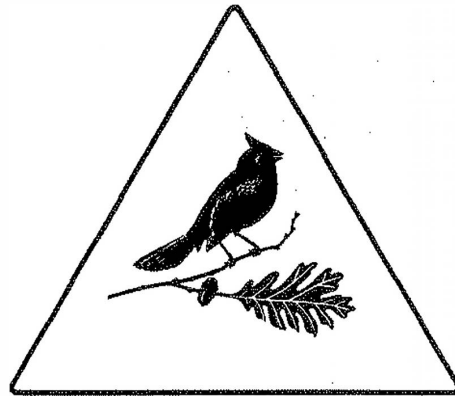


**COMPREHENSIVE PLAN
FOR THE
ILLINOIS NATURE PRESERVES SYSTEM**

PART 2

THE NATURAL DIVISIONS OF ILLINOIS



Illinois Nature Preserves Commission

**COMPREHENSIVE PLAN
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PART 2
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Prepared by the Illinois Nature Preserves Commission under
the guidance of the Framework Advisory Committee and in
cooperation with the Illinois Department of Conservation.

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FOREWORD

A major objective of the nature preserves system is to preserve adequate examples of all significant types of natural features occurring in the State. Natural features include landforms and geological formations, soils, streams and lakes, terrestrial and aquatic communities of plants and animals, and archaeological sites. The initial need in achieving this objective is the development of a useable delineation of the differing natural regions that exist in Illinois. The present work is intended to provide that delineation. It recognizes 14 different natural regions, termed "natural divisions", and divides them into 33 sub-regions, termed "sections". The natural divisions are distinguished according to differences in significant aspects of topography, glacial history, bedrock, soils, and distribution of flora and fauna. Most of the natural divisions are then divided into sections according to lesser differences of these features within the divisions. Many species of plants and animals and several entire natural communities are restricted to a single natural division. The "natural divisions" approach allows the recognition of these rare or restricted plant and animal populations.

The natural divisions serve as the basis for identifying natural features to be included in the nature preserves system. Each of the distinctive natural features within each division and section should be represented in the nature preserves system. The primary use of the Natural Divisions of Illinois will be as a guide for orderly development

of a State system of nature preserves. The eventual goal is to insure adequate representation of all of the remaining natural features. Although several natural features are well represented in the nature preserves system, other features, in some cases once widespread, are poorly represented.

The Natural Divisions will aid in setting priorities for acquisition and dedication of new preserves by demonstrating which types are not yet represented in the system as well as those types that are already adequately represented. The Nature Preserves Commission hopes this publication will be useful to persons interested in understanding and using the Illinois landscape, including scientists, resource planners, land managers, and educators.

The Commission began work on the development of a framework for the nature preserves system with appointment of the Framework Advisory Committee in 1969. The classification of the natural divisions of Illinois was initially drafted as a basis for the framework by John E. Schwegman in 1969. The final draft was approved for publication by the Nature Preserves Commission in June 1972. Edmund B. Thornton served as Chairman of the Commission during most of the period of preparation and Dr. Willard D. Klimstra served as Chairman of the Framework Advisory Committee. The Commission invites comments on this publication from interested persons and assistance in the task of preserving examples of the natural features of Illinois.

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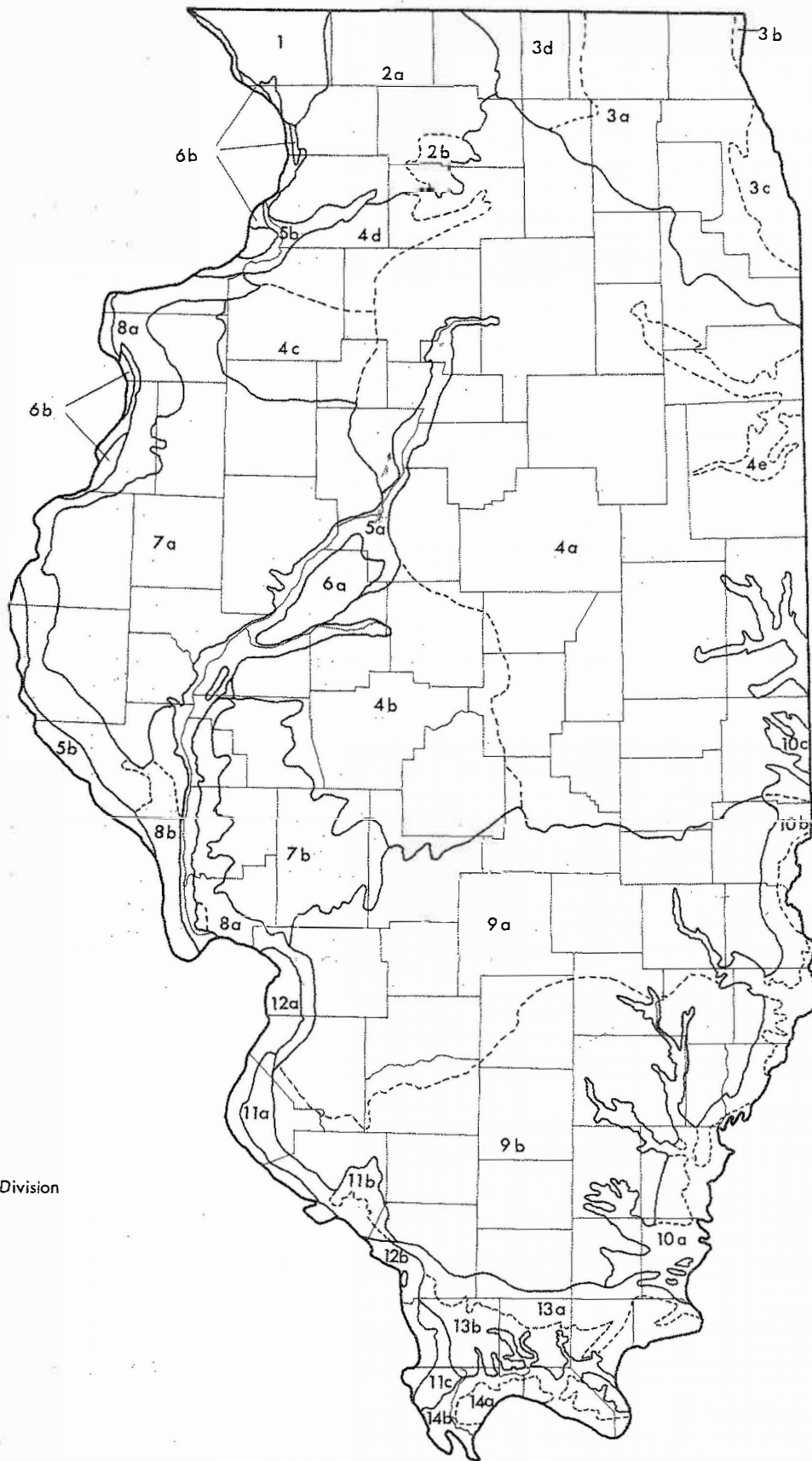


FIGURE 1. THE NATURAL DIVISIONS OF ILLINOIS

THE NATURAL DIVISIONS OF ILLINOIS

INTRODUCTION

The "Natural Divisions of Illinois" is a classification of the natural environments and biotic communities of Illinois based on physiography, flora, and fauna. The general approach was first applied to Illinois by Vestal (1931), who developed a preliminary vegetation map of the State based mainly on topography, soil type, and natural vegetation (Figure 2). Smith (1961) found that patterns of herpetofaunal distribution reinforced many of Vestal's vegetational divisions. He developed a map of the herpetofaunal divisions of Illinois (Figure 3) based on a modification of Vestal's map. Lindsey, Schmelz, and Nichols (1969) used the natural divisions concept in Indiana.

The natural divisions of Illinois (Figure 1) have been derived through an expansion of Vestal's approach. Factors considered in delimiting the 14 natural divisions are topography, soils, bed-rock, glacial history, and the distribution of

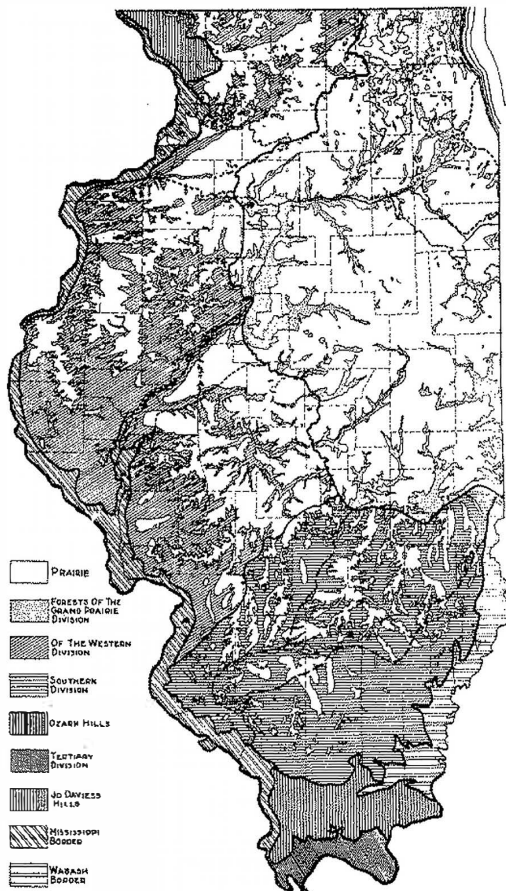


Figure 2. Vestal's "Preliminary Vegetation Map of Illinois" (1930), based on C. J. Telford (1926). The Natural Divisions of Illinois is an expansion of Vestal's approach.

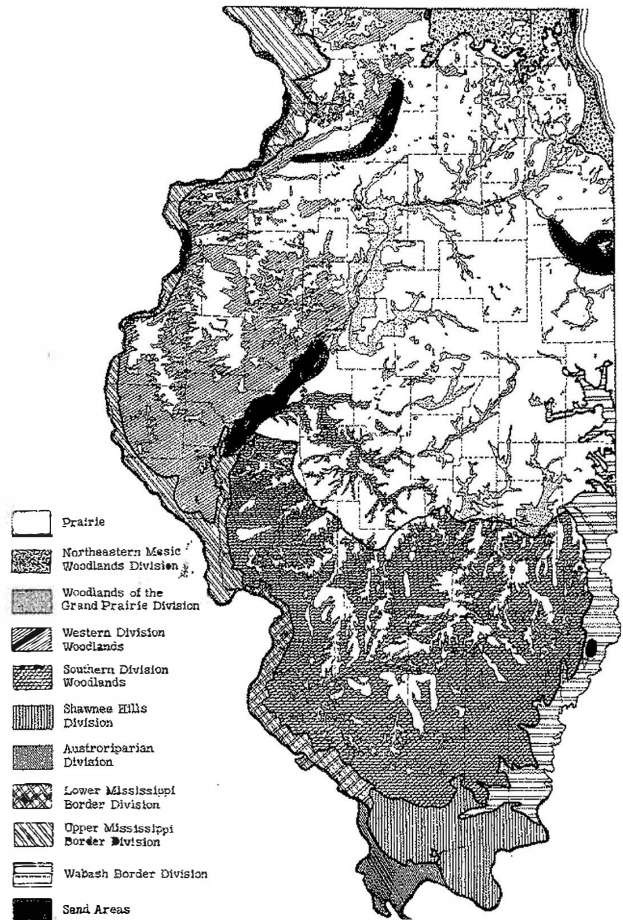


Figure 3. Smith's Herpetofaunal Divisions of Illinois, based on a modification of Vestal's 1930 map.

plants and animals. The divisions are divided into 33 sections based on differences that are of the same nature as those used to separate the divisions but deemed less significant. The role of each factor in developing this system is discussed in the text.

TOPOGRAPHY

The Landforms of Illinois (Bier, 1956) and Physiographic Divisions of Illinois (Leighton, Ekblaw, and Horberg, 1948) are the basic references on the topography of Illinois and its interpretation. The similarity of the physiographic divisions (Figure 4) to some of the natural divisions is apparent. Glacial history (Figure 5) has played an important role in shaping Illinois' topography. The major reference concerning glacial history is Willman and Frye (1970).

