NATURAL DIVISIONS

Based upon bedrock geology, glaciation, soils, climate and plant and animal distribution, Illinois can be divided into 14 natural regions and 33 distinct sections. From north to south, Illinois is more than 400 miles long. Throughout the 400 miles there is considerable variation in climate, topography and soils. The southern tip of Illinois contains cypress swamps like those of southern states. Bogs and other wetlands similar to those in Minnesota and Michigan are present in northeastern Illinois. Different types of prairie and forest remnants are present throughout much of the state.

Prairies were known from all but 8 of the 102 counties in Illinois, although the prairies were small in the southern part of the state compared to those of the north.

The landscape of Illinois once consisted of approximately 22 million acres of prairie and 14 million acres of forest. Prairies were largely restricted to the northern two-thirds of the state while forests were predominant along major streams and in the hill country of southern Illinois. In central Illinois, prairies were so prevalent that scattered wooded sites, known as "prairie groves," were the only sources of wood.

Included in the 22 million acres of prairie were mesic, black soil prairies, sand prairies and dolomite prairies. Of these, the black soil prairies were the most abundant, occurring in north-central, central and south-central Illinois. Sand prairies were present along the Mississippi, Illinois, Green and Kankakee rivers and along Lake Michigan while dolomite prairies were present in northern Illinois. Loess and glacial drift hill prairies were present along the south-facing bluffs of the major rivers, especially the Mississippi and the Illinois River systems.

The prairies of the Driftless Section in northwestern Illinois contain plant species of the northern Great Plains, such as pasque flower, plains buttercup and June grass. The sand prairies of the Illinois River and Mississippi River Sand Areas contain plants typical of the western plains, including prickly pear cactus, hairy grama grass, sand love grass (*Eragrostis trichodes*), silvery bladderpod and Patterson’s bindweed. Two plant species are largely restricted to the Western Forest-Prairie Division; the prairie trout lily (*Erythronium mesochoreum*) in the Carlinville Section and bunch flower (*Melanthium virginianum*) in the Galesburg Sections. Stickleaf (*Mentezelia oligiosperma*), a distinctive western plant, is present in the hill prairies of the Middle Mississippi Border Division.

GEOLOGY

Geologic evidence indicates that four glacial advances have occurred on what is now the state of Illinois. In order of occurrence, they were the Nebraskan, Kansan, Illinoian and Wisconsinan glacial epochs. The two most recent glacial advances, the Illinoian and Wisconsinan, are largely responsible for the uniform flatness that now characterizes much of the state. At the end of the Illinoian glaciation, only extreme northwestern and southern Illinois plus Calhoun County and portions of Pike, Jersey, Monroe and Randolph counties were left unglaciated. The glacier advanced to a site near the present

city of Carbondale, the southernmost point of glaciation in the northern hemisphere. The southern half of the state that was covered by the Illinoian glaciation is known as the southern till plain.

About 15,000 years ago the ice from the Wisconsinan glaciation covered most of the northern and east-central parts of the state. It is this glaciation that was responsible for the system of moraines in east central and northeastern Illinois. The area occupied by the Wisconsinan ice sheet corresponds to what would later become the Grand Prairie. This was the first major expanse of grassland encountered by the settlers after leaving the heavily forested areas of the eastern states.

About 12,000 years ago, the climate became warmer, and the glaciers began to melt and retreat, forming very large glacial lakes. Several of these were contained by moraines near the present site of the city of Kankakee. As the glaciers continued to melt, the water eventually cut through the moraines and cascaded down what is now the Illinois River valley, resulting in a huge flood known today as the Kankakee Torrent (Willman and Frye 1970).

The waters of the Kankakee Torrent carried tremendous volumes of sand and gravel downstream to the "Big Bend" at Hennepin where the river channel is narrow and entrenched in bedrock. Below Hennepin, where the river valley widens, the water lost its velocity, and the sand and gravel was deposited. Other major sand deposits in Illinois may be found along the Mississippi, Kankakee and Green Rivers, and along the shores of Lake Michigan. As these sand deposits dried, they ere exposed to wind action, resulting in large sand dunes. On these sands deposits a truly unique ecosystem developed in Illinois, the sand prairies.

SOILS

Over 600 soil types are known from Illinois, and most of these have developed from windblown silt which overlies glacial till. The windblown silt of loess was deposited during times of glacial retreat. The most recent soils are associated with the area of Wisconsinan glaciation. The soils of southern Illinois, on the area of Illinoian glaciation, are considerably older.

