



PRAIRIES



In all my life, I never saw or dreamed of so beautiful a sight as the rolling prairies. Nothing can equal the surpassing beauty of the rounded swells and the sunny hollows, the brilliant green of the grass, the numberless varieties and splendid hues of multitudes of flowers. I gazed in admiration too strong for words.

Ellen Bigelow
1835

Miss Bigelow's reaction was shared by many who were lucky enough to see the tallgrass prairie in all its glory. She was a New Englander who had grown up among forests. There are prairies as far east as Massachusetts, but they are small, sunny islands in a sea of trees. In the Illinois country, people moving west found tall waving grasses and the "splendid hues" of wildflowers covering much of the land. Here the prairies were the sea, and the woodlands were shady islands. The prairies of Illinois were the first real American experience of the wide-open spaces. Here you could find yourself in a prairie that stretched to the horizon, without a single tree in sight.

Many early visitors expected the prairies to be of little use to farmers. Their belief was that any soil too poor to grow trees was too poor to grow crops. Others noted the advantages of land that did not need to be cleared of trees. The prairie was instant pasture for cattle and horses and needed only a plow to make it ready to grow crops.

However, the first settlers who tried turning prairie sod with the light wooden plows they had used in the forests got a rather nasty shock. A plow that would turn a clean furrow in forest soil skittered over the surface of the prairie sod like a pebble skipping across a pond. Prairie soils seemed to be mostly roots.

Breaking prairie sod became a business. Men traveled the settlements with heavy plows

pulled by several teams of oxen and hired out to plow land at so much an acre. The sound of the tearing roots, they said, was like the rattle of small arms fire, as if an infantry company was engaged in battle. Individual farmers couldn't plow the prairie until 1837 when an Illinois blacksmith named John Deere invented the steel moldboard plow.

EVOLUTION OF THE PRAIRIE

Prairies are grasslands. The dominant plants are grasses—although many other kinds of plants are present. The group of plants we call grasses evolved during the Miocene Epoch, a period that began about 25 million years ago. Grasses have since become the dominant vegetation over large areas of the earth. The prairies of North America, the pampas of South America, the steppes of Central Asia, and the plains of East Africa are all grasslands.

Grasslands develop on flat lands in areas where long periods without rainfall are common—although the climate is not as dry as it is in deserts. These periods of drought may be regular seasonal occurrences—like the dry seasons of tropical lands—or they may happen only in some years—like the summer droughts of the American Midwest.

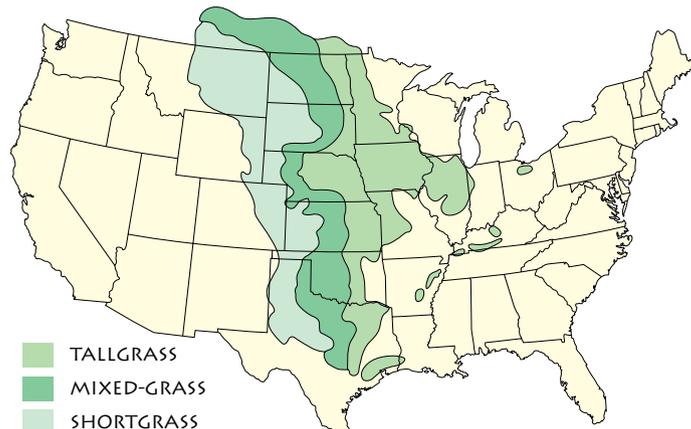
Those periodic droughts and the flat ground that offers few obstacles to advancing flames have made fire a major force in the ecology of the world's grasslands. Millions of years of evolution in the presence of fire have



Blazing star and goldenrod create a colorful display in a mid-summer prairie. The flower show starts in spring and continues until October.

HISTORIC RANGE OF THE PRAIRIE

Little remains east of the Mississippi, but some of the biggest and best of the surviving remnants are in the Chicago region.



made the tallgrass prairie dependent on periodic fires for its survival.

The prairies of central North America form a triangle extending from the foothills of the Rockies on the west to Ohio on the east. In the Chicago Wilderness region, the prairies share the land with a variety of wooded communities. To the west, trees become more rare. On the high plains in the shadow of the Rocky Mountains, they grow only in narrow strips along the rivers.