Except for relatively small driftless areas in northwestern, west-central, and extreme southern Illinois, the topography can be characterized as a more or less dissected plain of glacial till. Rugged topography is characteristic of the driftless areas and of much of the till plain along the major

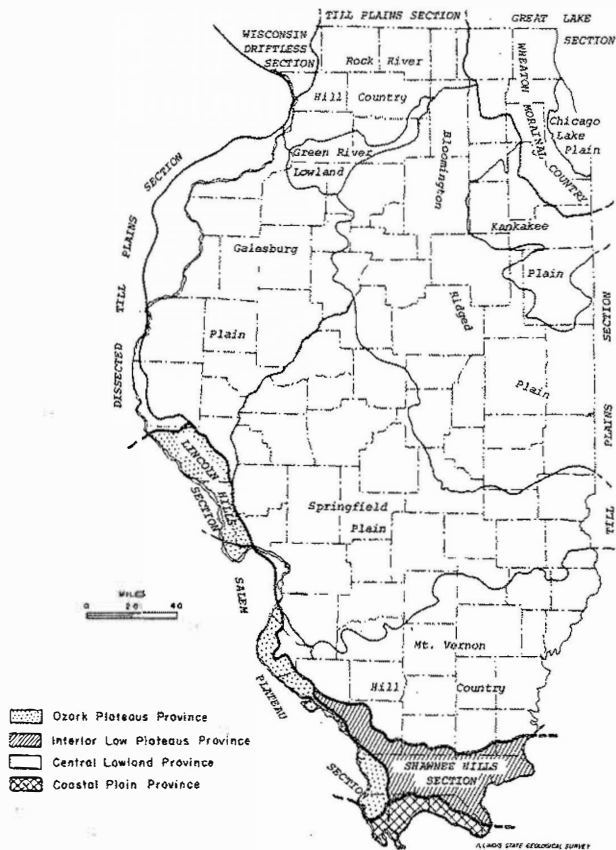


Figure 4. Physiographic divisions of Illinois. From Leighton, et al. (1948).

river valleys. Other areas of significant relief within the till plain are the youthful moraines of northeastern Illinois and areas of thin drift and rolling topography in the Rock River valley and southeastern Illinois. The remainder of this till plain is an arc of older, eroded Illinoian till south and west of the younger, less dissected Wisconsin till.

Topography has influenced the biota of Illinois by controlling the diversity of habitats. In the glaciated regions, forest was restricted mainly to the rugged topography of stream valleys and moraines while prairie occupied most of the level uplands and some of the broad floodplains. In general, the more rugged the topography the greater the diversity of habitats. Youthful topography, such as the Wisconsin till plain, is poorly drained, resulting in an abundance of aquatic habitats. Drainage has been improved by ditching in most prairie regions of the till plain.

SOILS

The basic reference for the soils of Illinois is Fehrenbacher, Walker, and Wascher (1967). The principal soil features influencing the recognition of divisions and sections are sand areas, soils derived from glacial till, deep loess soils,

and claypan soils. The description of soil conditions within the divisions is only generalized. Alluvial soils occur in every division, but they are not usually mentioned in the text.

In this work, the most important features of soils are parent material, (Figure 6) texture and degree of development. The general terms "heavy soils", "light soils", and "sandy soils" refer to texture. Heavy soils are predominantly clay; moisture generally moves slowly through such soils and aeration is poor. They often provide a more rigorous environment for plant growth. Light soils contain a mixture of clay, silt, and sand, are well aerated, and readily yield moisture to plants. Sandy soils are well aerated and have poor moisture-holding ability. They provide a severe environment for plants because of their

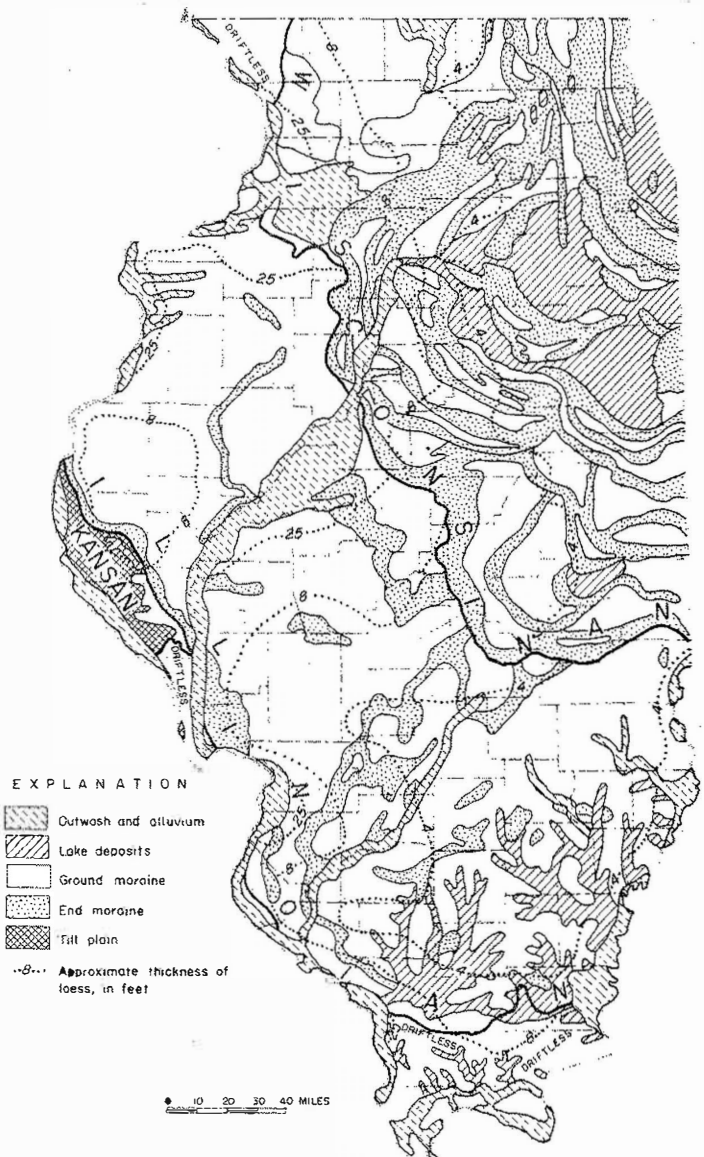


Figure 5. Glacial geology of Illinois. From Piskin and Bergstrom (1967).

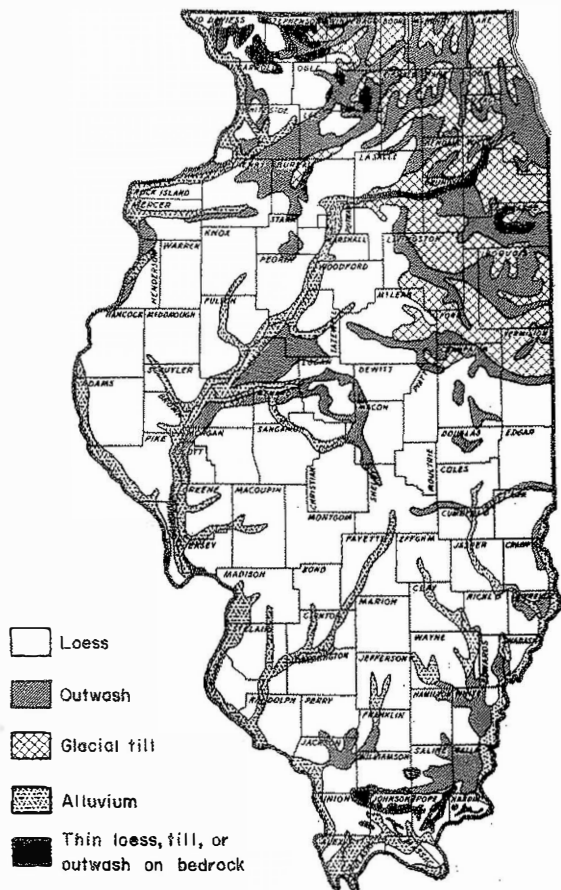


Figure 6. The extent of the main kinds of soil parent materials in Illinois. From Fehrenbacher, Walker and Wascher (1967).

droughtiness and susceptibility to wind erosion.

The parent material for most Illinois soils is loess, a wind-deposited silt. Loess deposits are deepest near the major river valleys and become thinner and of finer texture with increased distance. Figure 7 shows the distribution and depth of loess in Illinois. This mantle of loess has reduced the diversity of soil types in much of the State. Deep loess soils are generally less weathered, and more fertile than those derived from thin loess, especially in the southern third of Illinois.

Soils derived primarily from glacial till are restricted to northeastern Illinois, where geographic position has prevented deep accumulations of loess. The texture of these soils ranges from gravel to clay. The diversity of soil parent material is partly responsible for the great variety of environments and varied biota of this region.

Sand derived from glacial outwash is another important parent material that occurs as terraces along major streams throughout Illinois. In some instances the soils developed from sand support biota distinctive enough to warrant recognition in the natural divisions. Local sand areas are not

listed because they are generally not considered to be of statewide significance.

Alluvial soils tend to be lighter in central and northern Illinois than in southern Illinois. They frequently support distinctive biota.

Peat and bedrock are parent materials that give rise to soils which often support unusual plants and animals. Although limited in area, they have contributed to the recognition of some divisions and sections.

The degree of soil development is a function of time and climate. Older soils tend to be more strongly developed and have many of their soluble minerals and clay particles leached from the surface layers. The same is true of soils developed in areas of higher precipitation, as in southern Illinois. A strongly developed soil may have a claypan formed by the accumulation of clay particles in the subsoil. Claypan restricts penetration by roots and movement of ground water, thus sometimes determining the dominant vegetation over wide areas. For example, the strongly developed claypan soils of south-central Illinois determine to a great extent the distribution of post oak flatwoods. These soils are a primary factor in the recognition of the Southern Till Plain Division.

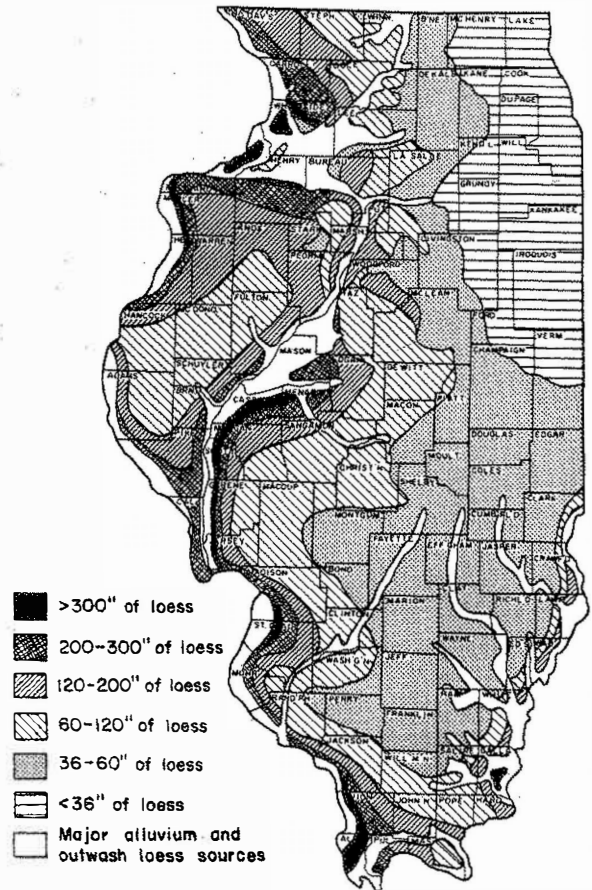


Figure 7. Approximate loess depth (in inches) on uneroded topography in Illinois. From Fehrenbacher, et al. (1967).

Younger soils are derived from relatively recent deposits of till, loess, or alluvium, or exposure of bedrock. They are not strongly developed, are relatively rich in minerals, and lack claypans.

BEDROCK

Bedrock differences are often reflected in the topography, especially in driftless areas. Bedrock also controls the plant life to some extent through the influence it has on the thin soils developed from it. Bedrock type can determine the presence of caves and other habitats.

The distribution of bedrock types in Illinois is shown on a State geologic map by Willman *et al.* (1967). The distribution of bedrock outcrops in the glaciated areas of the State is shown on a bedrock-surface map by Horberg (1950). The general distribution of caves is given by Bretz and Harris (1961).

