rising and falling in gentle undulations. We rode thus through a perfect wilderness of sweets, sending forth perfume, and animated with myriads of glittering birds and butterflies. We passed through whole acres of blossoms all bearing one hue, as purple, masses of yellow, or rose; and then a carpet of every color intermixed, or narrow bands.”

Another pioneer wrote that ducks filled the sky when they rose from the extensive wet prairies along the Green River in Lee County, where sandhill cranes were said to be as “common as bees in clover.” The warm weather of spring made the waters of wet prairies alive with frogs, according to an Adams County schoolgirl at a spelling bee on March 25, 1844. She described her surroundings as having “wild grass taller than a man, water boot-leg deep, full of frogs which made so much noise that the teacher was compelled to pronounce the words at the top of his voice in order to be heard at all.”

Though some regarded the prairies as monotonous, many were delighted with the wildflowers. The absence of trees gave people a feeling of spaciousness unlike anything that they had experienced. Though trees were largely absent, plum thickets, hazel nuts and Iowa crabapples were on the prairies, furnishing valuable nesting sites and sources of food for birds and other animals.

The prairies were much more than just plants or animals. They were ecosystems complete with innumerable birds, insects, mammals, plants, soils and even their own climate. They consisted of millions of acres. Despite its extent, the tallgrass prairie disappeared rather quickly after the arrival of European settlers. Today, the most extensive tallgrass prairie remnants are in the Flint Hills of Oklahoma and Kansas where thin topsoil makes the land unsuitable for row crop agriculture. In Illinois, Iowa, Indiana and Nebraska where the soils were deep and fertile, only small, scattered remnants remain.

Prairies of Illinois

When the glaciers retreated from Illinois about 14,500 years ago, they left a nearly level landscape and numerous shallow, water-filled depressions. About 8,300 years ago, during a prolonged dry period, prairies became the dominant vegetation of the flat to gently rolling topography of central Illinois. The prairie, complete with its abundant wildlife, persisted until the arrival of pioneers in the 1800s.

The landscape was nothing like today. Grasslands stretched from horizon to horizon, often without a single tree in sight. The movement of the wind among the grasses and wildflowers reminded many pioneers of the oceans that they had just crossed to get to the new country. Now they were entering a sea of grasses and wildflowers. It was unlike anything they had ever experienced.

Because Illinois was the first state that contained expansive prairies encountered by pioneers, Illinois became known as the "Prairie State." However, the prairies of Illinois were different from those in Minnesota, Missouri, Iowa or Wisconsin. One prairie type graded almost imperceptibly into another, forming one huge, complex, grassland biome.

Based on the Government Land Office Surveys, large prairies were present in all but eight of the 102 counties in Illinois. Taken collectively, 61 percent of the landscape or approximately 22 million acres of prairie were present in Illinois. The largest prairies were restricted to the northern two-thirds of the state while prairies in the southern counties tended to be smaller.

Included in the 22 million acres of prairie were mesic, black-soil prairies, sand prairies and dolomite prairies. The hill prairies located along major rivers were not included in this total because Government Land Office Surveyors generally classified these sites as forested land due to the presence of a few scattered trees. Of all prairie types in Illinois, the black-soil prairies of the central and northern parts of the state were the most abundant.

To some of the early inhabitants, the prairies were monotonous in their uniformity. There were few shrubs and virtually no trees except along streams. However, they were far more diverse than forests. The various prairie types contained over 300 plant species and a huge variety of animal life.

Prior to settlement of the prairies the nearly level topography caused water to pool, forming many potholes, sloughs, marshes and wet prairies. One of the largest wet prairie-marsh complexes in 19th century Illinois was located in Lee County along the Green River. This area, known as Inlet Swamp, received its name from a series of limestone ledges called the "Inlet." The Inlet caused the waters of the Green River to fan out across the flat, broad valley, forming a two- to three-mile-wide wetland whose waters flowed toward the Rock River to the west. Combined with the Great Winnebago Swamp a few miles down stream, the Green River wet prairies and marshes exceeded 100,000 acres.

Pioneers attempted to cross these sites, only to find that the wheels of their heavy wagons sank deep into the saturated soil, leaving them hopelessly mired, or "sloughed." Before there were roads, pioneers had no choice but to travel through the wet prairies and risk being sloughed. When the Doan Family left Chicago for Lee County in May 1836, crossing the first seven miles of wet prairie proved to be the greatest hardship of their entire journey. Water six to 18 inches deep covered the landscape from horizon to horizon, and the wheels of the heavy wagon cut deep into the saturated soils. The Doans had to wade throughout the day to ease the load for the weary oxen and help push the wagon when it became mired. As the sun set on the first day, the family was only halfway through the vast wet prairie. Darkness brought a frog serenade, mosquito attacks, a cold supper and a troublesome attempt to sleep on the hard floorboards of the wagon. During later years, in an effort to keep their wagons from sinking into the wet soils, pioneers constructed corduroy roads (logs laid side by side) across wet prairie sites.

Black Soil Prairies

The wildflowers of the mesic prairies are white false indigo, smooth aster, Illinois tick trefoil, rattlesnake master, compass plant and showy goldenrod. Characteristic spring-blooming wildflowers are shooting

stars, hairy puccoon, downy phlox, spiderwort, prairie oxalis and prairie violet. All of these, with the exception of the puccoon, phlox and prairie violet, die and disappear after blooming.

Summer brings a continuous change of color from the purple coneflowers and blazing stars to the yellow coneflowers, rosinweeds, false sunflower, stiff tickseed, compass plants and the white rattlesnake master and flowering spurge. As one species is coming into bloom, the blossoms of another are fading away.

Autumn brings asters, goldenrods, and sunflowers. However, the late season blooming of the tall grasses, big bluestem and Indian grass, masks the flowering of some of these plants. Both of these grasses have the potential of reaching two or more yards in height, depending upon site conditions and precipitation. The densities of some species sometimes reach 10 or 15 individuals or more in an area one square yard in size. Prior to the breaking of the prairies, these floral displays were incredible sights that stretched from horizon to horizon.