Mollisols, the dark-colored soils that developed under prairie vegetation, occur mostly in the northern half or two-thirds of Illinois. These thick, dark soils were formed by the decomposition of vegetation that consisted mostly of prairie grasses and wildflowers. To be classified as a mollisol, soils must have a dark surface layer at least 10 inches thick, and an organic content greater than one percent. Mollisols occupy approximately 49 percent of the state (Fehrenbacher 1967).

The other major soil group in Illinois, the alfisols, are the light-colored soils that developed under forest vegetation. The largest contiguous area of alfisols is the Southern Till Plain in the southern third of the state. These soils are less fertile than the mollisols, and large areas of Southern Till Plain were occupied by slow-growing post oak

flatwoods. Approximately 46 percent of the state is occupied by alfisols (Fehrenbacher 1967).

Another soil group in Illinois, the histosols, are soils that are high in organic content. These are wetland soils that generally have an organic content greater than 14 percent. Histosols are probably most common in the morainal district of northeastern Illinois, but they are present in seeps and marshes along rivers as well as the prairie potholes of the Grand Prairie.

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 and the vegetation changed. Oaks and hickories replaced the pines and spruces. At this time, 12,000 to 15,000 years ago, the prairie began to make significant eastward expansions (Axelrod 1985). About 8,300 years ago, during a prolonged hot, dry era known as the xerothermic period, the tallgrass prairie became a major vegetation type in Illinois (King 1983).

The present climate of the grassland region of central North America is the continental type, characterized by hot, dry summers and cold, usually dry winters. Precipitation varies from nearly 40 inches in the eastern tallgrass prairie to as little as 10 inches in the short grass prairies of the western plains states. Within Illinois, the annual precipitation averages about 38 inches, but the southern part of the state receives about 46 inches and the north receives about 34 inches annually, mostly as rainfall during the spring and summer months (Neely and Heister 1987).

The climate of Illinois is influenced by three air masses. The coldest and driest air originates from Canada and is most frequent in winter. Warm, very humid air originates from the Gulf of Mexico during the summer and dry, warm air from the Pacific Ocean influences our weather pattern, especially in the fall during what we refer to as Indian Summer.

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, and the dust bowl years of the 1930s (Blasing and Duvick 1984). The five driest decades, in the last 300 years, were: (1) 1816-1825, (2) 1735-1744, (3) 1696-1705, (4) 1931-1940, (5) 1791-1800. This research indicates that severe droughts, lasting for a decade, were a relatively common phenomenon on the prairies. Severe droughts similar to the dust bowl years of the 1930s can be expected to occur at least twice during every century (Duvick and Blasing 1981). Henry Allan Gleason, a renowned plant ecologist and geographer from Illinois, stated that the environmental extremes (floods, severe droughts, cold winters, late spring freezes) were climatic factors that had the greatest influence upon the distribution of plants.

The prairie ecosystem was modified and shaped by climate, fire, soils, topography, geology, glacial history, grazing pressures and time. Within the prairie biome, there are many different prairie types, each having its own distinct plants and animals. Corresponding to a steady decline in precipitation from east to west toward the Rocky Mountains, the prairies changed from tallgrass, to mixed grass, to the short grass prairie of the western plains.

FIRE

The prairies of central North America are lands characterized by a nearly level to gently rolling topography. This is the type of terrain which provides a barrier-free surface for the movement of fire. Fires eliminate the accumulation of dead leaves and stems of prairie plants and retard the encroachment of trees and shrubs. Trees and shrubs have vulnerable living tissue above ground and, therefore, are subject to the intense heat of a fire. In contrast, most prairie plants are deep-rooted perennials that go dormant in the autumn and winter months leaving only dead, extremely flammable tops exposed to fire.

While climate had a major influence on determining the distribution of prairies, geographer Carl Sauer, in writing about grasslands, stated that climate alone was not sufficient to explain the presence of the extensive prairies and savannas of the world.

"The more we learn of climatic data the less success there is in identifying climate with grassland. There are grasslands with as little as ten inches of rain a year, and with as much as a hundred, with long dry seasons, with short dry seasons, with high and low temperature ranges . . . Every climate that has been recognized in which there are grasslands has elsewhere dominance of forest, woodlands or brush, under the same weather conditions . . . Grasslands are found chiefly (a) where there are dry seasons or occasional short periods of dry weather during which the ground cover dries out, and (b) where the land surface is smooth to rolling . . . The occurrence (of plains) all around the world points to one known factor that operates effectively across such surfaces - fires. . . . I know of no basis for climatic grassland climate, but only for a fire grass "climax" . . . For millennia, and tens of them, fires, for the most part set by man, have deformed the vegetation over large plains of the world (Sauer 1950)."