The Ozark Division shows the effect of bedrock differences. The Northern Section (Monroe County) and the Southern Section (Union and Alexander counties) are both parts of the Salem Plateau of the Ozarks and were presumably uplifted at about the same time. The Southern Section is underlain by cherty limestone which is resistant to erosion and has produced very rugged topography with surface drainage. Steep cherty slopes in this section support acid-soil plants such as short-leaf pine, azalea, and farkleberry. On the other hand, the Northern Section is underlain by relatively pure limestone that is less resistant to erosion and groundwater solution, producing gentler topography with some internal drainage through sinkholes and solution cavities. Natural sinkhole ponds are common. Most of the acid-soil plants are lacking, and the flora includes a distinctive assemblage of Ozark "limestone glade" species.

NATURAL VEGETATION

There is no detailed map of the vegetation of Illinois with descriptions of the plant communities. Some communities are briefly characterized by Vestal (1931). The most complete reference on species composition of Illinois forests is Telford (1926). Evers (1955) described the hill prairies of Illinois in detail, and Gleason (1910) described the vegetation of the inland sand areas. Vestal (1914) and Sampson (1921) described the flatland prairies of Illinois. Gates (1912) described the vegetation of the Lake Michigan beach and dunes area. Some of the vegetation descriptions for northern Illinois follow Curtis (1959). The map compiled by Anderson (1970) indicates the distri-

bution of prairie in Illinois at about the time of settlement (Figure 8). Anderson also includes a general bibliography on Illinois prairie.

The dominant species and some of the most frequent associates in the principal plant communities of each natural division are listed in the text, but no attempt is made to characterize the total vegetation of each division. Generally the descriptions pertain to natural vegetation in Illinois about the time of settlement. At present this vegetation has been completely destroyed by man over vast sections of the State.

The striking contrast between prairie and forest vegetation that existed at the time of settlement is of little consequence to the recognition of natural divisions, as both forest and prairie or prairie-like communities occur in every division. However, the relative abundance of the prairie community was important in delimiting some divisions.

At the time of the settlement of Illinois there were considerable areas termed "barrens" by land surveyors. These barrens were briefly described by Engelmann (1868) as grassy areas of broken or hilly ground with scattered oaks. He speculated that they owed their existence to annual prairie fires. Apparently the barrens developed into forest or were cleared for agriculture soon after settlement. In any event, they were destroyed before being thoroughly described. They probably occurred in all the natural divisions, but they are not included in the vegetation accounts because their species composition is unknown.

FLORA

Basic references on the distribution of vascular plants in Illinois are Jones and Fuller (1955) and Winterringer and Evers (1960). Swink (1969) gives detailed distribution of plants in the Chicago region, and Mohlenbrock (1967, 1970a, 1970b, 1972) gives distribution of certain groups.

An analysis of the distribution of vascular plants in relation to physiographic provinces, bedrock types, soil types, topography, and drainage systems reveals a considerable number of distinctive species apparently restricted to certain provinces or natural features. These restricted distributions, especially for such dominant plants as trees, were important in delimiting the natural divisions. Many of these distinctive plants are listed in the descriptions of the divisions.

Common names of plants are used in the text. The corresponding scientific names are given in Appendix A. Nomenclature follows Jones (1963). The common names are those most generally used in Illinois.

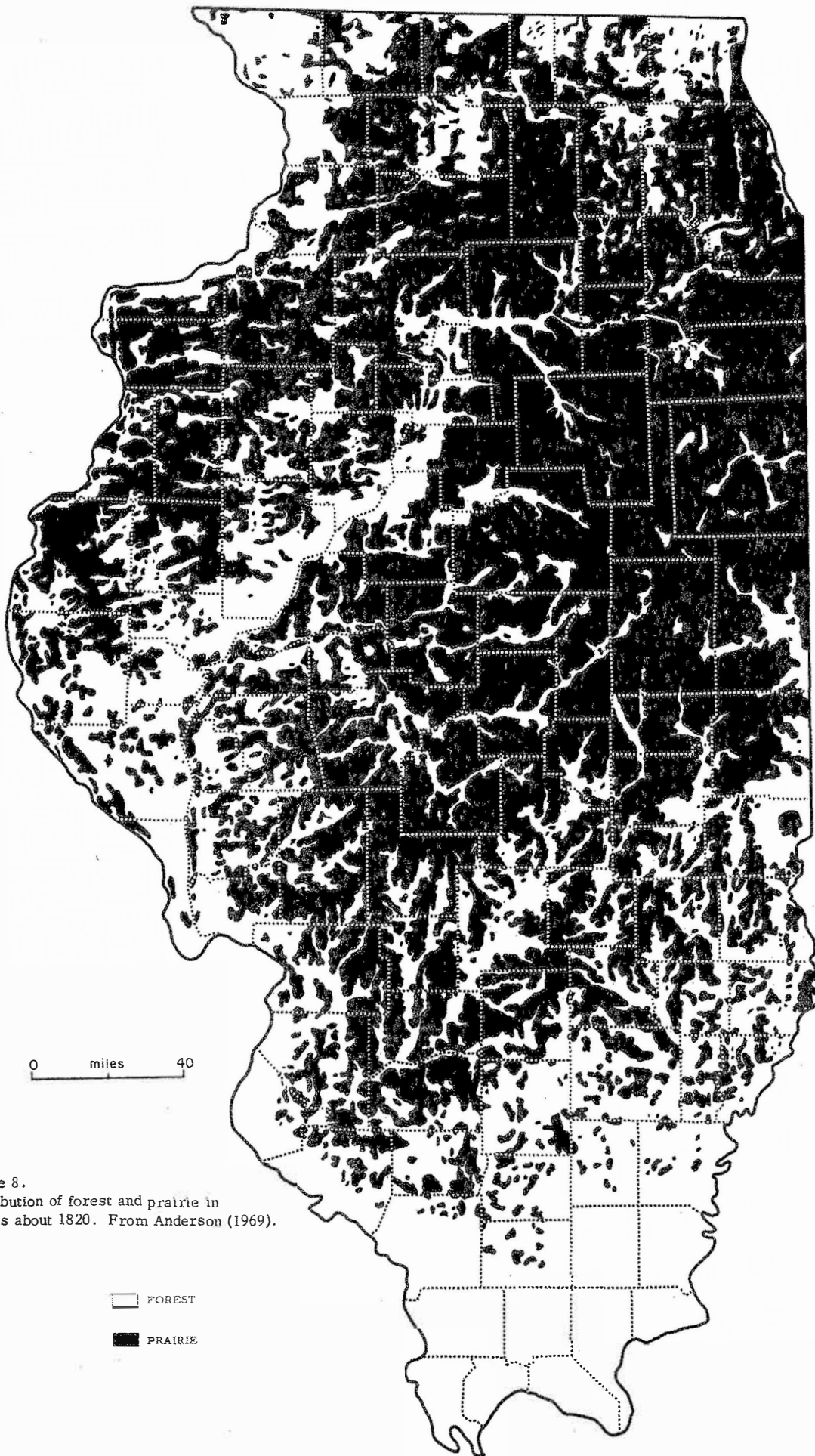


Figure 8.
Distribution of forest and prairie in
Illinois about 1820. From Anderson (1969).

□ FOREST
■ PRAIRIE

FAUNA

The general references on vertebrate distribution in Illinois are Smith (1965) for fishes, Smith (1961) for amphibians and reptiles, and Hoffmeister and Mohr (1957) for mammals. A detailed description of fish distribution in the Mississippi River is given in Smith, Lopinot, and Pflieger (1971).

The distribution of birds in Illinois is less adequately documented than that of other classes of vertebrates. Nor does their distribution correlate as well with the natural divisions recognized here, being more heavily influenced by climate and by artificial and transitory conditions. For these reasons, distinctive species of birds are mentioned in the descriptions of only a few natural divisions.

Examination of the distribution of non-avian vertebrates in Illinois reveals many correlations with physiographic features, vegetation, watersheds, and soil types. Smith (1961), by his recognition of herpetofaunal divisions of Illinois, has shown that this correlation exists for amphibians and reptiles. The present work indicates considerable correlation between the natural divisions and patterns of fish distribution, and to a lesser extent with those of mammals.

The vertebrates that are considered distinctive of certain divisions and species that have influenced the location of divisional boundaries are mentioned in the descriptions of the divisions. There is no attempt to characterize the fauna of each division.

Common names of vertebrates are used in the text. Scientific names are given in Appendix B. With regard to both common and scientific names, the nomenclature follows Smith (1965) for fishes and Smith (1961) for amphibians and reptiles. With few exceptions, the mammal names follow Hoffmeister and Mohr (1957). The names of birds mentioned in the text follow the American Ornithologists Union Check-list of North American Birds.

No attempt has been made to examine the distribution of invertebrates, or their relation to the natural divisions. The Plains scorpion is mentioned as a distinctive feature of the Ozark Division, but this is the only exception.

CLIMATE

Climate has played a role in the delineation of some divisions and sections by its effects on the distribution of plants and animals, especially in extreme northern Illinois and southern Illinois. However, there is little direct correspondence between climatic regions and the natural divisions.

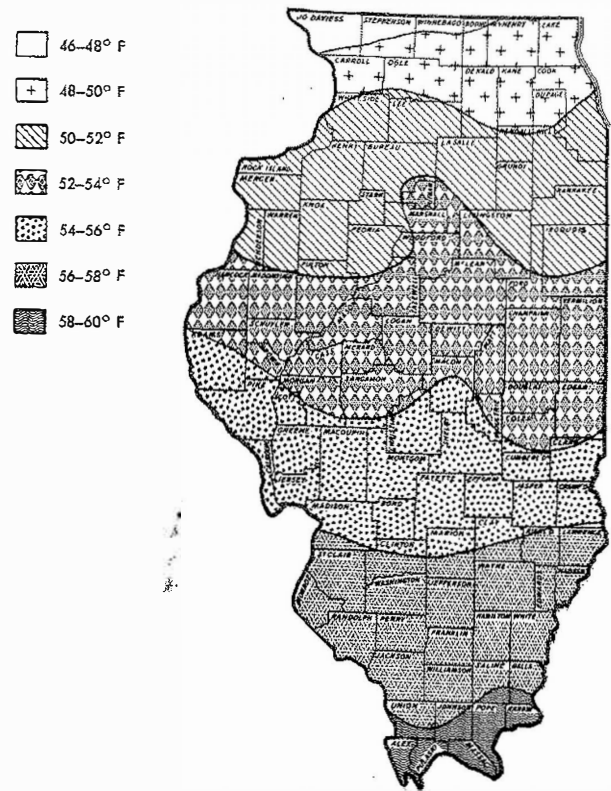


Figure 9. Average annual temperature (degrees Fahrenheit), 1931-1960. From Fehrenbacher, et al. (1967).

The basic reference on the climate of Illinois is Page (1949). More recent climatological data are available from the U. S. National Weather Service.

Illinois has a continental climate with hot humid summers and cold winters. This climate varies considerably from north to south in temperature and precipitation. The northern counties have lower mean annual temperatures, shorter growing seasons, and less precipitation than the southern counties.

The mean annual temperature (Figure 9) ranges from about 47° F in the north to about 59° F in the south. The mean January temperature ranges from 22° F in the north to 36° F in the south, and the mean July temperature ranges from 73° F in the north to 80° F in the south. The average length of the growing season (Figure 10) ranges from less than 160 days in northwestern Illinois to more than 200 days in the southern tip of the State.

Average annual precipitation (Figure 11) increases from about 32 inches in the north to 47 inches in the south. Although the southern counties receive the most rainfall, much of this occurs in winter. Precipitation during the growing season is more nearly uniform throughout the State.

1 WISCONSIN DRIFTLESS DIVISION

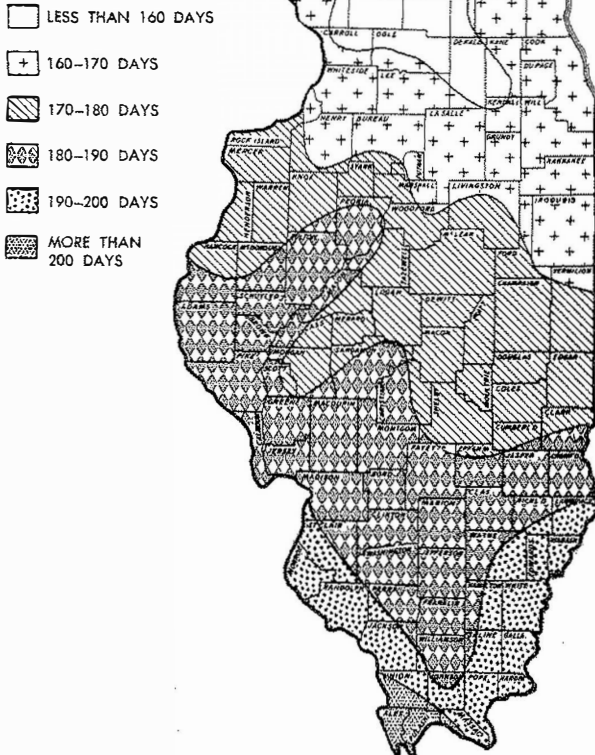


Figure 10. Average number of frost-free days in Illinois. From Fehrenbacher, et al. (1967).