Mesic prairie is known to have supported some very rare plant species, including Mead's milkweed and prairie white-fringed orchid. Mead's milkweed is currently known from just a few sites in extreme southern Illinois and is no longer present in any prairie remnant in the northern or central parts of the state. The last known plant of Mead's milkweed, a single plant that grew in a mesic prairie remnant along an abandoned railroad line in Ford County, was plowed and converted to row crop agriculture in the 1990s.

Most wet prairies were dominated by cord grass, or slough grass, a tall prairie species known for its long, narrow, sharp-edged leaves. Pioneers were not fond of this plant because the leaves scuffed their shoes and cut their clothing, hands and arms. Another common grass of wet prairies is bluejoint grass, as is tussock sedge, a plant that forms hummocks in the wetter parts of the prairie. Plants like white ladies' slipper orchid, wild blue iris (blue flag), swamp milkweed, swamp rose, Joe-Pye weed, flat top aster, seedbox and marsh fern are scattered throughout wet prairies. Goldenrods and asters appear in the fall.

Some wet prairies defied the odds and persisted despite valiant efforts to drain them. Matanzas Prairie in Mason County, the last wet prairie in the Illinois River Sand Area, has survived several attempts at drainage, including one that reversed the flow of water at the site. Today this wet prairie contains cord grass, bluejoint grass, anemone, turtlehead, wild blue iris, red osier dogwood, swamp rose, flat-top aster and tussock sedge. During the early spring, Illinois chorus frogs can be heard calling throughout the 100-acre site. Sedge wrens and common yellowthroats nest here, and the site is used extensively by migrating waterfowl.

Part of the Great Winnebago Swamp along the Green River also survived and is now the Green River State Fish and Wildlife Area in Lee County. The site boasts a spectacular series of prairie communities, including wet prairie that contains cord grass, bluejoint grass, cinnamon and royal ferns, prairie blazing stars and birds like swamp sparrows and yellow warblers.

Goose Lake Prairie in Grundy County survived drainage because of its large glacial rocks and bedrock relatively close to the surface. Goose Lake, the largest prairie preserve in Illinois, has extensive areas of cord grass and bluejoint grass. These prairies and the adjacent marshes support populations of birds like Virginia and sora rails, Bell's vireo, willow flycatcher and several waterfowl species.

Chauncey Marsh, a wet prairie and marsh site located in an old oxbow of the Embarrass River in Lawrence County, contains cord grass prairie that includes swamp milkweed, wild blue iris, cup plant and a large number of sedges. Red-winged blackbirds, ducks, rails and other birds inhabit the site.

Wet prairies contained vast numbers of wildlife, including ducks, geese, swans, prairie-chickens, sandhill cranes, herons, turtles and muskrats. Ducks were so common that they were considered a nuisance because they ate the grain in fields and feedlots.

Wet prairies have nearly disappeared from the state, but restoration efforts are underway at many sites to increase wet prairie acreage and to restore historic water levels. Prescribed burning, brush removal and plant and animal inventories are all part of these plans. It is now possible to view dramatic displays of prairie wildflowers at the Green River State Fish and Wildlife Area, and wet prairie plant species have returned to a 54-acre addition to Matanzas Prairie that was formerly cropland. Hundreds of acres of prairie have been restored at Goose Lake Prairie, and more are planned for Chauncey Marsh.

The wet prairies that remain provide valuable habitats for several different plant and animal species. The loss of this type of habitat corresponds with a precipitous decline in the populations of rails, sandhill cranes, Bell's vireos and plants like the white ladies' slipper orchid, American burnet, bunch flower and queen-of-the-prairie. These sites also provide food and resting areas for migrating songbirds, waterfowl and shorebirds, making wet prairies an important part of the natural heritage of Illinois.

Prairies in Floodplains

Most major river and creek system floodplains in the northern and western parts of Illinois contained considerable amounts of prairie. A study of the floodplain vegetation of the lower Illinois River and the adjacent Mississippi River floodplain indicates that 41 percent of the area was prairie. Scientists also described bottomland prairie along the Illinois River near Havana, but these prairies had been converted to agriculture by 1900. A few small remnants persisted until the 1970s.

The prairies along the Illinois River changed from wet, wet-mesic to mesic in response to the topography. The dominant plant in the wet portion of the prairie was cordgrass, a tall, coarse grass that spreads by rhizomes.

Sand and Gravel Prairies

Sand Prairies

Many residents of Illinois probably do not realize that sand prairies, complete with cacti, are present within the state. There are sand prairies associated with the sand deposits along the Green, Illinois, Kankakee and Mississippi Rivers and the shore of Lake Michigan. In many ways they are a "little bit of the west in Illinois." This statement refers to more than just sand. Many plants and animals present in the sand prairies of Illinois are western species. Scientists believe that the sand prairies, due to their aridity, have acted as refugia for these species, thus allowing them to persist in Illinois since the hot, dry period approximately 8,300 years ago.

Taken collectively, the sand areas represent about five percent of the total land surface of Illinois. They are all associated with glacial events, especially the Kankakee Torrent or great flood that took place about 14,500 years ago. The most extensive sand deposits are those along the Kankakee River in northeastern Illinois and the Illinois River in the central part of the state.

The topography within the sand regions is gently rolling, although some large sand dunes are present. The landscape of most areas has a characteristic dune and swale topography known as the Parkland formation. This dune and swale topography is thought to be due to strong winds that followed the deposition of sand by the Kankakee Torrent. Most soils contain a very high percentage of sand, like those from Mason County in the Illinois River Sand Area where the soils consist of about 95 percent sand, four percent silt, and one percent clay. Soil pH ranges from 5.1 to 5.3 from prairie to open forest, and soils are low in organic matter and nitrogen.

The sand is often 20 to 30 feet or more in depth, and precipitation moves very quickly through sandy soils. For this reason, little evidence remains of a summer thunderstorm only a few hours after it has ended. The hot sun and drying winds quickly remove moisture on the soil surface. Though it is very dry on the soil surface, there is a tremendous aquifer in the Illinois River Sand Area just a few feet below the surface. The depth of this aquifer from the soil surface rises and falls according to the amount of precipitation. During years with exceptionally high precipitation, such as 1993, the level of the aquifer rises, causing pooling of water in low-lying areas. This resulted in considerable local flooding in 1993.