In Illinois, fire was used by Native Americans in hunting buffalo, deer and other game. They used what was called a ring fire, or surround, in their hunting. Sometimes these fire hunts were organized by a fire chief or leader. The hunting party would set out before dawn to surround a herd of bison. When the sun had dried the grass to the point where it would burn, the fires were started and the hunt began. Penalties were severe if anyone caused the bison to stampede before the hunt (McClain and Elzinga 1994). Father Hennepin described the use of fire by the Miami Tribe near the present site of Kankakee in December of 1679:

"These animals are ordinarily in great numbers (which) is easy to judge by the bones, the horns and skulls that we saw on all sides (of the river). The Miamis hunt them at the end of autumn in the following manner: When they see a herd they gather in great numbers

and set fire to the grass everywhere around these animals except some passage which they leave on purpose and where they take post with their bows and arrows. The buffalo, seeking to escape the fire are thus compelled to pass near these Indians, who sometimes kill as many as a hundred and twenty in a day, all of which they distribute according to the wants of the families . . .(Hennepin 1880)."

Until their departure from Illinois in 1832, Native Americans continued to use fire in their hunting. As the pioneers arrived, some of them apparently adopted this practice because prairie fires continued to be fairly common. These fires imperiled prairie travelers and homesteaders who lived near the prairies. The fires moved with tremendous speed, stopping only where major rivers provided a break in prairie vegetation. One such conflagration in Illinois is described below:
"In November 1836, a fire started on (the) Spoon River (Stark County) about 10 o'clock in the morning, and with a strong southwest wind, it traveled about 10 miles per hour, passing between West Bureau and Green River, having a front eight miles in width, and its roaring could be heard for many miles distant. Before sundown, this fire had burned to the bands of (the) Rock River, where Rockford now stands, passing over a country of about 60 miles in extent (Matson 1872)."

As more pioneers arrived, prairie fires were discouraged due to potential harm to livestock, buildings, crops and people. Roads were constructed and cultivation of the prairie began. These activities created effective firebreaks and diminished the spread of prairie fires, the force that maintained the prairies by killing trees and other woody growth. It wasn't long before large trees were standing where prairie once grew.

Fire was a friend of the prairies, but it was greatly feared and hated by the pioneers. Some called it the "Messenger of Death." Uncontrolled fires were not compatible with their life style, so they worked hard to prevent them by burning late in the spring, by plowing and backfiring strips around their settlements, using cool season grasses, and by overgrazing the land. Getting rid of the fires meant getting rid of the tall, extremely flammable native grasses, and that meant getting rid of the prairie.

DISAPPEARANCE OF THE PRAIRIES

By 1830, farmers began to realize that the prairie soils were more fertile than forest soils and much easier to convert to agricultural use. For decades farmers had always girdled, cut and burned trees within the forest to create fields. This realization resulted in the first earnest attempts to claim farm ground from the prairie. The breaking of the prairie was usually accomplished by a team of oxen during the month of May. Very often, this type of work was contracted out to a "sodbuster" who charged $2 to $3 per acre for his services (Bogue 1968). The prairie which was intensely grazed was easier to break than ungrazed prairie. Certain plants, such as red root (New Jersey tea) were difficult to plow through.

In the years following the Civil War, cultivation of the prairie accelerated due to the development of railroads which gave farmers transportation for their produce and an easy

way to get wood and lumber necessary for building and heating. By 1900 most of the Illinois prairie was gone. Although most individuals did not mourn its disappearance, there were some that did. Dr. A.N. Herre, upon returning to Illinois, wrote the following:

"I returned to the region (Illinois) several summers during the 1890s, but the prairie as such had disappeared, and of course, its characteristic life with it. What a pity that some of it could not have been preserved, so that those born later might enjoy its beauty also (Herre 1940)."

The disappearance of the prairie was more than the loss of vast acreages of plants. It was the loss of a huge grassland ecosystem, its plants and animals. Unfortunately, few descriptions of the bird life of the unbroken prairie are in existence. One notable exception is Dr. Robert Ridgeway's description of the bird populations of Fox Prairie in Richland County from the late 1800's:

"The first visit to Fox Prairie was made on the 8th of June, 1871, the writer and his companions arriving a little before noon. A rolling plain spread before us, the farther side bounded by timber, while the prairie itself was free from tree or brush, except where some intersecting stream was followed by a narrow line of thickets, interspersed with occasional fair-sized and gracefully formed elms; or along the edge, where the jungle of sumac, thorn-bushes, wild plum, hazel, etc., backed by young oak and hickory trees, showed plainly the encroachment of the woodland.