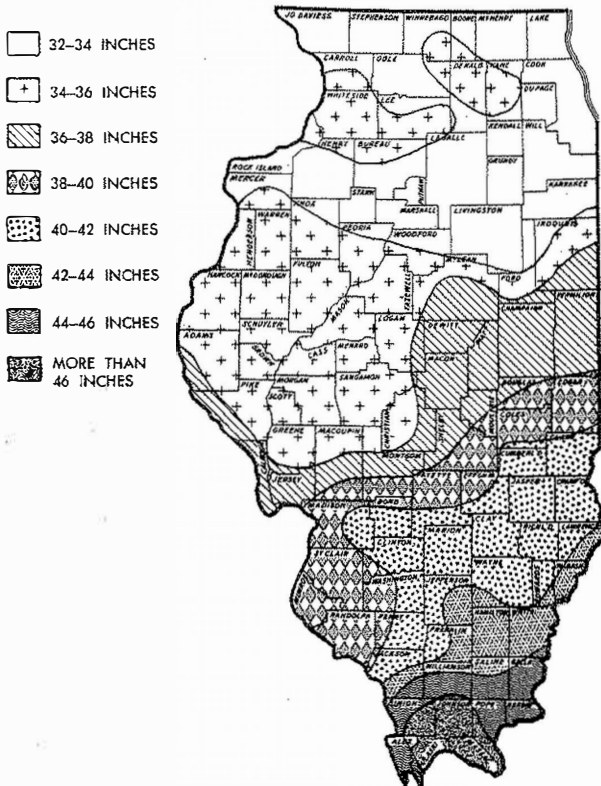
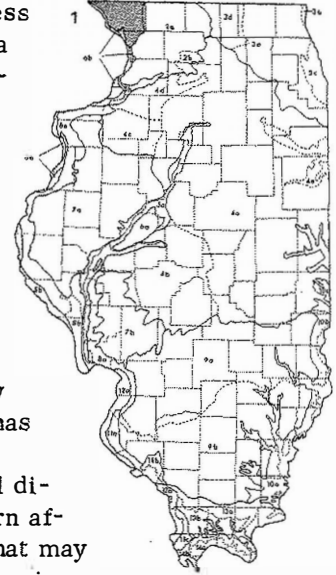


Figure 11. Average annual precipitation (in inches) in Illinois. From Fehrenbacher, et al. (1967).

The Wisconsin Driftless Division is part of an area extending from northwestern Illinois into Wisconsin, Iowa, and Minnesota that apparently escaped Pleistocene glaciation. This division is one of the most maturely developed land surfaces in Illinois and is characterized by rugged terrain that originally was mostly forested. It has the coldest climate in the State. It contains several distinctive plants of northern affinity and some species that may represent relicts of the pre ice-age flora. The division contains lead deposits.



BEDROCK

The Wisconsin Driftless Division is a maturely dissected upland of Ordovician and Silurian limestone, dolomite, and shale. Bedrock crops out along the major watercourses. Prominent "mounds" capped with the more resistant dolomite are common. A mineralized zone containing deposits of lead and zinc is an important feature. Caves are known in the dolomite.

TOPOGRAPHY

The topography of the Wisconsin Driftless Division is one of rolling hills and great relief, particularly along interior stream canyons. High erosional remnants, (including Charles Mound, the highest point in Illinois, with an elevation of 1,257 feet), are prominent features. There are loess-capped bluffs and palisades along the Mississippi River valley and ravines and bluffs throughout the division.

SOILS

The soils of this division have developed from loess or, on steeper slopes, from loess on bedrock. The loess soils are derived from thick deposits and are weakly to moderately developed. The soils on bedrock are thin to moderately thick and well drained.

PLANT COMMUNITIES

FOREST: The original vegetation of the Wisconsin Driftless Division was predominantly

upland hardwood forest dominated by black oak and white oak on dry sites and by sugar maple, basswood, and red oak on mesic sites. Floodplain forests dominated by silver maple, American elm, and green ash occupy alluvial soils of the stream valleys. Cliffs and cool, shaded slopes of this division often support white pine, Canada yew, and white birch.

PRAIRIE: Dry prairie on the rolling uplands contained such species of the northern Great Plains as the plains buttercup, pasque flower, June grass, and Wilcox's panic grass, along with the dominant little bluestem and side-oats grama. Areas of mesic and wet prairie were infrequent. Frink's Prairie and Jules Prairie were two extensive prairies on the uplands. Loess hill prairies dominated by little bluestem and side-oats grama occur on the steep southwest-facing bluffs above the Mississippi River floodplain.

AQUATIC HABITATS

The main aquatic habitats of the Wisconsin Driftless Division are creeks and rivers. Springs are local, and intermittent streams are characteristic of the ravines.

SPECIAL FEATURES

The Wisconsin Driftless Division contains several distinctive plants considered relicts of preglacial or interglacial floras, such as jeweled shooting star, sullivania, and cliff goldenrod. Cool shaded ravines, cliffs, and river bluffs provide habitat for relict populations of some distinctive northern plants including woodland white violet, bird's-eye primrose, American stickseed, and moschate. Some of these distinctive plants are restricted to river bluffs of the Mississippi River valley, and others grow only in interior stream canyons.

PRINCIPAL NATURAL FEATURES

FOREST: Dry upland, mesic upland, floodplain.

PRAIRIE: Dry, mesic, wet.

LOESS HILL PRAIRIE

BEDROCK: Outcrops of dolomite and shale, zinc and lead deposits, caves.

TOPOGRAPHY: Mississippi River bluffs, interior stream canyons, ravines, ridges and "mounds", level to rolling upland.

AQUATIC HABITATS: Creeks, rivers.

SPECIAL FEATURES: Northern and preglacial or interglacial plants.

2 ROCK RIVER HILL COUNTRY DIVISION

The Rock River Hill Country Division is a region of rolling topography that is drained by the Rock River. It has a thin mantle of glacial till. Prairie formerly occupied the larger expanses of level uplands, but forest was equally abundant along the water courses and in the more dissected uplands. Several distinctive plant species occur in this division. The Freeport and Oregon Sections are recognized on the basis of bedrock types and resultant floral differences.



GLACIAL HISTORY

The Rock River Hill Country Division is thinly mantled with glacial drift from the Illinoian and early Wisconsin stages of Pleistocene glaciation. The Pecatonica lobe of the Altonian substage of the Wisconsin glacial stage extended westward in this division into Stephenson and Ogle counties.

BEDROCK

The bedrock is primarily Ordovician and Silurian dolomite and limestone. Outcrops of the dolomite occur throughout the division, particularly along the streams. St. Peter sandstone underlies the Oregon Section and crops out frequently. There are caves in the dolomite near the Mississippi River.

TOPOGRAPHY

The topography varies from level to rolling, with river valleys, and "dells" or bluffs along streams throughout the division. The Oregon Section is very rough, with bluffs, ridges, and ravines in the sandstone. The Pecatonica River meanders through a broad plain formed by sediments of a glacial lake.

SOILS

The soils have developed primarily from moderately thick loess and thin loess on bedrock. Soils developed from glacial outwash occur in the major river valleys. Small areas of soils developed from glacial till occur throughout the division.

PLANT COMMUNITIES

FOREST: The forests are similar to those of the Wisconsin Driftless Division. They occurred on slopes and areas protected from prairie fires. The dry upland forests are dominated by black oak, white oak, bur oak, and wild black cherry. Mesic sites support forests dominated by sugar maple, basswood, slippery elm, and red oak. White pine, Canada yew, and yellow birch are occasionally found on cool, shaded bluffs. The floodplain forests are particularly well developed along the Pecatonica River and are dominated by silver maple, black willow, cottonwood, American elm, and ashes. The Oregon Section is heavily forested with black oak, white oak, and bur oak.

PRAIRIE: Prairies occupied much of the level to rolling uplands. The largest was known as Shannon Prairie. The dry upland prairies contained the floral elements of the northern Great Plains listed for the Wisconsin Driftless Division. Mesic prairies were the most common type and contained the species typical of the Grand Prairie, the dominant grasses being big bluestem, Indian grass, and prairie dropseed. Wet prairies contained cord grass, bluejoint grass and big bluestem.

MARSH: Marshes in poorly drained parts of the prairies and along the streams and river floodplains are dominated by cattail, bulrushes, sedges, and occasionally common reed.

AQUATIC HABITATS

The major aquatic habitats of the Rock River Hill Country Division are rivers and creeks. Meander scar sloughs characterize the Pecatonica River floodplain. Springs and seepage areas occur locally, especially in the sandstone areas of the Oregon Section.

a FREEPORT SECTION

The Freeport Section includes most of the Rock River Hill Country Division and is characterized by rolling hills and dolomite and limestone bedrock.

PRINCIPAL NATURAL FEATURES

FOREST: Dry upland, mesic upland, floodplain.

PRAIRIE: Dry, mesic, wet.

MARSH

BEDROCK: Outcrops of dolomite and limestone caves.

TOPOGRAPHY: Stream canyons and bluffs, floodplain, rolling uplands, meander scars.

AQUATIC HABITATS: Rivers, creeks, sloughs.

SPECIAL FEATURE: Northern relict plants.

b OREGON SECTION

The Oregon Section is distinguished from the rest of the division by its sandstone bedrock and the unique northern plants associated with it. These distinctive northern relicts include ground pine, rusty woodsia, oak fern, and American wintergreen.

PRINCIPAL NATURAL FEATURES

FOREST: Dry upland, mesic upland, floodplain.

PRAIRIE: Dry, mesic, wet.

BEDROCK: Sandstone outcrops.

TOPOGRAPHY: Rolling uplands, floodplain, ravines, bluffs.

AQUATIC HABITATS: Rivers, creeks.

SPECIAL FEATURE: Northern relict plants.

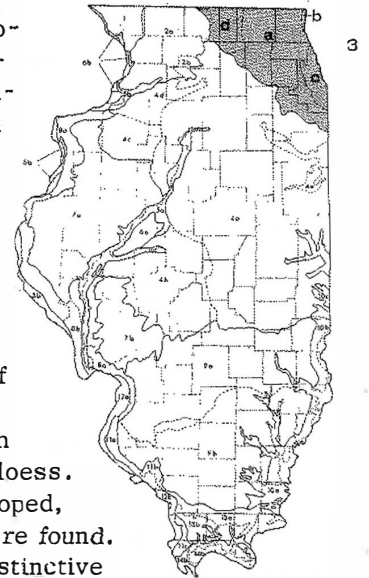
3 NORTHEASTERN MORAINAL DIVISION

The Northeastern Morainal Division is the region of most recent glaciation in Illinois. Glacial landforms are common features and are responsible for the rough topography over most of the area. Lake-bed deposits and beach sands are also frequent features. Unlike most of Illinois the soils of this division are derived from glacial drift rather than loess. Drainage is poorly developed, and many natural lakes are found. This division contains distinctive northern and eastern floral elements including the bog community. Several species of animals are known in Illinois only from this area.

The Sections are recognized because of differences in topography, soil, glacial history, flora, and fauna.

BEDROCK

The bedrock is primarily Ordovician and Silurian limestone and dolomite with some shale. The bedrock is deeply buried by glacial drift but limestone crops out along some of the streams.



GLACIAL HISTORY

The Northeastern Morainal Division is covered with deep glacial drift from the Altonian and Woodfordian substages of the Wisconsin glacial stage. Moraines, kames, eskers, and other glacial landforms occur throughout the division.