The prairies within the sand areas also have areas of bare sand known as blowouts. These areas vary in size from a few feet to hundreds of feet or more. Quite often, an actively moving dune of nearly pure sand is associated with the blowout. The most spectacular of these are the dunes associated with the sand areas along Lake Michigan, although these dunes may not always be associated with prairie. Blowouts begin when the prairie vegetation is displaced, permitting wind to move the sand. Though the vegetation of blowouts is usually sparse, three-awn grass and the sand reed grass are often abundant at blowouts. Sand reed grass spreads by rhizomes and tends to be a stabilizer of actively moving sand.

During the 1930s when prolonged droughts characterized the weather, blowouts were even more common in the sand areas of Illinois. Strong winds caused sand to blow, creating sand storms in the sand areas. Residents tried to stop the blowing sand by planting pines or black locust.

One endangered plant species associated with a blowout is the silvery bladderpod, a yellow-flowered member of the mustard family that is known for its silvery leaves. This plant grows at one location in Illinois, the H. A. Gleason Nature Preserve in Mason County. It is a plant that is common in the western states. The closest population of this plant outside of Illinois is on the gravelly slopes of some hill prairies in Redwing, Minnesota.

The plant communities of sand deposits are very diverse and represent some of the most unusual natural areas in Illinois. Due to different geographical locations and developmental histories, each sand area supports a distinctive type of prairie vegetation compared to that of the other sand regions. Though sand forests, savannas and other prairie types are present, the most common vegetation within these areas was dry sand prairie. Certain plants, however, are characteristic of undisturbed dry sand prairies in all sand areas. One of the primary species is little bluestem, which is the dominant grass of prairies in the Green, Illinois, Mississippi and Kankakee River Sand Areas, and Lake Michigan. Most sand prairies also have prickly pear cactus, although some do not contain any cacti. Aside from some dry ledges along escarpments in southern Illinois and the bluffs of the Mississippi River, sand prairies are the only places in Illinois where cacti are common.

In dry sand prairies along the Mississippi River in Carroll, Jo Daviess and Whiteside counties, the common herbaceous plants are plains prickly pear, hairy panic grass, western ragweed, goat's rue and June grass. One major difference in the prairies of the Mississippi River compared to those of the Illinois

River is the presence of plains prickly pear cactus in the Mississippi River sand deposits compared to the eastern prickly pear in the Illinois River sands. However, some prairie remnants of the Mississippi River, such as Ayers Sand Prairie, do not contain any cacti. Instead, a small club moss grows among the clumps of grass.

A variety of prairie types are present along the Green River in northern Illinois in the area known as the Green River Lowlands. In the dry prairie of sandy ridges, the grasses little bluestem and prairie dropseed and wildflowers heath aster, pale purple coneflower and prairie coreopsis are common, contrasting sharply with dry sand prairies along the Illinois, Kankakee and Mississippi rivers that do not have any or very little heath aster, pale purple coneflower or prairie coreopsis. Cacti, commonly found in Illinois and Mississippi river dry sand prairies, are completely absent from the Green River sand prairies.

Mesic sand prairies occur on slopes of dunes or low-lying areas within the Green River lowland. The primary grasses are big bluestem and Indian grass, and the primary wildflowers are Canada and grass-leaved goldenrods, rigid sunflower and old-field cinquefoil. Mesic sand prairie was once a common community type within this sand region before the conversion of the region to row crop agriculture.

The dry sand prairies of the Illinois River are dominated by little bluestem along with goat's-rue, eastern prickly pear, western ragweed and hairy panic grass. Other common species of these prairies are *Leptoloma cognatum* and sand reed grass. Sand reed grass is especially common in areas of actively moving sand because of little competition and its rhizomatous growth habit that make it ideal for stabilizing the moving sand. Sand love grass is also present in these prairies, but it is most abundant in disturbed sites such as abandoned agricultural fields. Another short grass, hairy grama, is sometimes locally abundant, especially in areas of actively moving sand.

The sand areas along the Kankakee River in northeastern Illinois contain a variety of plant species that are found just within this natural division. Among these species are sweet fern, shore St. John's wort, Carey's smartweed, bristly blackberry and primrose violet. Populations of yellow wild indigo and Muhlenberg's nut rush were recently discovered in this region of Illinois. Both plants were formerly thought to be extirpated from the state.

Though not a common community, shrub prairies are present within the Kankakee River Sand Area. Due to invasion by other woody plants, shrub prairies have become very rare in Illinois. The shrubs hardhack and raspberry are present along with herbaceous plants such as tussock sedge, grass-leaved goldenrod, little bluestem and rough blazing star.

Both wet-mesic and dry-mesic prairies are present in the Kankakee Sand Areas. Grass-leaved goldenrod and Indian grass are present in these communities. Little bluestem is a dominant in the dry-mesic sand prairies, and aster is common in the dry-mesic sand prairies.

Though not restricted to sand prairies, the plains pocket gopher is a common animal in the sand areas. Its characteristic mounds are often seen in the open prairies. A small lizard, the six-lined racerunner, also lives in the sand prairies. The lark sparrow, a ground-nesting bird, nests almost exclusively within the sand areas. Badgers live in some of the sand areas. Their favorite prey is the plains pocket gopher.

Gravel Prairies

The east bluff line of the Rock River valley in Winnebago County, extending from the Wisconsin border to the Kishwaukee River, consists of an interrupted series of gravel hills. Gravel deposits are also present

along the Illinois River and in kames and eskers in northeastern Illinois. Theses formations are due to the glacial meltwaters from the Wisconsinan glaciation. A unique prairie flora developed on these sites.

The primary species of these prairies are little bluestem, prairie dropseed, sideoats grama and June grass. The prominent wildflower is the pasque flower, along with leadplant, compass plant, pale penstemon, blazing stars, prairie smoke, wormwood, stiff coreopsis and *Potentilla arguta*.