A third visit to this prairie was made early in June, 1883 -- exactly twelve years after the first trip. The change which had taken place in the interval was almost beyond belief. Instead of an absolutely open prairie some six miles broad by ten in extreme length, covered with its original characteristic vegetation, there remained only 160 acres not under fence. With this insignificant exception, the entire area was covered by thriving farms, with their neat cottages, capacious barns, fields of corn and wheat, and even extensive orchards of peach and apple trees. The transformation was complete; and so it was only by certain ineffectual landmarks that we were able to identify the locality of our former visits. As a consequence, we searched in vain for the characteristic prairie birds. Upon the unenclosed tract of 160 acres, dickcissels, Henslow's buntings, yellow-winged sparrows, and the meadowlarks were abundant as ever; and running in the road, now wallowing in the dust, then alighting upon a fence stake, were plenty of prairie larks, but equally numerous were the detestable and detested European house sparrow, already ineradicably established. We searched in vain for Bell's Vireo, for all the thickets had been destroyed. Neither was a solitary kite, of either species, to be seen. We left our beautiful prairie with a sad heart, disgusted with the change (however beneficent to humanity) which civilization had wrought.

The same is the history of all the smaller prairies in many portions of the state; and it will probably not be many years before a prairie in its primitive condition cannot be found within the limits of Illinois (Ridgeway 1889)."

The words of Ridgeway were all too prophetic, for only vestiges remain of the once vast

Illinois prairies. Looking Glass Prairie, String Prairie and the largest prairie of all, the Grand Prairie, exist today as names on maps. Relatively undisturbed prairies still remain in Illinois along railroad rights-of-ways, in pioneer cemeteries, or on sites that are unsuitable for row crop farming, pasture or development.

TODAY

Representative prairie communities can be found today in Illinois at Midewin National Tallgrass Prairie (Will County), Goose Lake Prairie State Natural Area (Grundy County; largest remnant of prairie left in Illinois), Gensburg-Markham Prairie Nature Preserve (Cook County, dry-mesic, mesic and wet-mesic sand prairie), Wolfe Road Prairie (Cook County, tallgrass prairie and savanna), Sand Prairie-Scrub Oak Nature Preserve (Mason County, dry sand prairie and forest), and Fults Hill Prairie Nature Preserve (Monroe County, loess hill prairie).

ECOLOGICAL IMPORTANCE

Prairies were important habitats for a diversity of wildlife. A variety of ground-nesting birds such as the greater prairie-chicken, meadowlark and upland sandpiper lived on prairies. Many birds of prey circled overhead in search of food. Northern harriers, red-tailed hawks, short-eared owls and turkey vultures were commonly seen over the prairie. Millions of individual insects may potentially occur on prairies. Insects provide an important food source for other prairie inhabitants, and serve to pollinate plants, decompose plant and animal materials, and till the soil.

Native Americans and settlers relied on the large mammals that roamed the prairie. Bison and elk provided food and materials for homes and clothing. Other large animals such as the black bear, mountain lion, bobcat and wolf once roamed the grasslands. Smaller mammals burrowed in the soil, eating insects and other small mammals. Badgers, Franklin’s ground squirrels, prairie voles and plains pocket gophers served in this role. Their fossorial habits aerated the soil.

ECONOMIC IMPORTANCE

Beneath the surface of a prairie lies soil and an immense system of roots called sod. The roots of compass plant and leadplant, both prairie forbs, extend more than 10 feet below the surface. The roots of grasses, such as big bluestem and switchgrass, can be found to depths of five feet or more. Through decomposition, nutrients in dead roots rot and return nutrients to the soil. More than 641,000 fungi and 20 million bacteria have been recorded in an acre of prairie soil. These decomposers produce the rich soil that extends the depth of the prairie plant root system. This soil, or humus, makes Illinois a leader in agricultural crop production.

MANAGEMENT PRACTICES

Fires were common on the prairie. Fires remove the dead layers of grass (thatch) that

accumulate on the surface and prohibit new plants from pushing though the dense mat. Nutrients are released by fire, and the cycle begins anew in young plants. Fires also keep invading and undesirable young trees from growing and shading out prairie grasses and forbs. Today, intentionally set fires, called prescribed burns, are used to maintain a prairie.

Control of exotic plants is an important management activity for the prairie manager. Mowing, herbicides, hand removal and fires are all used to eliminate potentially damaging species such as bluegrass, sweet clover, black locust and rough-leaved dogwood.

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