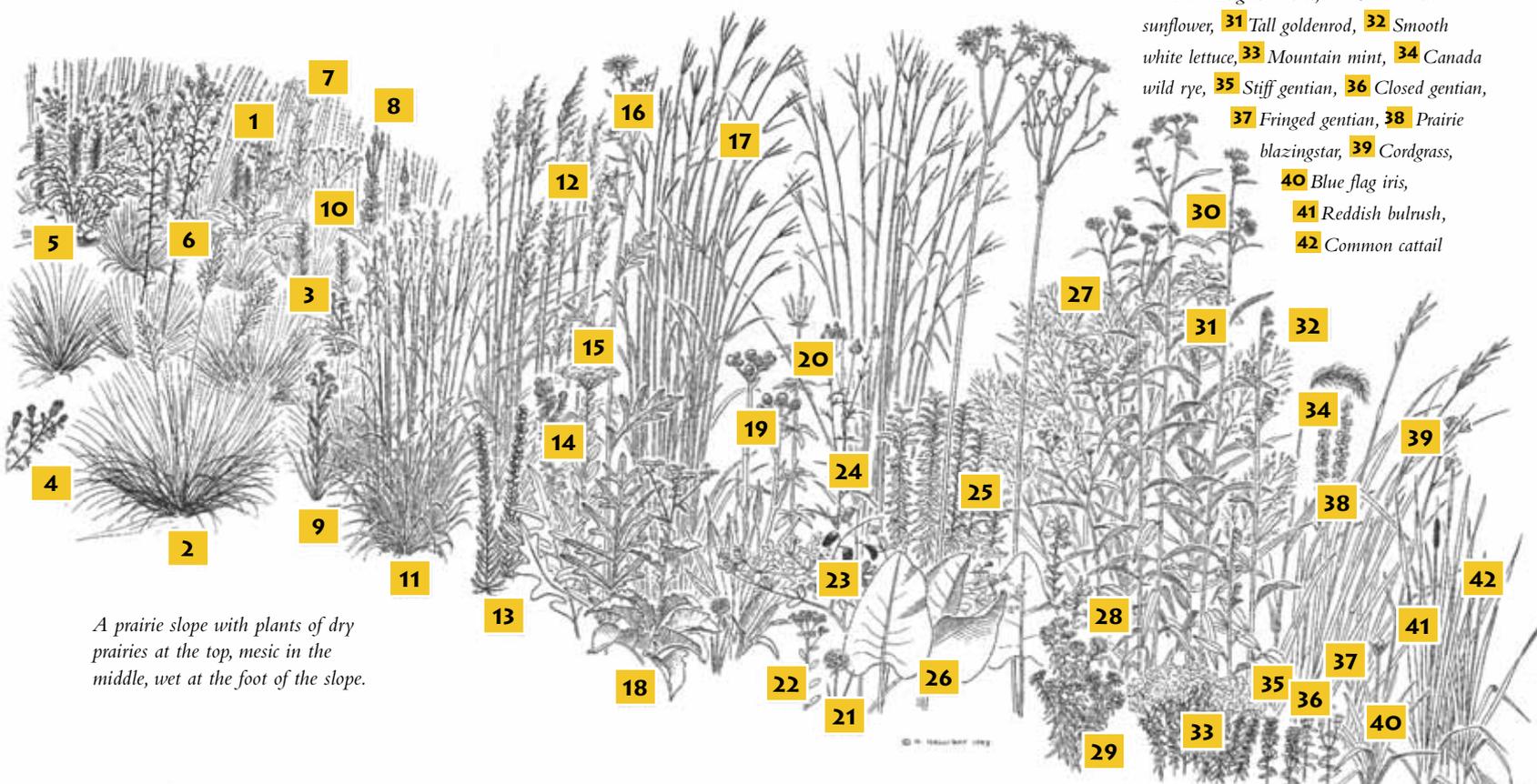
The western prairies—the grasslands of eastern Montana, Wyoming, and Colorado, are considered short-grass prairies. Precipitation averages less than 20 inches a year. In the dry, windy environment, plants hug the ground, seldom growing much above a foot in height. With increasing precipitation, the grasses and

other prairie plants get taller. From central Nebraska east, tallgrass prairies dominate the treeless parts of the landscape. Early accounts tell of grasses tall enough to hide a man on horseback. That height must have been rare, but settlers often lost cattle in the pastures of August.

ROOTS AND SOILS

Most of the biomass, the living material, of both prairie grasses and prairie wildflowers—botanists call them forbs—is underground. On deep soils, the root systems of some prairie species extend nearly 20 feet below the surface. They may live for decades, each spring sending up new green shoots to flower, set seed, and die.