Due to the high demand for gravel for road surfaces, most of these deposits have been mined and the prairie has been destroyed. However, some examples remain in the northern part of the state that provide a fairly good representation of their flora.

Dolomite Prairies

This variation of tallgrass prairie is present in northern Illinois where dolomite bedrock is close to the surface. Sometimes the topsoil that overlies the dolomite is only two feet thick. The shallowness prohibits the growth of deep-rooted plants that are typical of black soil prairies in central Illinois.

The lack of a deep soil layer affects plant growth and distribution. Though dolomite prairies can be wet in the spring, they often become very dry in the summer months. This dramatic change causes vegetation to be sparsely distributed and considerably reduced in height compared to sites with deeper soils. Plants that would normally be six to eight feet tall in the black soil prairies are half this height in dolomite prairies.

This thin layer of soil, due to the proximity of dolomite, contains a high percentage of magnesium, an important nutrient for plant growth. The soils of dolomite prairies are alkaline in nature, permitting the growth of calcium-loving plants, including leafy prairie clover and Butler's quillwort.

Based upon moisture, five different types of dolomite prairie are present in Illinois, ranging from dry to wet. The dry prairies occupy the higher ground while the wet prairies are present in the depressions. Prairie satin grass is a common component of the dry prairie sites. The primary grasses of the prairies with intermediate moisture levels are big bluestem, Indian grass, porcupine grass and prairie dropseed. Slender sandwort is a common wildflower in these prairies. The wetter dolomite prairie areas contain tufted hair grass, prairie cord grass, blue-joint grass, Riddell's goldenrod and swamp milkweed.

It was the presence of bedrock near the soil surface that saved the dolomite prairies. They occur within four natural divisions in northern Illinois. These include the Driftless Division, Rock River Hill Country, Northeastern Morainal Division, and the Grand Prairie Division.

Restored populations of Lakeside daisy, a federally threatened and state endangered plant species, are present in dolomite prairie remnants in northeastern Illinois. The calcareous seeps wiithin these prairies also support populations of the Hine's emerald dragonfly, a state and federally endangered insect known to occur only in these alkaline seeps.

Hill Prairies

Loess Hill Prairies

The sunny, windswept bluff slopes along major rivers in Illinois contain small treeless areas in the midst of forest. These distinctive grassy sites, once common in Illinois in the 19th century, are known as hill or "goat prairies." The most abundant are those associated with loess deposits on the bluffs of the Illinois,

Mississippi and Sangamon rivers and their tributaries. Due to their inaccessible location, many are relatively undisturbed and represent some of the best prairie remnants in Illinois.

Due to their steep topography and poor, highly erodible soils, most hill prairies were never plowed. However, most have a long history of grazing, often resulting in the development of well-defined "grazing terraces." Many overgrazed prairies characterize the bluff line of the Illinois, Mississippi and Sangamon rivers. Sometimes the grazing has been so intense that some hill prairies support very little native prairie vegetation.

The presence of deep loess deposits near major rivers is associated with the glacial history of Illinois. In addition to the sand and gravel carried by floodwaters, a fine "rock flour" or silt was also carried downstream. A thick layer of "mud" was left in the river bottoms once the water receded. Once this material dried, strong westerly winds carried it out of the bottoms and onto the uplands. The depth of loess on the soil surface tends to decrease eastward away from the rivers on the western side of Illinois.

Loess is especially thick along the Illinois and Mississippi rivers where it may reach depths of 25 feet or more. One of the best-known deposits of loess in the world is present in the Mississippi River valley of Illinois. Loess is generally calcareous, and oddly shaped nodules of calcium carbonate are present in the soil. These are often visible on the surface of the loess, or only a few inches below the surface.

The type of bedrock underlying most hill prairies in Illinois is limestone, dolomite, sandstone or shale. The bedrock often forms outcrops below the loess cap, forming a ledge along a steep bluff that sometimes is 200 feet above the floodplain. The slope below this bluff may consist of broken rocks or talus. Elsewhere, the bedrock may be completely concealed by loess or other materials.

The height of the bluffs may influence the development and persistence of hill prairies. Along the Mississippi River in Calhoun, Monroe, Pike and Randolph counties, the bluffs rise 220 to 340 feet above the floodplain. There are numerous hill prairies along the bluffs in these counties compared to none north of Quincy in Adams County where the bluffs are approximately 100 feet in height. The additional height may provide additional exposure, resulting in conditions favoring prairie vegetation.

Exposure has undoubtedly played a major role in the persistence of hill prairies. Hill prairies are most abundant in Illinois at locations on bluffs that border a wide, flat floodplain where the winds can blow without hindrance. During summer months, high temperatures and low humidity are conditions present on the southwest or west-facing hill prairies, resulting in a high evaporation rate that favors drought-resistant prairie plants.

The most common type of hill prairie in Illinois is loess hill prairie. The location of the loess deposits on high bluffs, and their southwest exposure makes these sites ideal for the development of prairie. Loess is also drouthy and poor in nutrients. The greatest concentration of loess hill prairies is in Pike County along the high bluffs of the Mississippi River. Compared to black soil or sand prairies, practically no attention was given to these sites by pioneers. The Government Land Office Surveyors usually characterized sites located on hilly land with a few scattered trees as forest. However, the prominence of hill prairies on the bluffs did not go unnoticed by early French settlers, causing them to name villages after specific sites, like Prairie du Rocher (Prairie of the Rock) and Prairie du Pont, now known as Dupo. In the 1860s, state geologist Amos Worthen discussed grass-covered loess knobs in his report on the geology of Greene and Scott counties. A few scientists briefly described hill prairies in the early 1900s, but the most comprehensive study of hill prairies was not completed until the early 1950s. This

publication, *Hill Prairies of Illinois,* by R. A. Evers, is still the most comprehensive work on the hill prairies of Illinois.