TOPOGRAPHY

Moraines and morainic systems are dominant topographic features and account for the rough, hilly, and rolling terrain of most of the division. There are outwash plains at the fronts of major terminal moraines, such as the Marengo Ridge. The Chicago lake plain and ancient beach ridges are prominent features of the Chicago area and were formed by sediments of glacial Lake Chicago. Bluffs were formed along Lake Michigan north of Chicago during high water stages of glacial Lake Chicago.

Sand dunes are present along Lake Michigan north of Waukegan and east of the Sugar River in Winnebago County. The Lake Michigan dunes are well developed and are associated with the beach area. This is the only division to have a natural beach-and-dunes association. Ridges and swales occur in the sand area north of Waukegan and in the Chicago lake plain.

SOILS

The soils are derived primarily from glacial drift, lake bed sediments, beach deposits, and peat. They range from very poorly drained to well drained on the uplands. They are diverse in texture, ranging from gravel and sand to silty clay loams. The many different soils are responsible for the diversity of plant communities found in this division.

PLANT COMMUNITIES

FOREST: Bur oak and white oak dominate the dry upland forests on moraines and other glacial landforms of this division. Many of the forests were typical oak openings but have been heavily grazed or have rapidly grown up to closed, dense forests due to the effective exclusion of fire. The mesic upland forests are dominated by sugar maple, basswood, red oak, and white ash. Notable northern shrubs of these mesic forests are highbush cranberry and red elder. Beech occurred in a few ravines along Lake Michigan. The dominant species of the floodplain forests are silver maple, green ash, and American elm. Some of the poorly drained upland forests are dominated by swamp white oak. Black oak and Hill's oak oc-

cur on the sandy soils of the dunes and ridges, forming savanna-like or scrub-oak forests. Jack pine and white pine once grew on sandy ridges in the Chicago lake plain. Tamarack occurs in some poorly drained depressions of the Valparaiso morainic system. Plants essentially restricted in Illinois to the forests of the Northeastern Morainal Division include maple-leaf viburnum, round-lobed hepatica, wood reed, large-leaved aster, moccasin flower, and purple trillium.

PRAIRIE: The presettlement vegetation of the Northeastern Morainal Division was about 60 percent prairie. Dry prairie on the gravel moraines and eroded bluffs was dominated by little bluestem and side-oats grama, and contained several species typical of the western plains. The mesic prairie and wet prairie were dominated by prairie dropseed, big bluestem, Indian grass, switch grass, cord grass and bluejoint grass, and contained many characteristic forbs. Extensive areas of sand prairie occurred in the sand areas of the Chicago lake plain, east of the Sugar River in Winnebago County, and in the Lake Michigan Dunes Section. Some distinctive plants of sandy prairie and sandy open woods are sweet-fern, speckled alder, yellow fringed orchid, fringed gentian, and small fringed gentian. Colic-root, hardhack, and lupine occur in sand prairies near Lake Michigan.

FEN: A fen is a type of wet prairie with an alkaline water source. Fens are associated with calcareous springs and seeps and also occur in swales and on low ground near lakes in areas of calcareous ground water. They warrant recognition because of their distinctive species composition. Some of the notable plants are small white lady's slipper, grass-of-Parnassus, meadow spikemoss, Ohio goldenrod, Kalm's lobelia, shrubby cinquefoil, low calamint, and white camass.

MARSH: Marshes are conspicuous plant communities of the Northeastern Morainal Division, common because of the poorly drained soils. Marshes are generally dominated by cattails and bulrushes, with common reed locally abundant.

SEDGE MEADOW: Many of the marshes of this division grade into an open community where sedges dominate instead of cattails and bulrushes, forming sedge meadows. These are often associated with wet-shrub communities dominated by dogwoods, willows, and infrequently, speckled alder.

BOG: True bogs are found in Illinois only in the Northeastern Morainal Division. These have formed in poorly drained depressions in the Valparaiso morainic system and contain many distinc-

tive plants such as pitcher plant, sundew, cranberry, leatherleaf, poison sumac, winterberry, and dwarf birch. All stages of bog succession - young, mature, and old - are represented.

AQUATIC HABITATS

The Northeastern Morainal Division is poorly drained and has many aquatic habitats. It contains all of Illinois' glacial lakes and is the only division on Lake Michigan. The glacial lakes are generally of two types: those with a peat base, and those with a sand or marl base. The biota of each type is different. Some species of water marigold and two species of bladderwort are restricted to the glacial lakes of this division.

DISTINCTIVE FAUNA

The pugnose shiner, blackchin shiner, and banded killifish are known in Illinois only from the glacial lakes of this division. The alewife, American smelt, lake chub, and ninespine stickleback are fishes that occur in Illinois only along the shore of Lake Michigan. Lake trout and lake whitefish are species restricted to the deeper waters of Lake Michigan. The common tern breeds in Illinois only in a few locations near Lake Michigan, and the piping plover did so until fairly recently. Breeding of the golden-winged warbler in Illinois is restricted to this division, where it has been known to hybridize with the blue-winged warbler. Breeding of the Nashville warbler in Illinois is reported only from this division. Except for casual occurrences, the large population of oldsquaws that winters on Illinois waters is restricted to Lake Michigan; and much the same is true for wintering white-winged, common, and surf scoters. The occurrence in Illinois of several species of migrant waterbirds such as the parasitic, pomarine, and long-tailed jaegers, the knot, and Bonaparte's and little gull is limited almost entirely to Lake Michigan or its shores. Other animals restricted to this division are the spotted turtle, blue-spotted salamander, and pigmy shrew.

a MORAINAL SECTION

The Morainal Section of the Northeastern Morainal Division encompasses the moraines and morainic systems of the late advances of the Woodfordian substage of Wisconsinan glaciation. This section contains most of Illinois' glacial lakes as well as its true bogs. Glacial landforms are well represented.

PRINCIPAL NATURAL FEATURES

FOREST: Dry upland, mesic upland, wet upland, floodplain, tamarack swamp.

PRAIRIE: Dry, mesic, wet.

FEN

MARSH

SEDGE MEADOW

BOG: Youthful, mature, old.

GLACIAL LANDFORMS: Moraines, kames, eskers, drumlins, kettle-holes.

TOPOGRAPHY: Rolling upland, ravines, lake bluffs.

AQUATIC HABITATS: Rivers, creeks, glacial lakes, sloughs.

b LAKE MICHIGAN DUNES SECTION

This section is recognized because of the unique flora of its dunes and beaches. This flora includes some sand-binding plants that differ from those of the inland sand deposits, such as beach grass, creeping juniper, and bearberry. Plant communities range from sand prairie, to marsh, to scrub-oak forest. The continuing vegetational succession from shifting sand to stabilized sand results in a wide variety of plant associations.

PRINCIPAL NATURAL FEATURES

FOREST: Scrub-oak.

SAND PRAIRIE: Dry, mesic, and wet.

FEN

MARSH

TOPOGRAPHY: Beach, ridges and swales, dunes.

AQUATIC HABITATS: Creeks, Lake Michigan.

c CHICAGO LAKE PLAIN SECTION

The Chicago lake plain is a flat, poorly drained area of lakebed sediments deposited by glacial Lake Chicago. It is recognized because of its special topography and physiographic history. Long ridges of shore-deposited sands are conspicuous topographic features. A few natural lakes occur near Calumet City. The original vegetation was mostly prairie and marsh, with scrub-oak forests on sandy ridges. Black gum and sassafras are found in some of the wet forests. *Thismia*, one of the most unusual plants of the American flora, occurred only in the Chicago Lake Plain Section, near Lake Calumet, but is now considered extinct because this area has been converted to industry.

PRINCIPAL NATURAL FEATURES

FOREST: Scrub-oak, mesic upland, floodplain.
PRAIRIE: Dry, mesic, wet.
SAND PRAIRIE: Dry, mesic, wet.
FEN
MARSH
TOPOGRAPHY: Lake plain, ridges and swales.
AQUATIC HABITATS: Lakes, creeks, Lake Michigan.

d WINNEBAGO DRIFT SECTION

This section encompasses the Winnebago Formation of Altonian drift. This early Wisconsinan drift is better drained than that of the Morainal Section, having fewer marshes and no glacial lakes. The original vegetation was predominantly prairie, with oak openings, dry upland forest, and well developed floodplain forests. Glacial outwash is extensive along many of the creeks and rivers. Wet prairie and marsh with large sedge meadows or "prairie bogs" occur in the sand area along Coon Creek. Dunes have formed along the east bank of the Sugar River and support sand prairie vegetation and dry upland forests of black oak and Hill's oak.

Distinctive features of this section are the extensive gravel hill prairies which once extended along the eroded east bluffs of the Rock River valley into Wisconsin. These prairies contained many western elements, including pasque flower, plains buttercup, and prairie smoke.

PRINCIPAL NATURAL FEATURES

FOREST: Dry upland, mesic upland, floodplain.
PRAIRIE: Dry, mesic, wet.
SAND PRAIRIE: Dry, mesic, wet.
MARSH
SEDGE MEADOW
BEDROCK: Outcrops of limestone and sandstone.
TOPOGRAPHY: Dunes, outwash plains, river terraces, meander scars.
AQUATIC HABITATS: Rivers, creeks, sloughs.

4 GRAND PRAIRIE DIVISION

The Grand Prairie Division is a vast plain formerly occupied primarily by tall-grass prairie. The soils were developed from recently de-

posited loess, lakebed sediments, and outwash and are generally very fertile. Natural drainage was poor, resulting in many marshes and prairie potholes. Forest bordered the rivers and there were occasional groves on moraines and other prominent glacial landforms. The Sections of this division are differentiated on the basis of soils, topography, and glacial history.

At one time bison grazed the prairies and waterfowl in great numbers occupied the marshes and potholes. The steel plow brought about the rapid destruction of the vast Illinois prairies. Ditches and tile lines drained almost all of the marshes and potholes. The bison were gone by 1814. The abundant waterfowl were displaced. The giant Canada goose was extirpated as a breeding bird, and other characteristic species disappeared or became scarce. The prairie, once seemingly limitless, is now one of the rarest plant communities in Illinois, with only pitifully small and often degraded patches remaining.

GLACIAL HISTORY

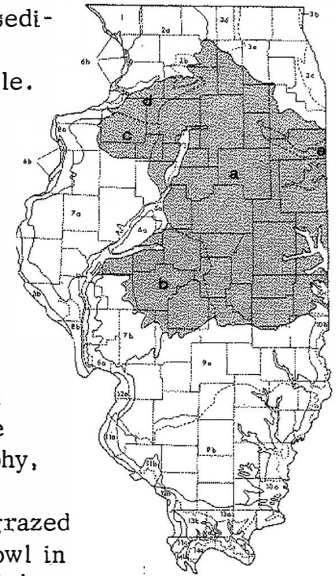
The Grand Prairie is a rather level, poorly drained plain of glacial drift from the Illinoian and Wisconsinan stages of Pleistocene glaciation. Repeated advances and retreats of the Wisconsinan glaciers created a series of moraines and morainic systems of which the Shelbyville and Bloomington morainic systems are conspicuous.

BEDROCK

The bedrock, deeply buried by glacial drift, crops out only along the larger rivers. Major outcrops of sandstone are found near Ottawa along the Illinois and Fox rivers. Dolomite crops out along the Kankakee River west of Kankakee.

TOPOGRAPHY

The topography of the Grand Prairie Division is generally level to rolling, with the major stream valleys and the extensive systems of moraines providing the greatest relief. Large flat expanses of lakebed deposits are found in LaSalle, Kendall, Will, Grundy, Livingston, Ford, Iroquois, Kankakee, and Douglas counties. Extensive out-



wash plains and sand dunes are found in Kankakee and Iroquois Counties and in the valleys of the Green River and lower Rock River. The major rivers have well developed floodplains, and in many areas there are ravines in the bluffs.

SOILS

The soils are relatively young and high in organic content, having developed from a thin to moderately thick layer of loess, glacial drift, or lakebed sediments. Soils developed from sand, muck, and peat exist in the Kankakee Sand Area and Green River Lowland sections. Deep loess occurs along the Illinois and the lower Sangamon rivers.