- 1 Side-oats grama grass, 2 Prairie drop-seed, 3 Whorled milkweed, 4 Purple prairie clover, 5 Gray goldenrod, 6 False boneset, 7 Tall boneset, 8 Hoary vervain, 9 Cylindric blazingstar, 10 Daisy fleabane, 11 Little bluestem, 12 Indian grass, 13 Rough blazingstar, 14 Round-headed bush-clover, 15 Stiff goldenrod, 16 Compass plant, 17 Big bluestem, 18 Wild quinine, 19 Rattlesnake master, 20 Culver's root, 21 Wild onion, 22 Flowering spurge, 23 White wild indigo, 24 Yellow-headed coneflower, 25 Canada goldenrod, 26 Prairie dock, 27 Switchgrass, 28 Obedient plant, 29 New England aster, 30 Saw-toothed sunflower, 31 Tall goldenrod, 32 Smooth white lettuce, 33 Mountain mint, 34 Canada wild rye, 35 Stiff gentian, 36 Closed gentian, 37 Fringed gentian, 38 Prairie blazingstar, 39 Cordgrass, 40 Blue flag iris, 41 Reddish bulrush, 42 Common cattail



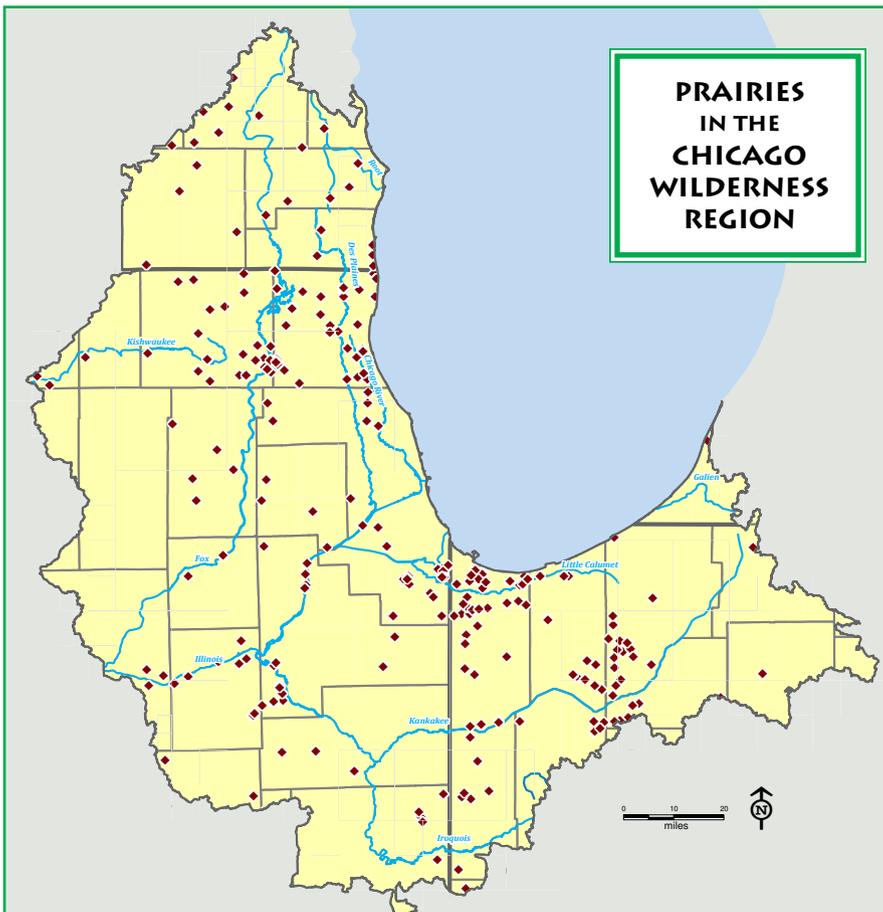
A prairie slope with plants of dry prairies at the top, mesic in the middle, wet at the foot of the slope.



Dr. Robert F. Betz

of Northeastern Illinois University led campaign to save Indian Boundary Prairies; initiated first large scale prairie restoration at Fermi National Accelerator Lab near Batavia, Illinois.

Prairie remnants are scattered over the Chicago Wilderness region. Most of the prairies shown on this map are less than 20 acres in size.



These huge root systems are constantly growing and constantly dying. New roots seek new sources of minerals and water in the sub-soil. Old roots die and decay, adding organic matter to the soil.

Organic matter may form a layer nearly two feet thick in prairie soils. It is this organic matter that gives prairie soils their dark color. Organic matter also made prairie soils extremely productive of crops such as corn and soybeans. This fertility doomed nearly all the prairies.