Hill prairie openings are usually small, and most are less than two acres in size. The vegetation consists of prairie grasses and wildflowers. All of these plant species require full to nearly full sunlight to survive. Although hill prairies are regarded as unique communities, few plant species are unique to hill prairies. The grasses of hill prairies are bunch grasses as in our other prairies.

The most common grass of hill prairies is little bluestem. This is especially true on drier, more exposed slopes. Another common grass, found in hill prairies along the western border of Illinois, is side-oats grama grass, a very short grass known for its spectacular orange stamens when in flower. More mesic or wetter sites lower on slopes of hill prairies are likely to have big bluestem or Indian grass. Sometimes these two larger grasses are mixed with little bluestem.

Hill prairies contain an assortment of wildflowers, including scurf pea, pale purple coneflower, bluets and purple prairie clover. Other common hill prairie wildflowers include leadplant, showy goldenrod and white prairie clover.

A seasonal aspect occurs with progression of flowering from one species to another throughout the growing season. Spring is characterized by the yellow flowers of hoary puccoon, the violet-colored flowers of violet wood sorrel, the white flowers of pale penstemon and the blue flowers of Ohio spiderwort. Summer months bring pale purple coneflower, scurf pea, purple prairie clover and white prairie clover, and fall blooms include the flowers of showy goldenrod, rigid goldenrod and several species of aster. Little bluestem turns a deep bronze color in the fall, creating a very lovely aspect in combination with the wildflowers.

Besides loess, hill prairies are found on a variety of substrates, including glacial till, sand and gravel. These substrates tend to be drouthy and nutrient-poor and have a south- or southwest-facing aspect that exposes them to the hot, dry winds of summer. Hill prairies are not present on the northeast facing slopes of bluffs. These sites are usually characterized by forest vegetation.

Hill prairies were once part of a prairie continuum along many of the major rivers. The bottomlands of major streams contained considerable amounts of wet prairie. Going from the stream toward the bluffs, elevation and soil moisture levels gradually changed. Wet prairie changed to mesic prairie and eventually to hill prairie vegetation. There is no place in Illinois where this prairie continuum still exists.

Glacial Drift Hill Prairies

Glacial drift hill prairies are uncommon in Illinois. These small prairie openings are restricted to glacial drift on bluffs of the upper Illinois, Middle Fork of the Vermilion and Embarras rivers plus tributaries of Macoupin Creek in Macoupin County in the central and eastern part of the state. Their small size and their location within forest have made their permanence questionable. Some scientists believe that these hill prairies are short-lived communities under the current land use practices of most landowners.

The glacial drift is of Illinoian and Wisconsin age, and the soils comprising these sites are often rocky and nutrient poor with little organic matter. Rocks, ranging from less than an inch to six or more inches in diameter, are present in the till. The soils often contain clay, causing them to become very dry and hard during times of drought.

Glacial drift hill prairies have a south- or southwest-facing aspect. Most of these prairies are located on steep bluffs associated with a river. Sometimes the steepness of bluffs contributes to slumping, a phenomenon that appears to help maintain these prairie communities at some sites. The slumping often occurs after periods of high precipitation. Slumping is characteristic of hill prairie communities located along the Embarras and Middle Fork of the Vermilion rivers.

The glacial drift hill prairies along the tributaries of Macoupin Creek in Macoupin County are dominated by big and little bluestem. The common wildflowers are pale purple coneflower, drooping yellow coneflower, field goldenrod and purple prairie clover. Nearly all populations of the state-endangered large ground plum are known from Macoupin County. Only one other plant of this species is known to occur in Illinois outside of Macoupin County.

Rare Plants of Hill Prairies

Three plant species appear to be restricted to hill prairies, including stickleaf, narrow-leaved milkweed and Missouri coneflower. All populations of these plants are present on the hill prairies and rock ledges along the Mississippi River on the western border of Illinois. All other plant species present in hill prairies are also present in other types of prairies.

Animals of Hill Prairies

No bird or mammal species is known to be restricted to hill prairies.

Loss of Hill Prairies

The majority of hill prairies in Illinois are decreasing in size. Active management and use of prescribed fire do not ensure a reversal of this trend. It may be that the prescribed fires are too infrequent and of too low an intensity to make a difference. Brush-cutting may temporarily remove shrubs and other woody invasion, but they return quickly if sprouting is not controlled with fire or herbicides.

One of the primary invaders of hill prairies is rough-leaved dogwood, a shrub that forms a dense zone around the periphery of the prairie. The presence of the shrub zone creates increased shade, competition and humidity, causing diminished vigor of herbaceous prairie species. Left unchecked, the shrub zone continues to advance upon the prairie.

Future management for hill prairies must consider the landscape context of these sites. Many hill prairies are small openings located on hillsides in the midst of forest. Sites like these are highly vulnerable to invasion by woody plants because they experience diminished sunlight and wind action and increased humidity and shade due to the presence of trees. Both brush clearing and prescribed burning should be implemented using procedures that will increase air movement and sunlight.

Prairie Fauna

The prairies of Illinois were once very wet. The large expanses of prairie provided habitat for unfathomable numbers of animals, including insects, such as bees, wasps, ants, butterflies, crickets, grasshoppers, beetles, bugs, flies, gnats, mosquitoes and an assortment of others. Some insects were so numerous that their wing beats created a constant humming sound. Added to the sounds of the insects was the chirping and singing of birds such as song sparrows, meadowlarks, prairie chickens, dickcissels, ducks and geese.

No comprehensive list exists for the wildlife of the prairies. Like the plant *Thismia americana*, it is likely that many insects and other organisms were driven to extinction as the prairie disappeared. The

following list provides information about some of the prairie fauna. It is not a complete list. The animals listed include only those that we know are still present in Illinois, except where noted.

Insects

The prairie cicada is an insect that is now rare in Illinois due to the small amount of remnant prairie. Like other cicadas, it lives most of its life underground where it feeds on juices obtained from roots of plants.

Prairie walking sticks are known from only one locality in Illinois, a hill prairie in the central part of the state. This insect is much more common in some of the western states and is an example of how some western insects have persisted in Illinois in prairie remnants.