PLANT COMMUNITIES

FOREST: The forests of the Grand Prairie Division are generally associated with the stream valleys and moraines. On dry sites, the forests are dominated by white oak, black oak, and shagbark hickory, with shingle oak and bur oak frequent associates. On mesic sites these species are replaced by basswood, sugar maple, slippery elm, American elm, hackberry, red oak, and white ash. Black walnut, butternut hickory, and, in the northern part, bigtooth aspen are common. The floodplain forests are of the silver maple-American elm - ash type. The prairie groves were influenced by recurrent fires and are generally of two types: one dominated by bur oak and the other dominated by American elm and hackberry. Sandy soils in the Green River Lowland and Kankakee Sand Area sections support scrub forests of black oak.

PRAIRIE: The vast prairies of Illinois were once one of its most remarkable features. They contained several hundred species of grasses and forbs and were interspersed by numerous marshes and prairie potholes. At the time of settlement, wet and mesic prairie were the most widespread plant communities of the Grand Prairie Division. Mesic prairie was dominated by big bluestem, Indian grass, prairie dropseed, switch grass, and little bluestem and contained many characteristic prairie plants such as leadplant, compass plant, prairie dock, and rattlesnake master. The wet sites were dominated by cord grass, sedges, and bluejoint grass and supported such species as ironweed, boneset, swamp milkweed, and water hemlock.

Dry upland prairie occurs mainly on steep slopes along the Illinois River, on loess bluffs along the lower Sangamon River, and on gravel moraines and kames. The dominant species of

the dry prairies are little bluestem and side-oats grama. They commonly contain such forbs as scurf-pea, pale beard-tongue, false boneset, cylindrical blazing star, and fringed puccoon.

Sand prairie occurs in the Kankakee Sand Area and Green River Lowland sections. Little bluestem, fall witch-grass, and sand dropseed are the important grasses, and goat's rue and spotted monarda are common forbs. June grass and porcupine grass are common. The sand prairies contain several species of Great Plains affinity such as western ragweed, prickly-pear cactus, poppy mallow, hairy grama, western sunflower, silky aster, and flax-leaved aster.

MARSH: The formerly common marshes and prairie potholes of the Grand Prairie Division were dominated by bulrushes, sedges, bur-reeds, cattails, and common reed and contained many species of aquatic and semi-aquatic plants such as arrowhead, water plantain, pondweed, pickerelweed, beggar-ticks, and water crowfoot.

AQUATIC HABITATS

The aquatic habitats of the Grand Prairie Division are rivers, creeks, and prairie potholes.

DISTINCTIVE FAUNA

Distinctive animals of the Grand Prairie Division are Blanding's turtle, western smooth green snake, western fox snake, eastern plains garter snake, Kirtland's water snake, northern lined snake, Franklin's ground squirrel, and thirteen-lined ground squirrel. None of these animals are completely restricted to this division, but all are most abundant here. Several amphibians and reptiles common outside the limits of Wisconsinan glaciation are conspicuously absent from the Grand Prairie.

a GRAND PRAIRIE SECTION

The Grand Prairie Section encompasses the area outside the Northeastern Morainal Division that was covered by the Woodfordian substage of the Wisconsinan stage of Pleistocene glaciation, excluding the outwash and sand areas. The Shelbyville and Bloomington morainic systems form the boundaries of this section. Mesic black-soil prairie, marshes, and prairie potholes in the young, poorly-drained drift are characteristic. Glacial landforms are common. The Kankakee mallow and Chase aster are endemic to Illinois and restricted to small areas of the Grand Prairie Section. The Kankakee mallow is found only on an

island in the Kankakee River, and Chase aster is known only from three counties near Peoria.

PRINCIPAL NATURAL FEATURES

FOREST: Floodplain, mesic upland, dry upland.
PRAIRIE GROVE
PRAIRIE: Wet, mesic, dry.
MARSH
BEDROCK: Sandstone and dolomite outcrops.
TOPOGRAPHY: Level to rolling upland, floodplain, ravines, river bluffs, lake plains, glacial landforms.
AQUATIC HABITATS: Prairie potholes, rivers, creeks.
SPECIAL FEATURES: Endemic plants

b SPRINGFIELD SECTION

The Springfield Section is part of the Illinoian drift, and the drainage system is better developed than in the younger Wisconsinan drift of the Grand Prairie Section. This section was mostly prairie in presettlement times. Deep loess deposits that support dry hill prairie occur along the lower Sangamon River. Large tracts of floodplain forest exist in the valley of the lower Sangamon River and its tributaries.

PRINCIPAL NATURAL FEATURES

FOREST: Floodplain, mesic upland, dry upland.
PRAIRIE: Wet, mesic, dry.
LOESS HILL PRAIRIE
MARSH
BEDROCK: Outcrops.
TOPOGRAPHY: Level to rolling upland, floodplain, ravines, river bluffs.
AQUATIC HABITATS: Rivers, creeks.

c WESTERN SECTION

The Western Section was predominantly prairie in presettlement times and therefore is in the Grand Prairie Division. It is part of the older, dissected Illinoian drift.

PRINCIPAL NATURAL FEATURES

FOREST: Floodplain, mesic upland, dry upland.
PRAIRIE: Wet, mesic, dry.
MARSH
BEDROCK: Outcrops.
TOPOGRAPHY: Level to rolling upland, floodplain, ravines.
AQUATIC HABITATS: Creeks.

d GREEN RIVER LOWLAND SECTION

The broad valley of the Green River and lower Rock River was formed by glacial melt waters. Much glacial outwash was deposited, and sand flats and dunes developed. This section had extensive marshes and wet prairies. It has scrub-oak forests on the dry sandy ridges and floodplain forests along the rivers. Sand prairie occupied the sand flats and dunes. Most of this section has been disturbed by grazing, drainage, and cultivation. There are some active dunes where the stabilizing cover has been removed.

PRINCIPAL NATURAL FEATURES

FOREST: Scrub-oak, floodplain.
PRAIRIE: Wet, mesic.
SAND PRAIRIE: Wet, mesic, dry.
MARSH
TOPOGRAPHY: Outwash plain, dunes.
AQUATIC HABITATS: Rivers.

e KANKAKEE SAND AREA SECTION

The sand of the Kankakee Sand Area Section was deposited by the Kankakee Flood during late Wisconsinan glaciation. Sand prairie and marsh were the predominant vegetation of this section before the land was drained for cultivation. Primrose violet and Carey's smartweed are restricted in Illinois to this section. Scrub-oak forests occur on drier sites. The clear, well-vegetated, sand-bottomed streams contain such unusual fishes as the weed shiner, iron color shiner, and least darter.

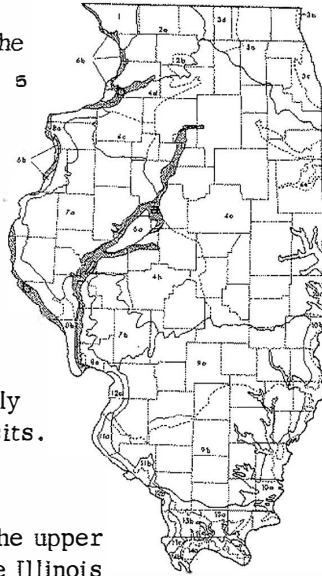
PRINCIPAL NATURAL FEATURES

FOREST: Scrub-oak.
SAND PRAIRIE: Wet, mesic, dry.
MARSH
TOPOGRAPHY: Outwash plain, dunes.
AQUATIC HABITATS: Creeks.

5 UPPER MISSISSIPPI RIVER AND ILLINOIS RIVER BOTTOMLANDS DIVISION

The Upper Mississippi River and Illinois River Bottomlands Division encompasses the rivers and floodplains of the Mississippi River above its confluence with the Missouri River and the bottomlands and associated backwater lakes of the Illinois River and its major tributaries south of LaSalle. It does not include the major sand deposits, which are in a separate division. Much of

the division was originally forested but prairie and marsh also occurred. The more sluggish nature of the Illinois River and its distinctive backwater lakes distinguishes the Illinois River Section from the Upper Mississippi River Section.



BEDROCK

The bedrock of the two river valleys is deeply covered by alluvial deposits.

TOPOGRAPHY

The bottomlands of the upper Mississippi River and the Illinois River are characterized by broad floodplains and gravel terraces formed by glacial flood waters.

SOILS

The soils are from recent alluvium and glacial outwash. They are poorly drained, alkaline to slightly acidic, and vary from sandy to clayey. In general they are lighter than the alluvial soils of the Lower Mississippi River Bottomlands Division.

PLANT COMMUNITIES

FOREST: The bottomland forests are generally dominated by silver maple, American elm, and green ash. Pin oak is the most important oak; and pecan, bur oak, sycamore, honey locust, hickories, and black walnut are frequent. Black willow and river birch are common in the Mississippi River Section. A few southern lowland species, including water locust, overcup oak, sugarberry, deciduous holly, and swamp privet, range into the southern part of this division.

PRAIRIE: In presettlement times mesic prairie and wet prairie occurred in the broad bottomlands. The species composition of these prairies was similar to that of the prairies of the Grand Prairie Division.

MARSH: Marshes containing the typical marsh species are important features throughout both sections.

SPRING BOGS: Springfed bogs with peat deposits are found on terraces along the Illinois River. These are unique to the Illinois River and the

species composition differs from that of the bogs of the Northeastern Morainal Division. Distinctive plants include black ash, willows, poison sumac, and skunk cabbage.

AQUATIC HABITATS

Oxbow lakes occur in both the Illinois River valley and the Mississippi River valley. Backwater lakes are distinctive of the Illinois River valley, and the Illinois River is more sluggish than the Mississippi River. Springs are common in gravel terraces along the Illinois River. The bottomland forests are subject to prolonged periods of flooding.

DISTINCTIVE FAUNA

The fish faunas of the Illinois River and the upper Mississippi River are similar although they differ somewhat from that of the silt-laden Mississippi River south of its confluence with the Missouri River.

a ILLINOIS RIVER SECTION

The Illinois River Section is distinguished from the Mississippi River Section by its distinctive backwater lakes and differences in forest vegetation. The spring bogs along the river bluffs are a special feature.

PRINCIPAL NATURAL FEATURE

FOREST: Bottomland.

PRAIRIE: Wet, mesic

MARSH

SPRING BOGS

TOPOGRAPHY: River floodplain, river terraces.

AQUATIC HABITATS: Backwater lakes, oxbow lakes, rivers.

b MISSISSIPPI RIVER SECTION

This section is composed of several disjunct bottomlands along the Mississippi River, from Wisconsin to Calhoun County. Most of the prairies of this section have been drained for agriculture. Forests are still found along the river inside the levees and on the river islands.

PRINCIPAL NATURAL FEATURES

FOREST: Bottomland.

PRAIRIE: Wet, mesic.

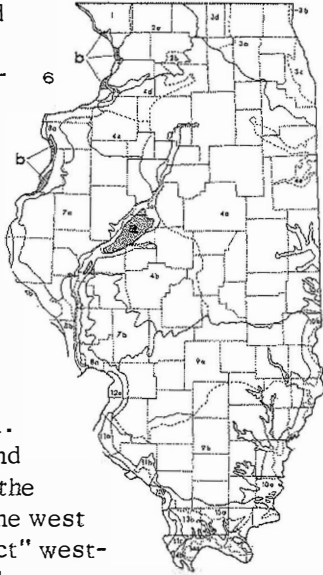
MARSH

TOPOGRAPHY: River floodplain, river terraces.

AQUATIC HABITATS: Oxbow lakes, rivers.

6 ILLINOIS RIVER AND MISSISSIPPI RIVER SAND AREAS DIVISION

The Illinois River and Mississippi River Sand Areas Division encompasses the sand areas and dunes in the bottomlands of the Illinois and Mississippi rivers and includes the "perched dunes" atop the bluffs near Hanover in Jo Daviess County. Scrub oak forest and dry sand prairie are the natural vegetation of this division. Several plant species found here are more typical of the short-grass prairies to the west of Illinois. Several "relict" western amphibians and reptiles are known only from these sand areas. The two sections are distinguished because of differences in flora and fauna.



TOPOGRAPHY

The topography is generally one of level to rolling plains of sand deposited by glacial melt waters and blown into widespread areas east of the rivers. In many areas the sand has migrated onto the bluffs and uplands east of the river terraces. In places, dunes 20 to 40 feet high have formed and blowouts are common in unstabilized sand.

SOILS

The soils are derived from sand and sandy material. Other soils in depressions surrounded by sand are also in this division. The soils are generally droughty and subject to wind erosion. Low areas are generally wet.