TYPES OF PRAIRIES

As many as 350 different species of plants grew on the prairies of Illinois, Indiana, Wisconsin, and Michigan but they didn't all grow together. Instead they grew in distinctive communities. Each community had its own unique mix of species. Soil moisture and soil texture are the two most important factors in controlling where these communities grew. Prairies on wet soils shared many plants with such wetland communities as sedge meadows and fens. Prairies on sandy soils, where the coarse soil texture lets water drain away quickly after rains, often contained plants more common in the drier lands to the west.

Ecologists have named five moisture groups:



A line of life-restoring fire crackles across a natural area. Fire is essential to the health of many different kinds of natural areas.

wet, wet-mesic, mesic, dry-mesic and dry. The word “mesic”—which means “in the middle” or “moderate”—turns up often in ecology. In addition, two kinds of prairies are classified by the texture of the ground they grow in. Sand prairies grow along Lake Michigan and inland as well. Gravel hill prairies often grow on top of kames.

If we survey the plants growing in a wet prairie, we are likely to find that cord-grass (*Spartina pectinata*) and blue joint grass (*Calamagrostis canadensis*) are the most common grasses. In dry prairies, side-oats grama (*Bouteloua curtipendula*) becomes important. In mesic prairies, the dominant grasses are big bluestem (*Andropogon gerardii*) and northern dropseed (*Sporobolus heterolepis*). The forbs show similar shifts.

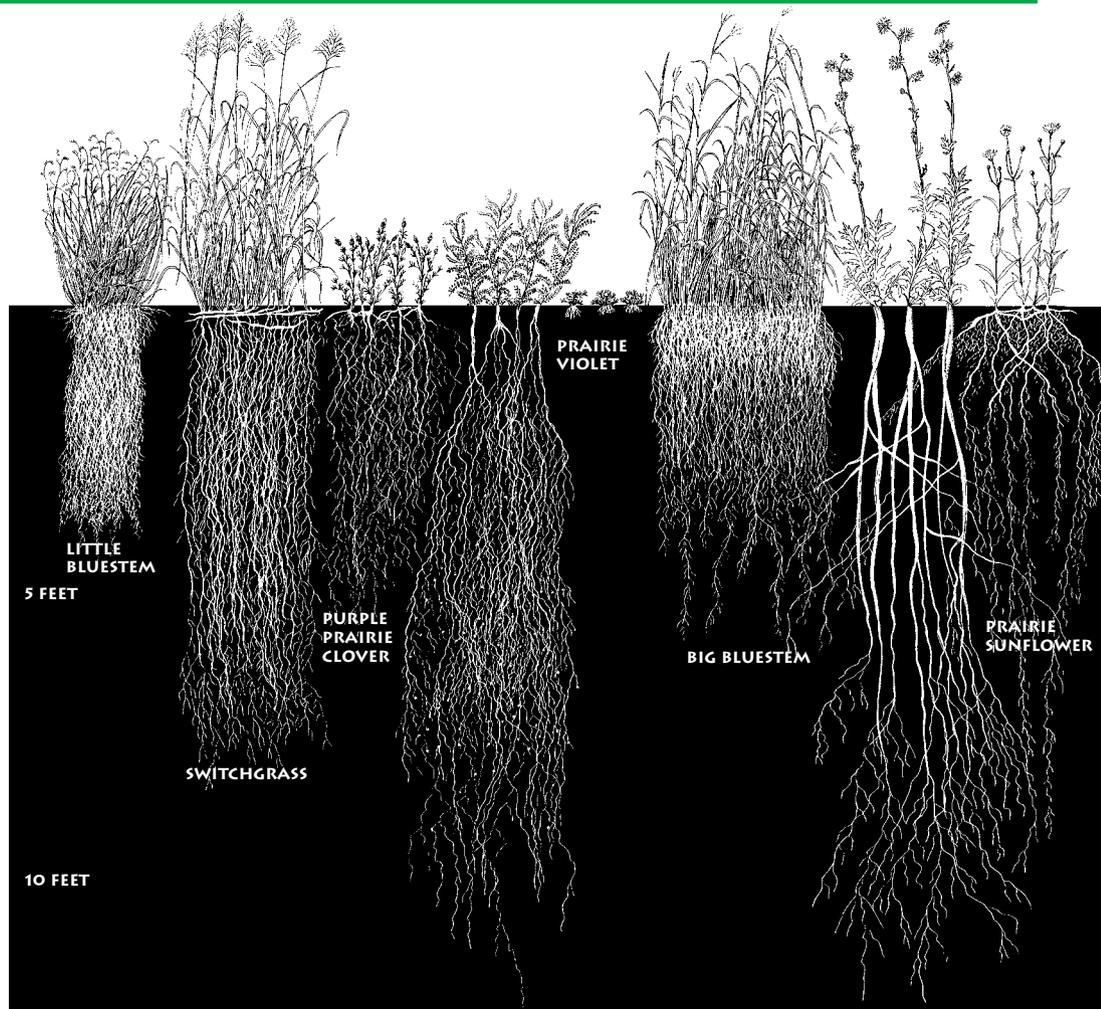
PRAIRIES AND FIRE

Prairies are fire-dependent communities. Without fire, tallgrass prairies are invaded by trees and shrubs that kill the prairie plants with their shade. Without fire, species begin to vanish from the prairie. Smaller plants and plants with small seeds seem to go first. Legumes also disappear. Their removal makes it easier for weeds to invade.