The painted lady is a small butterfly that migrates into Illinois each year because its life stages are not capable of surviving an Illinois winter. The southern states with their warmer temperatures serve as refugia for these insects. When spring arrives, adults begin to disperse northward where they recolonize suitable landscapes.

The silver-bordered fritillary is a butterfly found mostly in the northern half of the state. Its larval host plants are violets. The loss of open woodland coupled with competition from invasive exotic species, such as garlic mustard, have combined to reduce violet populations and thus decrease the number of these butterflies that live in the state.

The regal fritillary is a large, distinctive butterfly known for its strong flight. It has been declining throughout its range during the last few decades but is still found in sandy regions in the northern third of Illinois where its larval host plants are violets. Recent studies have demonstrated that regal fritillary larvae have switched to an annual violet species typical of disturbed sites instead of perennial violet species. The reason for this shift in food seems to be the decline of perennial violet populations.

Mammals

Franklin's ground squirrel is a small mammal that is present in tall, dense prairie. It has a solid gray coat. This animal makes a distinctive whistling noise. Franklin's ground squirrel has been declining in recent years, apparently due to the lack of suitable habitat or the effects of habitat fragmentation.

Badgers are carnivorous animals. They dig several entrances to their burrow that may be present along roads, railroads or in grasslands within former prairie regions. Their favorite prey in sand prairies is the plains pocket gopher, so sites that have high densities of pocket gophers are also likely to have badgers. The strong legs and sharp claws of badgers enable them to dig very quickly.

The plains pocket gopher spends most of its life underground where it feeds on the roots of plants. These mammals are especially common in sand regions where their small, circular mounds are highly visible.

Meadow jumping mice are commonly found in tallgrass prairie remnants. They feed on seeds and other vegetation. Some sources state that they are capable of jumping 10 feet with one leap. They hibernate below ground during winter, sometimes as far as two feet below the soil surface.

The prairie white-footed mouse is a common small mammal in mesic, black soil and sand prairies. It feeds primarily on vegetation, such as seeds and fruits. It may utilize holes created by other animals for nesting or nest in a log near the prairie.

Prairie voles are also common in mesic prairie communities. They feed primarily on vegetation, including grass and weed seeds. They develop paths, or runs, that they travel throughout the day.

Reptiles and Amphibians

The coachwhip snake is known from a single population in southwestern Illinois where it inhabits hill prairies.

Bullsnakes live in sand prairies and old fields in the former prairie regions of Illinois. They feed extensively on small mammals and greatly reduce mice populations in the vicinity of farmsteads.

The prairie kingsnake is common in the southern half of Illinois where it may be found in prairie remnants or grassy fields. It feeds on small mammals, birds, frogs, reptiles and insects.

The Illinois mud turtle spends most of the year underground feeding on plant parts. Its original habitat in the sand areas along the Green and Illinois rivers has been destroyed. The adults move to temporary or permanent ponds in spring or early summer to breed.

The western hog-nosed snake is restricted mostly to the sand deposits along the Illinois and Mississippi rivers.

The lined snake is found in former prairie areas in the central part of the state. It lives underground much of the time and feeds almost exclusively on earthworms.

The massasauga rattlesnake is a medium-sized snake that was once common in wet prairies and marshes prior to the drainage and cultivation of these sites. It is now known from only a few locations in the state.

Six-lined racerunners are lizards that are common in the sand prairies of Illinois. They feed on insects and snails and are known for their speed.

The Illinois chorus frog is a subspecies of Strecker's chorus frog that is known from sand areas along the Illinois River. It spends much of its life underground, emerging in spring following heavy rains to breed in flooded fields and vernal pools

Birds

The greater prairie-chicken is one of the most symbolic animals of the tallgrass prairie. During the 1800s, market hunters harvested tens of thousands of these birds and shipped them to cities as far away as Boston and New York. Hunting for prairie-chickens was stopped in 1933 when the population within Illinois declined to an estimated 25,000 birds. Though land was purchased hoping to sustain their numbers, the population continued to decline. A small number of these birds exist in Jasper and Marion counties in the southeastern part of the state. The decline of the prairie-chicken was attributed to habitat loss, but late burning of the prairies when the hens were nesting killed many and certainly contributed to the overall decline. More recently, the introduction of ring-necked pheasants has created problems. Pheasants lay their eggs in the nest of prairie-chickens, a habit called nest parasitism. Because pheasant eggs require a shorter incubation period compared to those of the prairie-chicken, the pheasant eggs hatch first, and the prairie-chicken hens abandon their eggs to raise the young pheasants. Due to the small population size, the gene pool is not very diverse which has led to problems in hatching

prairie-chicken eggs. Greater prairie-chickens were imported from other states about 20 years ago to try to increase genetic diversity and stabilize the population. Recent factors, such as drought and hail storms, have caused further declines.

The lark sparrow is a ground-nesting species common in the sand prairies of Illinois where it nests in clumps of little bluestem.

Northern harriers are known for their low flights over grassy fields as they hunt for mice and small birds. These raptors are known to nest on the ground in tall grasses such as big bluestem.

The dickcissel is a small, sparrow-sized bird that is a distinctive grassland species. It is found throughout the former prairie regions of Illinois where it nests in grassy waterways, roadsides or old weedy fields.

The eastern meadowlark is a yellow-breasted bird with a black "V" at the top of its breast. Once widely distributed throughout the former prairie regions, it is now present in old fields or strips of grasses along roads where its distinctive call can be heard during the summer months.

Western meadowlarks are also present in Illinois, but they are so similar in appearance to the eastern meadowlark that identification is sometimes difficult. One of the best ways to distinguish the two species is by their songs. Western meadowlarks are frequently found in the sand areas along the Illinois and upper Mississippi rivers.

Upland sandpipers are one of the few shorebirds that make their home on the prairie. Upland sandpipers require a minimum area of 40 acres in order to forage for food and establish nesting territories.

Short-eared owls are known for their butterfly-like flights over open country at dusk or dawn. They may also be active during the day, especially if the day is cloudy. They often roost in grassy fields or occasionally in pine trees.