PLANT COMMUNITIES

FOREST: The forests of this division are limited to scrubby stands dominated by black oak in the Mississippi River Section and black and black-jack oaks in the Illinois River Section.

PRAIRIE: Sand prairie, composed of such species as little bluestem, June grass, Indian grass, and porcupine grass, is the major com-

munity of this division. The sand prairie habitats range from dry to wet and include such plants as goat's rue, spotted monarda, prickly-pear cactus, tubercled three-awned grass, poppy mallow, and fall witch-grass. The dry sites have western floral elements, including sand love-grass, hairy grama, and, rarely, bladderpod and Patterson's bindweed. The mesic and wet sites have prairie vegetation similar to that of the Grand Prairie Division. There are also various plant associations related to unstabilized sand. Long-leaved calamovilfa is one of the principal sand binders.

MARSH: Marsh occurs in low, poorly drained areas.

DISTINCTIVE FAUNA

Distinctive animals are the bullsnake, plains hognose snake, Illinois mud turtle, and Illinois chorus frog. The Illinois chorus frog is restricted to the Illinois River Section. The white-tailed jackrabbit is found in Illinois only in the northern part of the Mississippi River Section. The lark sparrow breeds most commonly in Illinois in the sandy habitats of this division, and a northern outlier population of the summer tanager breeds in forests of the Illinois River Section.

a ILLINOIS RIVER SECTION

The Illinois River Section is distinguished from the Mississippi River Section on the basis of floral and faunal differences.

PRINCIPAL NATURAL FEATURES

FOREST: Scrub-oak.

SAND PRAIRIE: Dry, mesic, wet.

MARSH

TOPOGRAPHY: Dunes, blowouts, level to rolling plain.

b MISSISSIPPI RIVER SECTION

The Mississippi River Section has floral elements absent from the Illinois River Section, including rock spikemoss, rough-seeded rock-pink and beach-heath. Rock spikemoss and beach-heath form large mats that stabilize blowouts.

PRINCIPAL NATURAL FEATURES

FOREST: Scrub-oak.

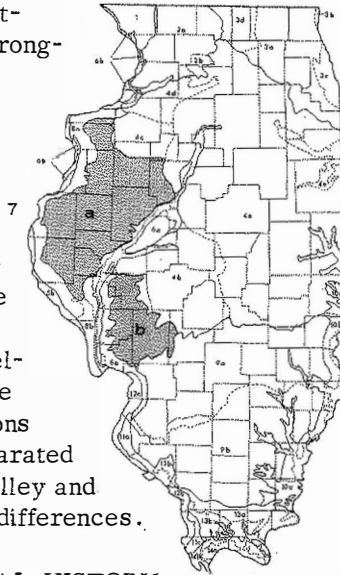
SAND PRAIRIE: Dry, mesic, wet.

MARSH

TOPOGRAPHY: Dunes, blowouts, level to rolling plain.

7 WESTERN FOREST-PRAIRIE DIVISION

The Western Forest-Prairie Division is a strongly dissected glacial till plain of Illinoian and Kansan age. At the time of settlement, forest was the predominant vegetation, but there was also considerable prairie on the level uplands. The prairie soils were developed from loess and are fertile. The two sections are geographically separated by the Illinois River valley and also have some faunal differences.



GLACIAL HISTORY

Most of the bedrock is covered by glacial drift from the Illinoian stage of Pleistocene glaciation. There is an area of older Kansan drift in the western parts of Pike and Adams counties.

BEDROCK

Pennsylvanian and Mississippian bedrocks of limestone, sandstone, shale, and coal crop out frequently along the major streams.

TOPOGRAPHY

The till plain is strongly dissected, with many ravines in the level to rolling uplands. Floodplains are developed along the major streams.

SOILS

Most of the soils are fairly young, having developed from four to five feet of loess. The prairie soils are high in organic matter and are similar to those of the Grand Prairie Division. The forest soils are acidic and low in organic matter. Relatively small areas of droughty, fine-textured soils have developed in till on some steep slopes.

PLANT COMMUNITIES

FOREST: The upland forests consist of an oak-hickory association with black oak, white oak, and several species of hickory as the dominants. Scattered sites of fine-textured soils support a post oak-blackjack oak community. This forest community also occurred on the margins of the prairies, perhaps because of fires. The mesic forests contain white oak, red oak, basswood,

sugar maple, and slippery elm. The floodplain forests are dominated by silver maple, American elm, ashes, and box elder.

PRAIRIE: In presettlement times large prairies existed on the uplands of this division. Carthage Prairie, Hancock Prairie, and Bushnell Prairie were in the Galesburg Section; and String Prairie and Brown's Prairie were in the Carlinville Section. The prairie vegetation was similar to that of the Grand Prairie Division, but wet prairie was less frequent.

MARSH: Poorly drained areas with marsh vegetation are less frequent than in the Grand Prairie Division but are similar in composition.

AQUATIC HABITATS

The aquatic habitats of this well drained division consist mainly of rivers and creeks.

DISTINCTIVE FAUNA

There is some continuity of animal life between the Western Forest-Prairie Division and the Southern Till Plain Division. The five-lined skink, the broad-headed skink, and the ornate box turtle are species that occur throughout the Southern Till Plain Division and range into this division but are absent from the adjoining Grand Prairie Division.

a GALESBURG SECTION

The Galesburg Section is the area north of the broad Illinois River valley and is distinguished from the Carlinville Section because of its separate location. There were about equal amounts of forest and prairie in this section at the time of settlement, with the forests primarily in the well-dissected areas along tributaries of the Illinois River.

PRINCIPAL NATURAL FEATURES

FOREST: Dry upland, mesic upland, floodplain.

PRAIRIE: Dry, mesic, wet.

MARSH

BEDROCK: Outcrops.

TOPOGRAPHY: Level to rolling uplands, ravines, floodplain.

AQUATIC HABITATS: Rivers, creeks.

b CARLINVILLE SECTION

The Carlinville Section is the area of well-dissected land southeast of the Illinois River valley. The original vegetation of this section was mostly forest, with only about 12 per cent of the area prairie.

PRINCIPAL NATURAL FEATURES

FOREST: Dry upland, mesic upland, floodplain.

PRAIRIE: Dry, mesic, wet.

MARSH

BEDROCK: Outcrops.

TOPOGRAPHY: Level to rolling uplands, ravines, floodplain.

AQUATIC HABITATS: Creeks.

8 MIDDLE MISSISSIPPI BORDER DIVISION

The Middle Mississippi Border Division consists of a relatively narrow band of river bluffs and rugged terrain bordering the Mississippi River floodplain from Rock Island County to St. Clair County and the lower Illinois River floodplain. Forest is the predominant natural vegetation but hill prairies are common on the west-facing bluffs. The soils were generally developed from very deep loess. Limestone cliffs are common features. This division is best distinguished from the river bluffs to the north and south of it by the absence of certain floral and faunal elements. The Driftless Section was never glaciated and is distinguished from the remainder of the Division.



BEDROCK

The bedrock of the Middle Mississippi Border Division consists of limestone and sandstone, with dolomite associated with the sandstone in Calhoun County. Outcrops and cliffs of limestone are common along the bluffs, and sandstone outcrops occur in Rock Island and Calhoun counties. Cretaceous gravels and clays occur in Pike and Adams counties. There are caves throughout the division in the limestone and dolomite but they are most abundant in unglaciated Calhoun County.

GLACIAL HISTORY

Most of the division was glaciated during the Illinoian stage of Pleistocene glaciation. An area of older Kansan drift is in western Hancock, Adams, and Pike counties. Calhoun County and parts of Pike and Adams counties apparently escaped Pleistocene glaciation.

TOPOGRAPHY

The Middle Mississippi Border Division is greatly dissected, particularly along the major streams where there are bluffs and ravines. Sinkhole plains are most common in the southern part of the division. The Driftless Section is higher and has more rugged topography than the Glaciated Section.

SOILS

Most of the soils on the uplands have developed from deep, well drained loess. Isolated areas of heavy soils are also present, especially in the southern part of the division.

PLANT COMMUNITIES

FOREST: The vegetation of the Middle Mississippi Border Division is mostly mesic and dry forests associated with the dissected uplands. The forests of the dry sites are dominated by black oak and white oak. Sugar maple, basswood, red oak, hackberry, slippery elm, and black walnut are major components of the forests on mesic sites. Floodplain forests along the creeks contain silver maple, hickories, cottonwood, and sycamore. Post oak is common on the heavy soils and near ridge tops.

PRAIRIE: Prairies of the Middle Mississippi Border Division are limited to the steep slopes and ridges of deep loess atop the river bluffs. The prairies are dominated by little bluestem and side-oats grama, with purple prairie clover and flowering spurge among the most frequent forbs. Scurf-pea, a distinctive western plant, is also common. Stick-leaf, another western plant, reaches its northeastern limits on the exposed limestone ledges of this division and of the Northern Section of the Ozark Division.

AQUATIC HABITATS

There are creeks throughout the division and sinkhole ponds in the Driftless Section.

DISTINCTIVE FAUNA

The dark-sided salamander and western worm snake are restricted in Illinois to the Middle Mississippi Border Division. Forested glens of this division serve as major nighttime roosting places for wintering bald eagles.

a GLACIATED SECTION

The topography of this section has been modified by the Illinoian and Kansan stages of Pleistocene glaciation. Limestone underlies most of the

Glaciated Section and frequently forms cliffs along the river bluffs.

PRINCIPAL NATURAL FEATURES

- FOREST: Dry upland, mesic upland, floodplain.
- LOESS HILL PRAIRIE
- BEDROCK: Limestone outcrops, caves.
- TOPOGRAPHY: River bluffs, ravines, floodplain, sinkhole plain.
- AQUATIC HABITATS: Creeks.
- SPECIAL FEATURE: Roosting areas for wintering bald eagles.

b DRIFTLESS SECTION

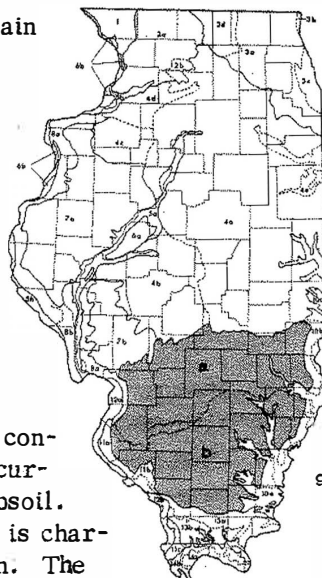
The Driftless Section apparently escaped Pleistocene glaciation. Its topography is rougher than that of the Glaciated Section, and it has many sinkholes and sinkhole ponds. Except for the jeweled shooting star, the Driftless Section is not known to harbor preglacial relict plants.

PRINCIPAL NATURAL FEATURES

- FOREST: Dry upland, mesic upland, floodplain.
- LOESS HILL PRAIRIE
- BEDROCK: Limestone and sandstone outcrops, caves.
- TOPOGRAPHY: River bluffs, ravines, floodplain, sinkhole plain.
- AQUATIC HABITATS: Creeks, sinkhole ponds.
- SPECIAL FEATURE: Roosting areas for wintering bald eagles.

9 SOUTHERN TILL PLAIN DIVISION

The Southern Till Plain Division encompasses most of the area of dissected Illinoian glacial till plain south of the Shelbyville Moraine and the Sangamon River and Macoupin Creek watersheds. Both forest and prairie were present at the time of settlement. The soils are relatively poor because of their high clay content and the frequent occurrence of a "claypan" subsoil. Post oak flatwood forest is characteristic of the division. The



two sections are distinguished because of topographic differences.

BEDROCK

The bedrock of the Southern Till Plain Division consists of sandstone, limestone, coal, and shale, which commonly crop out in the eastern and southeastern parts of the division. Bedrock lies near the surface in the Mt. Vernon Hill Country Section.

GLACIAL HISTORY

The Illinoian stage of Pleistocene glaciation reached the southernmost limit of North American continental glaciation just beyond the limits of this division. The Southern Till Plain Division is entirely covered by Illinoian till. Glacial landforms are common only in the northwestern part of the division.

TOPOGRAPHY

The glacial till of the Southern Till Plain Division becomes thinner from north to south. The bedrock of the Mt. Vernon Hill Country Section is near the surface, accounting for its hilly and rolling topography. The Effingham Plain Section is a nearly level to dissected till plain. There are broad floodplains along the major streams and there are ravines in the bluffs along the stream valleys.