Some trees can survive regular prairie fires. Bur oak (*Quercus macrocarpa*) and black oak (*Quercus velutina*) can live for a century or more even though regular fires repeatedly kill all parts of the plant that are above ground. They survive as roots—called “grubs.” The grubs are not harmed by the fires and each year, they produce new sprouts. When large scale settlement began, people noticed communities they called “brushy prairies.” These were prairies where bur oak, black oak, and sometimes white oak grubs were common. Fire suppression after settlement quickly turned these brushy prairies into oak woods.



New growth sprouts with the help of minerals released by fire.



Historical accounts tell us that Native Americans set fires every year to improve forage for bison and elk. If the weather was right, these fires might burn for days.

Fires burn best on level ground. In hills, they burn well uphill but are likely to go out on the downhill side. In the Chicago Wilderness region, prairies dominated the flat land unless that land was on the downwind side of a river, lake, or other permanent body of water. Fires burning from west to east often went out on the west banks of rivers or the western shores of lakes and permanent wetlands.

PRAIRIE SUCCESSION

In the presence of fire, prairies are very stable communities. Many of the common prairie plants live for many years, but they do not readily invade new ground. Before settlement, disturbed places—like buffalo wallows—would be quickly filled with weedy prairie species—plants that grow fast and specialize in invading disturbed ground. In time, the more conservative species would replace these invaders.

During the past 175 years, millions of acres of tallgrass prairies have been converted to cornfields or covered with buildings. Surviving prairies are small and widely scattered. It is impossible for seeds from these small prairies to reach all the lands where they could grow.

With the native prairie species so rare, a cornfield left idle for a few years is likely to be invaded by plants from Europe and Asia that have been imported into this area since settlement. Most of the grasslands in the Chicago Wilderness region are dominated by exotic (non-native) species such as Hungarian brome grass (*Bromus inermis*) and Queen Anne's lace (*Daucus carota*).

The tallgrass prairie survives in tiny fragments. Conservationists have mounted protracted campaigns on behalf of prairie remnants of five or ten acres. Hope for the survival of this ecosystem rests on good management of these fragments and on restoration projects that return prairie to lands where it has not grown for a century or more.

Most of the living stuff in a prairie is underground. The huge root systems of prairie plants live for many years, sending up new green shoots every year. The death of old roots adds organic matter—called humus—to the soil.



VIOLA PEDATIFIDA
Prairie violet



POTENTILLA ARGUTA
Prairie cinquefoil



SISYRINCHIUM ALBIDUM
Common blue-eyed grass



POTENTILLA SIMPLEX
Common cinquefoil



PHLOX PILOSA
Prairie phlox



ZIZIA APTERA
Heart-leaved meadow parsnip

The Beauty of

Imagine a circle the size of a hula hoop. All 30 of the plants pictured on these two pages were found growing in just such a circle randomly placed at the Somme Prairie Nature Preserve in Northbrook, Illinois. Biodiversity is typical of tallgrass prairie. If we studied a few acres of prairie, we might find a hundred species of plants.

In our hoop, the violets bloom first. Their flowers open in late April. From that point until the moment in October when the last aster fades, something would always be blooming inside this small circle. A bumble bee in search of pollen, a butterfly looking for nectar would stand a good chance of finding what it needs.