Grasshopper sparrows have a high-pitched "buzzing" voice. These birds prefer open prairies or open, disturbed sites.

Extirpated Fauna

In Illinois elk were regarded as animals of the prairies. Elk were hunted for their meat and furs during the 1700s. By the early 1800s, elk were very scarce in Illinois. By 1818 no elk existed east of the Illinois River. The last elk were probably extirpated from the state by 1830.

American Bison

The following article by William McClain is a history of the bison in Illinois. This information was gleaned from pioneer accounts and was published in *Illinois Steward* magazine.

On the Buffalo Trail, a Story of the Bison in Illinois

The American bison is the greatest symbol of the once expansive North American prairie. They are revered by native cultures, and are the topics of legend and lore for others. Known for their great endurance and strength, their large roaming herds have long created awe and fascination. More than

anything else, they are the ultimate images of freedom on the prairies. Perhaps it is this freedom that appeals to the multitudes of today.
The first Europeans to observe bison in Illinois were the French explorers Marquette and Joliet. In their travel down the Mississippi River in 1673, they observed an abundance of bison in the vicinity of present day Rock Island. In 1680, Marquette wrote that the "Illinois country is alive with buffalo, snorting, wading, wallowing, and winding their way in long files" across the landscape.

Although buffalo appear to be abundant in Illinois in the late 1600s, some archeological studies have suggested that bison were not present in Illinois until a few centuries before the arrival of the French. Their advance eastward at this time was thought to be due to reduced hunting pressures in the west where smallpox had reduced native populations. Although they may have been present in Illinois only a short time, the Indians in Illinois had a well-developed procedure for hunting these large animals when the French arrived in the late 1600s.

Father Louis Hennepin, a priest on the Marquette and Joliet expedition, described the use of ring fires by Indians in hunting the bison. This type of hunting was done in the fall of the year by surrounding the bison and firing the grass, except for a passage that they intentionally left unburned. They waited in ambush for them at this passage, and would sometimes kill as many as 120 in a day.

Hunting bison was not without its dangers. Bison are large, powerful, and fast-moving animals. Cows often weigh 1,000 pounds, and it is common for bulls to weigh 2,000 pounds or more. With their size, strength, speed, and endurance, they command respect at all times. When wounded, they seethe with anger and attack their tormentors with unrelenting fury. When horses were used in hunts, bull bison could sense when a horse was tiring, then flank the horse and rider and gore the horse in the side.

During the hunts, not all bison hit by a spear, arrow, or rifle slug were killed. Though mortally wounded, some managed to run off far from the hunt to die. Most superficial wounds healed, but arrow or spear points that hit bone sometimes became permanently lodged. With time, bone tissue grew over the point. Wounds such as this likely caused continuous pain, and sometimes infection killed the animal.

Once the hunt was over, many parts of the bison were used by the Indians, including the hide, wool or fur, meat, and even the bones. The meat was removed from the bones, cut into strips, and smoked over a fire to create a jerky that would resist spoilage. Pierre Liette, a Frenchman who accompanied the Illinois Indians on some hunts, remarked that there was "no shortage of wood for the Illinois to smoke the buffalo meat."

The year of their first observation in 1673 was also the beginning of change for the bison population of Illinois. Native cultures used the bison as a source of meat and clothing, but the French saw their fur and hides as a source of revenue. Within a few years, large French hunting parties were roaming the grasslands along the Wabash, Cumberland, and Tennessee Rivers in search of bison. These hunters as well as the Indians were encouraged to kill as many buffalo as they could.

La Salle, who was much involved in the fur trade, urged the French hunters to get as many buffalo hides as possible. By 1682, buffalo hides were said to be available in great quantities. Father Charlevoix stated that the buffalo hides from Illinois made the finest skins in all of America. In 1694, Henri de Tonty, who was also involved in the fur business, remarked that there were innumerable buffalo hides. By 1703, La Mothe Cadillac wrote that trade in buffalo hides was about to be abandoned because they were so numerous that their value was very low.

To accommodate the growing buffalo hide business, a tannery was built by a Frenchman named Juchereau in 1702 along the Ohio at a location considered to be near the mouth of the Cache near the present site of Mound City. Although the exact number of hides processed by this tannery is unknown, at least eight thousand and as many as fifteen thousand hides were collected in the year 1703 from an area thought to be within 100 miles of the tannery. The hides never made the voyage to France. Some were stolen and the others became infested with insects or rot. The year 1703 would also mark the end of the tannery due to the death of its owner, Juchereau.

Throughout the early- to mid-1700s, the French fur business continued and hunting parties roamed the vast prairies in search of bison. Despite the hunting pressures, the bison populations were said to be plentiful throughout these decades, especially in the interior of the state. In 1778, George Rogers Clark and his army marched their way to Kaskaskia and encountered a prairie where grazing bison dotted the landscape.

Early writings describe buffalo trails that lead to water or shade, but especially to salt licks. In southern Illinois, government surveyors and early writers described the trails leading to Half Moon Lick and Lower Lick south of Equality in Gallatin County, and to the Au Vase Lick along the Big Muddy River in Jackson County. Half Moon Lick, so named because of its horseshoe shape, was the largest salt lick in Illinois. When measured around the year 1800, it was a depression approximately 200 yards wide, 250 yards long, and 12 to 16 feet deep that was nearly devoid of vegetation. Deep, heavily trodden buffalo trails descended into the lick.

The path taken by Clark was along the Buffalo Trace, a buffalo trail leading from the Falls of the Ohio at New Albany northward through southern Indiana to a ford on the Wabash south of Vincennes, then across southern Illinois to Kaskaskia. This trace had been used as a travel route since the Revolutionary War, but even then people weren't the only travelers. In July of 1787, Joseph Buell and his party, while traveling south toward the Falls of the Ohio, encountered five buffalo moving north along the trail. The buffalo, which wouldn't budge off the trail, attempted to pass through the party, alarming the people and causing the men to shoot and kill three of them. In October of the same year, general Josiah Harmar reported great quantities of buffalo along the trail at French Lick in southern Indiana. In 1792, another traveler named Heckwelder killed an 800-pound buffalo and wrote that a herd of buffalo "bore down on them" along the trail in the vicinity of French Lick. Because the Buffalo Trace was such an important and historically significant route, government surveyor William Rector was commissioned in 1805 to describe and map the trail through southern Indiana.

The "old timers" stated that the buffalo made both spring and fall migrations along the Buffalo Trace. During the fall, the immense prairies of Illinois were often burned by the Indians, leaving little edible forage. As the weather grew colder, the warmer temperatures of Kentucky and southern Illinois would have been attractive to buffalo, but the large salt licks and extensive canebrakes would have been greater attractions. Kentucky also had an abundance of buffalo clovers, two plant species thought to be closely associated with these animals. These plants were so common that Simon Girty described Kentucky as the "land of cane and clover" in 1782. The strong attraction of bison to cane was committed to words of an old song of the time: "Then we'll rally 'round the canebrake and chase the buffalo."

By the late 1700s, buffalo were becoming scarce in Illinois. Travelers passing along the old Buffalo Trace in southern Illinois in 1795 remarked that they saw no buffalo. Only five years earlier, buffalo were said to be numerous throughout the prairies along this route. The decade of the1790s seems to be when the

decline of the buffalo became apparent in Illinois. Individuals or small herds of bison were seen after 1800, but they were mostly in the northern part of the state.

In 1831, a single bull bison was seen near Dad Joe's Grove near the Green River. Some men grasped their guns and took off in hot pursuit. Although they fired at the beast several times, it made its escape and was never seen again. Samuel Aimes killed the last buffalo known from Illinois in the vicinity of Troy Grove in 1837. Although the literature does not describe any danger presented by either of these two animals, there seems to be some sort of unwarranted pride and notoriety in man for killing the last individual of an animal such as the buffalo.

In 1841, William Oliver wrote that the bison was gone from Illinois, but their trails were still plainly visible. Some individuals explained their absence by stating that it was the nature of the buffalo and other wild creatures to recede from the advance of civilization. Others believed that the bison had been driven across the Mississippi River due to competition with bell-toting cattle. Still others believed that they were timid animals that were not fond of people. They had merely moved north into the large prairies where there were no settlements.

Other writers insisted that the disappearance of the bison was due to the severe winter of 1763. As evidenced by the winter of the deep snow of 1830-31 when large numbers of deer perished, severe winters with exceptionally heavy snowfalls probably did cause the loss of large numbers of bison. However, other authors continued to describe the abundance of bison in Illinois until about 1790, thirty years after the severe winter. A far more plausible explanation for the disappearance of bison from Illinois was extermination.

The plight of the bison was well known in Washington, and two individuals with ties to Illinois, Congressman Greenburg Fort and President Ulysses S. Grant figured prominently in the efforts to save the buffalo. It was Fort that introduced a bill for their protection, and it passed both the House and the Senate. However, Grant refused to sign the bill to make their protection a law. Undaunted, Fort tried again in the next legislative session, but this time the bill failed to be advanced out of a senate committee.

In the 1880s, both the Smithsonian Institution and the American Museum of Natural History sent expeditions to the west in search of bison, hoping to kill several for use in displays at both museums. They searched several states, managing to find only a few individuals. Unlike Illinois some 50 years earlier, there were no theories advanced to explain their disappearance. There were still plenty of men around that were still bragging about killing 75 or 80 animals with their buffalo guns without having to change their location.

By this time the Illinois landscape of the 1800s was no longer a place where large, free ranging animals such as the buffalo could exist. The prairie was gone, and roads and fences were present everywhere. In southern Illinois, Half Moon Lick had been modified for salt production, and the extensive canebrakes had been cleared. The route of the Buffalo Trace through southern Indiana became a highway, and the Falls of the Ohio would be blasted out for a navigation channel. The buffalo clovers of the bluegrass and barrens areas of Kentucky became very rare, and running buffalo clover was once thought to be perilously close to extinction. So was the buffalo.

Although their populations were estimated at more than 60 million individuals prior to 1800, they began to decline rapidly following the arrival of European settlers. Their numbers dropped to 20 million in

1850, 15 million in 1865, 1 million in 1875, 395,000 in 1880, 20,000 in 1885, and less than 1,000 in 1895. It is no wonder that they were nearly exterminated. The bison had many things that people wanted: first their meat, then their fur and hides, then their bones, but most of all, the land where they roamed. They were said to be easy to kill. Find and shoot the leader of the herd, and the rest of the animals wouldn't move. The animals had always relied upon the leader for direction and the herd for safety. The reports of rifles weren't something that they associated with danger. Even if they had recognized the danger, where would they hide on the vast, open prairies?

Hunters continued to roam the prairies, relentlessly searching for bison. By the late 1890s, this great symbol of the North American prairies was about to silently slip into extinction. Then help came from an unlikely source, a Scotsman named James "Scotty" Phillips. Phillips located and bought bison and began to assemble a herd. His efforts did not go unnoticed, and in 1906, the U. S. Government rented 3,500 acres of land to him for the purpose of maintaining his herd. This landmark event was the first action by the U.S. Government directed toward preventing the extinction of a species. Phillips' small herd continued to increase, eventually forming the nucleus of the herds at Yellowstone National Park and other sites. Without the conservation actions of Phillips, past, present, and future generations may have had only a few books, photographs, and an even fewer number of buffalo robes, skulls, and horns, lying about museums and libraries throughout the world, for use as resources to learn about the once immense bison herds. Without the intervention of Phillips, there would have been a great void on the North American prairies, and a nearly deafening silence where the herds used to pass.

The tiny herd was allowed to roam free and increase. Earlier, several individuals had attempted to domesticate the bison, but most people quickly gave up working with the animals. They said the bison were stubborn and slow to learn. Perhaps centuries of roaming free on the prairies had made them this way. It is proper that they were never truly domesticated. It would seem a most humiliating fate for the bison to be wearing bells, walking about small pastures, or herded from the fields to the barn.