FRAGARIA VIRGINIANA
Wild strawberry



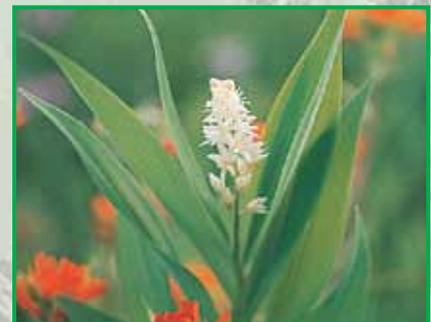
HEUCHERA RICHARDSONII
Prairie alum root



TRADESCANTIA OHIENSIS
Common spiderwort



LITHOSPERMUM CANESCENS
Hoary puccoon



SMILACINA STELLATA
Starry false solomon's seal



VIOLA PAPILIONACEA (VIOLA AFFINIS)
LeConte's violet



ERYNGIUM YUCCIFOLIUM
Rattlesnake master



COMANDRA UMBELLATA
False toad flax

PARTHENIUM INTEGRIFOLIUM
Wild quinine





SORGHASTRUM NUTANS
Indian grass

RATIBIDA PINNATA
Yellow coneflower



CAREX CONOIDEA
Prairie gray sedge



CAREX BICKNELLII
Copper-shouldered oval sedge



ASTER ERICOIDES
Heath aster



ALLIUM CANADENSE
Wild onion



ASTER NOVAE-ANGLIAE
New England aster



LIATRIS SPICATA
Marsh blazing star

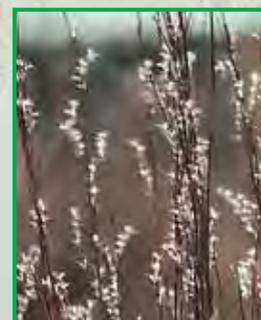
Biodiversity

Several species of the tiny butterflies called skippers could reproduce in our hoop. Skipper caterpillars feed on grasses and sedges. On the violets, we might find caterpillars that would grow into gaudy orange and black fritillaries.

In healthy ecosystems, energy flows freely through the system. There are many pathways for it to follow. Plants of many species support a variety of insects. Snakes, salamanders, and meadowlarks eat the insects and northern harriers eat the insect eaters. Thanks to the biodiversity in our hoop, the flow of energy can support them all.



SOLIDAGO JUNCEA
Early goldenrod



ANDROPOGON SCOPARIUS
Little bluestem grass



SILPHIUM TEREBINTHINACEUM
Prairie dock



LIATRIS ASPERA
Rough blazing star



BROMUS KALMII
Kalm's brome

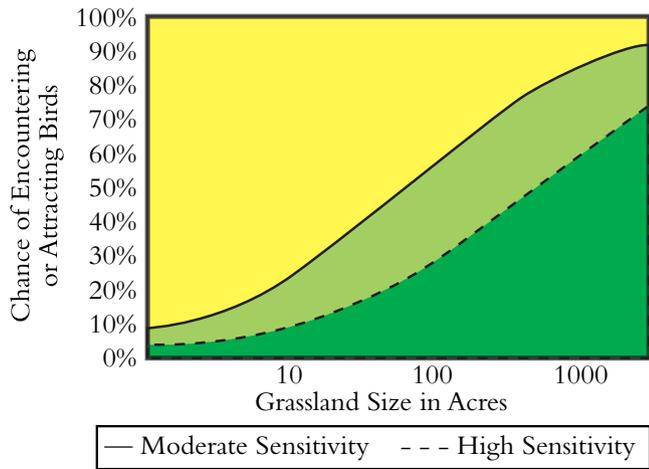


ASTER AZUREUS
Sky-blue aster

AGROPYRON TRACHYCAULUM
Bearded wheatgrass



Grassland Bird Area Sensitivity



Moderate Sensitivity	High Sensitivity
Eastern Meadowlark	Northern Harrier
Western Meadowlark	Upland Sandpiper
Grasshopper Sparrow	Greater Prairie-Chicken
Sedge Wren	Bobolink
	Savannah Sparrow
	Henslow's Sparrow

Some grassland birds require large areas of suitable habitat and are considered to be “area sensitive.”



Dickcissels are wanderers. They change nesting grounds from year to year.

One of the few populations remaining of the Illinois state-endangered upland sandpiper (*Bartramia longicauda*) is at Midewin National Tallgrass Prairie.



PRAIRIES Birds

On the green prairies of early summer, early in the morning before the sun burns off the dew, you might hear a long eerie whistling cry as if the wind were alive and singing. From overhead comes a tinkling song: a long, complex melody delivered from high in the sky. These are songs of prairie birds. The cry comes from the upland sandpiper (*Bartramia longicauda*). The overhead tune is the flight song of the bobolink (*Dolichonyx oryzivorus*).

The tallgrass prairie supports two distinctive groups of birds. Adapted to life in a treeless environment, grassland birds sing in the air or from swaying perches on the stems of prairie grasses. Shrubland birds prefer scrubby patches within the prairie landscape.

Most grassland birds are migratory, but a few species have found ways to survive prairie winters. The cold winds are a severe test, but those same winds serve to keep some areas free of snow, revealing food for the resident birds.

Upland sandpipers and bobolinks are the champion long-distance migrants among our grassland birds. They fly all the way to Argentina for the winter. Dickcissels (*Spiza americana*) winter as far south as Venezuela. This grassland species is known for its nomadic habits. They may nest in some numbers in a location one year, be completely absent the next year, only to return in subsequent years. These movements may be triggered by changes in food availability or moisture level.

Meadowlarks are partial migrants. Some birds go south, but a few remain throughout the winter. We have two species: the eastern (*Sturnella magna*) and the western (*S. neglecta*). Meadowlarks eat a varied diet, specializing in insects in summer and switching to seeds in winter. They can nest in fields as small as 20 acres if the surrounding land is open, which makes them one of the least area sensitive of our prairie birds. Area sensitivity refers to the need which many birds have for large blocks of uniform habitat around their nesting territories.



Common in our shrublands, brown thrashers (*Toxostoma rufum*) are great singers—they have more songs in their repertoire than most any other bird in North America.



(Left) Grasshopper sparrows use only a small space for nesting territory, but they will not nest on small patches of grassland.



Eastern kingbirds come by their genus and species name honestly: *Tyrannus tyrannus*. Fierce protectors of their nests, they will attack birds much larger than themselves, including jays, crows and hawks.

The discovery of area sensitivity has made us aware of the need for large preserves to sustain all our species. Henslow's sparrows (*Ammodramus henslowii*) claim a territory of only a few acres, but they rarely nest in any grassland smaller than about 80 acres.

Northern harriers (*Circus cyaneus*) and short-eared owls (*Asio flammeus*) are the principal hunters of the prairie. They seek their prey—rodents, small birds, frogs, snakes and insects—by flying low over the ground and pouncing on anything that shows itself. Both of these birds favor wetter prairies and often hunt over wetland areas.

Birds are highly affected by the structure of their habitat. Grassland birds like open habitat, even meadows filled with non-native grasses. As long as a grassland is sufficiently large and has little or no woody vegetation, open grassland birds will continue to use it.

The ability of grassland birds to adapt to life among strange grasses helped sustain their populations even after agriculture had destroyed almost all the prairies. The birds simply moved into pastures and hay fields. However, the switch from general farming to an almost exclusive reliance on corn and soybeans produced a disaster for prairie birds. Since the

1950s, populations have declined 90 percent or more for all our open grassland species.

Because few of our prairie remnants are large enough to support bird populations, most of our grassland birds nest in meadows of Eurasian grasses and invasive shrubs. But the birds' plight has inspired dozens of large-scale prairie restorations in the last 10 years.

Shrubland birds have declined almost as much as many prairie bird species. Field sparrows (*Spizella pusilla*), eastern kingbirds (*Tyrannus tyrannus*), and brown thrashers are the three most commonly encountered shrubland birds in our region. These three birds generally nest in areas with widely scattered shrubs.

Bell's Vireos (*Vireo bellii*), another shrubland bird of conservation concern in the region, usually are found in small shrub clumps within grassland areas. As the density of shrubs increases, yellow-breasted chats (*Icteria virens*) begin to appear. Shrubs in wet grassy areas are good places to find willow flycatchers (*Empidonax traillii*).

Shrubland birds usually achieve higher nest success than prairie birds do in the region's grasslands, perhaps because their nests are usually up off of the ground.

PRAIRIES

Butterflies and Moths



Symbiotic relationships are a kind of mutual back scratching. Here, ants protect the pink caterpillar of the silvery blue butterfly (*Glaucopsyche lygdamus*) from predators and parasites. In return, the ants enjoy sugars and amino acids secreted by the caterpillar.

Most of the animals on earth are insects, so it is not surprising that most of the animals of the prairie are insects. In the Chicago Wilderness region, this is truer than it ought to be. Our prairie remnants are mostly so small and scattered that they support few animal species larger than mice, voles and insects.

Although a number of insect species can adapt to other habitats, some even to weed patches, others are able to survive only in healthy prairie communities.

Extended investigation into more than 800 species belonging to seven families of insects of prairies and savannas has revealed that about one quarter of the total species in these groups are confined to remnants of the native landscape. That means that more than 200 different kinds of insects—known as remnant dependent species—could not continue to live in our area if the last prairie and savanna remnants were destroyed.

Remnant dependence is particularly high among butterflies and moths, with 40 percent of our local grassland butterflies confined to prairies. This high rate of remnant dependence



The rare moth, *Papaipema cerina*, lives on prairie remnants in the Chicago Wilderness region.

is largely due to certain species relying on particular plants for food. Some caterpillars, for instance, feed on only a single species.

The caterpillars of regal fritillaries (*Speyeria idalia*) and Aphrodite fritillaries (*Speyeria aphrodite*) feed only on different types of clover, while the adults sip the nectar of various milkweeds, thistles and blazing stars.

Among root-borer moths of the genus *Papaipema*, more than 80 percent of our local species are confined to remnants of the natural landscape. One species of these moths, *Papaipema eryngii*, has only a single host plant: rattlesnake master (*Eryngium yuccifolium*), a plant common on prairies but rarely seen outside them. This moth is known from only three sites in the world: two in the Chicago region and one in Oklahoma.



Aphrodite fritillaries (*Speyeria aphrodite*) are prairie specialists. They depend on certain native prairie plants, such as butterfly weed (*Asclepias tuberosa*), for their survival.

Mammals

The big grazers are long gone from the Chicago region. Bison (*Bison bison*) was the first species to be killed off following settlement, followed by elk (*Cervus elaphus*). Long gone, too, are the large predators, including wolves (*Canis lupus*) and mountain lions (*Felis concolor*).

The absence of these large mammals is keenly felt throughout the Chicago Wilderness region. Few prairie remnants are large enough to sustain bison, but historically they were a key factor in prairie ecosystem health. Bison grazed in such a way that they actually promoted a greater biodiversity of plant life. And their waste acted as an important means of cycling nitrogen back into the soil.

Without top-of-the-food-chain predators, such as wolves and mountain lions, the population of native white-tailed deer (*Odocoileus vir-*

ginianus) has exploded to many times its original numbers. Although there are few things as endearing as a spotted fawn, too many deer have been squeezed into too few preserves. Evidence of this is plainly visible. Because deer eat just about everything they can reach, many of the region's wooded areas are relatively bare to the height of four to five feet.

Coyotes (*Canis latrans*) are native predators that have adapted to the changing landscape. Portrayed in many Native American traditions as crafty and clever, they generally maintain a low profile, feeding on small prey, including mice, voles, and even insects.

In their abundance, common prairie species such as deer mice (*Peromyscus maniculatus*), prairie voles (*Microtus ochrogaster*) and meadow voles (*Microtus pennsylvanicus*) play a critical role in the food chain. They consume the energy stored in plants, which in turn they pass on as protein when preyed upon by coyotes, foxes, snakes, hawks and owls.



Bison were probably the first large mammal species extirpated from this region after settlement.

Herps

People who study reptiles and amphibians are called herpetologists. The name comes from a Greek word meaning "creeping." Herpetologists call the creeping creatures they study "herps." It is a useful word, short and easy to remember, and it saves us from the endless repetition of the cumbersome phrase "reptiles and amphibians." We will use "herps" to refer to these animals throughout this Atlas.

The Chicago region is rich in garter snakes. We are at the eastern end of the range of the plains garter snake (*Thamnophis radix*). A few isolated populations of the western ribbon snake (*Thamnophis proximus*) and northern ribbon snake (*Thamnophis sauritus septentrionalis*) can be found in our region. We even have our own special garter snake, the Chicago garter snake (*Thamnophis sirtalis semifasciatus*) a subspecies of the eastern garter snake.

In the chaotic conditions of a booming metropolis, you might discover one of these snakes almost anywhere, but in places where natural conditions are a bit more stable, they begin to sort themselves out. At the Fermi National Accelerator Lab near Batavia, Illinois, a large scale ecological restoration project has been underway for more than 20 years. Inside the accelerator ring, an enormous half-buried steel doughnut a mile in diameter, is a small

grove of oaks surrounded by a recovering prairie. Search among the oak trees and you will probably find *sirtalis*, the eastern garter snake. Out on the prairie, the usual snake is *radix*. Search a transition zone, the land within about 200 yards of the trees, and you might find either species. The snakes are a walking—or rather slithering—demonstration of the need to protect all the varieties of natural habitat in our region.

Herps can serve as guides to conditions on the land. Their limited mobility makes it difficult for them to travel in search of a better home, especially in a land of six-lane expressways. As a result, they are vulnerable to local extinction. If a small population dies out, new animals of the same species are unlikely to be able to colonize the vacated habitat.



The Smooth Green Snake

*In the Chicago Wilderness region, the herp most closely associated with the prairie is the smooth green snake, a lovely little serpent whose smoothly scaly skin practically glows with a Kelly green tint. The presence of a smooth green snake (*Opheodrys vernalis*) can be taken as an indication of the quality of a prairie remnant. Found in an old field full of recently imported Eurasian weeds, the smooth green snake is a sign that the land was once a prairie, and that it has not been too heavily dosed with pesticides.*

Smooth green snakes are small. The largest specimen ever measured was 26 inches long. Their diet is principally insects.