SOILS

The soils on the uplands are light colored and strongly developed, with poor internal drainage. They have developed from thin loess and till under both forest and prairie vegetation. Fragipan and claypan layers are characteristic of the upland soils. Some of the prairie soils have a high sodium content and are known locally as "alkaline slicks".

PLANT COMMUNITIES

FOREST: The level, poorly drained, heavy soils on the uplands of the Southern Till Plain Division support a characteristic flatwoods forest of post oak, swamp white oak, blackjack oak, and pin oak. Forests on the uplands, where drainage is slightly improved, include black oak, shingle oak, mockernut hickory, and shagbark hickory in the post oak community. The forests on the slopes along stream valleys are dominated by white oak, shingle oak, and black oak on the drier southern and western exposures, with hickories, white ash, basswood, sugar maple, wild black cherry, slip-

perly elm, and black walnut with the oaks on the more mesic sites. Forests in the broad floodplains of the Kaskaskia and Big Muddy rivers are dominated by silver maple, willows, sycamore, and American elm near the rivers, with pin oak, white oak, hickories, ashes, hackberry, and honey locust on the heavier soils farther from the rivers. Pin oak occasionally grows in nearly pure stands over large areas of the floodplain. The floodplain forests of the smaller streams have a higher percentage of oaks than the floodplain forests of central and northern Illinois. Pin oak and shingle oak are dominant, with white oak, red oak, hickories, black walnut, river birch, and cottonwood occasional associates. Shumard oak and sweetgum grow in the floodplain of the Big Muddy River but are not generally abundant.

PRAIRIE: At the time of settlement about 40 per cent of the uplands of the Southern Till Plain Division supported prairie vegetation. Most of the prairie was of the mesic tall-grass type characteristic of the Grand Prairie Division. Twelve Mile Prairie and Looking Glass Prairie were two large expanses of prairie. Mesic prairies extended along the west side of the division almost to the limit of glaciation but were rare in the southeastern part. Wet prairie was not common but did occur in parts of the Kaskaskia River floodplain. It is not known whether the alkaline slicks of this division supported a unique prairie flora.

MARSH: Marshes were associated with the stream floodplains of this division.

AQUATIC HABITATS

The aquatic habitats of the Southern Till Plain Division consist of rivers, creeks, and oxbow lakes.

DISTINCTIVE FAUNA

The northern crayfish frog, northern fence lizard, ground skink, five-lined skink, and broad-headed skink are common in the Southern Till Plain Division but are rare or absent from the Grand Prairie Division.

a EFFINGHAM PLAIN SECTION

The Effingham Plain Section is a relatively flat plain drained by the Kaskaskia River. It originally was mostly prairie. Post oak flatwoods are characteristic of the uplands of this section.

A few flocks of the greater prairie chicken remain within this section. Sanctuaries are being established to maintain the population by providing nesting habitat.

PRINCIPAL NATURAL FEATURES

FOREST: Upland flatwoods, dry upland, mesic upland, and floodplain.

PRAIRIE: Wet, mesic, dry.

MARSH

BEDROCK: Outcrops.

TOPOGRAPHY: Level to rolling upland, dissected till plain, ravines, floodplain.

AQUATIC HABITATS: Creeks, rivers, oxbow lakes.

SPECIAL FEATURES: Greater prairie chicken population, alkaline slicks.

b MT. VERNON HILL COUNTRY SECTION

The Mt. Vernon Hill Country Section is distinguished from the Effingham Plain Section by its rolling, hilly topography. In presettlement times upland forests covered most of this section. The striped shiner and the stoneroller, two fishes of nearly statewide distribution, are absent from most of the Mt. Vernon Hill Country Section. The broad bottomlands of the major rivers that drain the eastern part of this section are considered to be part of the Wabash Border Division.

PRINCIPAL NATURAL FEATURES

FOREST: Upland flatwoods, dry upland, mesic upland, floodplain.

PRAIRIE: Wet, mesic, dry.

MARSH

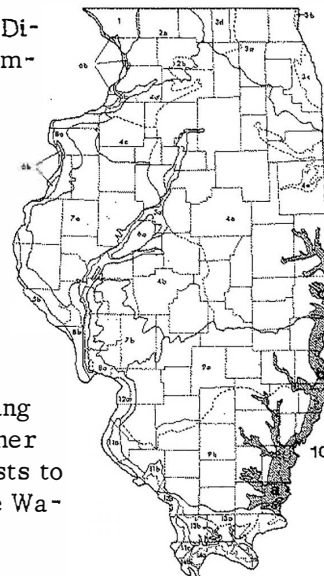
BEDROCK: Outcrops.

TOPOGRAPHY: Rolling till plain, dissected till plain, ravines, floodplain.

AQUATIC HABITATS: Creeks, rivers, oxbow lakes.

10 WABASH BORDER DIVISION

The Wabash Border Division includes the bottomlands of the Wabash River and its major tributaries, the loess-covered uplands bordering the Wabash River, and the forests of the Vermilion River, Little Vermilion River, and Crab Apple Creek. This is a region of lowland oak forests containing beech, tuliptree, and other trees typical of the forests to the east of Illinois. The Wa-



Wabash River drainage contains several distinctive fishes. The sections are distinguished by differences in topography, glacial history, and flora and fauna.

BEDROCK

The bedrock of the Wabash Border Division consists of limestone, sandstone, coal, and shale. Small outcrops of bedrock occur along some of the streams throughout the division. Bedrock outcrops along the river bluffs are few and never form the towering cliffs characteristic of the western border of Illinois.

GLACIAL HISTORY

All but a small area in the southern part of the Wabash Border Division was subject to Pleistocene glaciation. The Vermilion River dissects younger Wisconsinan drift, whereas the remainder of the division is the older Illinoian till plain. There are areas of outwash sand along the lower Wabash River.

TOPOGRAPHY

The topography of the Wabash Border Division is relatively gentle. The Southern Uplands Section is a low, eroded till plain, with bluffs above the bottomlands. The Vermilion River Section has more rugged topography resulting from erosion of its streams into Wisconsinan drift. The rivers have broad floodplains formed by glacial lakes, which include terrace deposits and many meander scars.

SOILS

The soils in the Bottomlands Section range from floodplain soils to terrace soils. The soils of the Southern Uplands Section have developed from moderately deep loess deposits. Soils of the Vermilion River Section are derived from thin loess over loamy till. Despite the diversity of soils, this division is united by the continuity of its forest vegetation and its fish and amphibian faunas.

PLANT COMMUNITIES

FOREST: The forests of the bottomlands are developed either on Recent alluvium or on Pleistocene terraces, which are generally better drained. Bottomland forests in the floodplains of the major rivers are dominated by pin oak, overcup oak, swamp white oak, swamp chestnut oak, bur oak, cherrybark oak, and Shumard oak. Commonly

associated with the oaks are sweetgum, hackberry, American elm, kingnut hickory, silver maple, and pecan. The forests on the terraces contain a mixture of the tree species found on the floodplains and those found on the uplands. Shumard oak, bur oak, and sweetgum are the commonest, with pin oak and swamp white oak in poorly drained areas. The best drained terraces contain shagbark hickory and tuliptree. Other characteristic trees are kingnut hickory, Kentucky coffeetree, and hackberry. Along the rivers black willow, cottonwood, sycamore, and silver maple predominate. Sloughs near the Wabash River and Saline River contain bald cypress and some other southern swamp species.

The mesic forests of the Southern Uplands Section and the Vermilion River Section are dominated by white oak, red oak, and sugar maple and frequently contain beech and tuliptree. Forests on drier sites are dominated by black oak and hickories. Forests in the floodplains of the Southern Uplands Section and Vermilion River Section contain silver maple, cottonwood, willows, sycamore, and American elm.

PRAIRIE: At the time of settlement some of the Southern Uplands Section supported mesic prairie, while mesic and wet prairie occurred in the Bottomlands Section. The prairies of this division were similar to those of the Grand Prairie Division.

MARSH: The poorly drained bottomlands contain large areas of marsh associated with the sloughs and meander scars. These are dominated by cord grass and river bulrush.

AQUATIC HABITATS

The poorly drained Bottomlands Section of the Wabash Border Division contains many aquatic habitats, including river, oxbow lakes, and sloughs. The Southern Uplands and Vermilion River sections are better drained, and the aquatic habitats consist mainly of creeks and rivers.

DISTINCTIVE FAUNA

Fishes limited in Illinois to the Wabash Border Division are the river chub, river herring, mountain darter, and greenside darter. The northern bigeye chub and bluebreast darter are known in Illinois only from the Vermilion River system, and the harlequin darter is known only from the Embarras River. The red-backed salamander is essentially restricted in Illinois to this division.

a BOTTOMLANDS SECTION

The Bottomlands Section of the Wabash Border Division encompasses the bottomland forests, sloughs, marshes, and oxbow lakes in the floodplains of the Wabash River, the Ohio River, and their major tributaries. Bottomland forests are the predominant vegetation with wet prairie and marsh associated with the sloughs.

PRINCIPAL NATURAL FEATURES

FOREST: Floodplain, terrace, swamp.

PRAIRIE: Mesic, wet.

MARSH

TOPOGRAPHY: River floodplain, terrace deposits, meander scars.

AQUATIC HABITATS: Oxbow lakes, sloughs, rivers.

b SOUTHERN UPLANDS SECTION

The Southern Uplands Section contains the dry and mesic upland forests on the deep loess bluffs along the Wabash River. The upland forests of white oak, sugar maple, beech, and sweetgum are the predominant plant community. Some sandstone ravines support an unusual combination of plant species that includes some relict northern species.

PRINCIPAL NATURAL FEATURES

FOREST: Dry upland, mesic upland, floodplain.

PRAIRIE: Mesic, dry.

BEDROCK: Outcrops.

TOPOGRAPHY: Dissected till plain, river bluffs, ravines.

AQUATIC HABITATS: Creeks

SPECIAL FEATURE: Relict northern plants.

c VERMILION RIVER SECTION

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

PRINCIPAL NATURAL FEATURES

FOREST: Dry upland, mesic upland, floodplain.

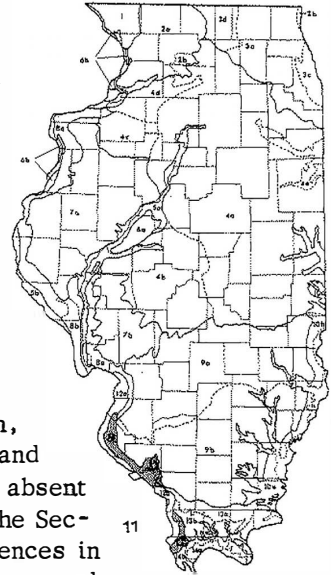
PRAIRIE: Dry, mesic, wet.

TOPOGRAPHY: Dissected till plain, ravines, floodplain.

AQUATIC HABITATS: Rivers, creeks.

11 OZARK DIVISION

The Ozark Division consists of the Illinois part of the Salem Plateau of the Ozark uplift from northern Monroe County southward and includes the glaciated sandstone ravines in Randolph County. The area is mostly forested, but many hill prairies occur in the Northern Section. The division contains many Ozarkian, southern, and southwestern plants and animals that are rare or absent elsewhere in Illinois. The Sections are based on differences in bedrock, topography, flora, and fauna.



BEDROCK

Most of the Ozark Division is part of the Salem Plateau of the Ozark uplift. The northern part of the division is underlain by relatively pure limestone, while the southern part is underlain by cherty limestone that is more resistant to erosion. Sandstone underlies the Central Section of the division. Bedrock crops out in all sections. Caves and sinkholes are numerous in the limestone of the Northern Section and less so in the Southern Section.

GLACIAL HISTORY

Part of the Northern Section and all of the Central Section of the Ozark Division were glaciated during the Illinoian stage of Pleistocene glaciation. The Southern Section is driftless.

TOPOGRAPHY

The topography of the Ozark Division is that of a maturely dissected plateau with steep bluffs along the Mississippi River. There are ravines and stream canyons throughout the division, especially in the sandstone of the Central Section. The Northern Section has a well developed sinkhole plain topography.

SOILS

Most of the soils of the Ozark Division are derived from deep loess, but thin soils occur over the bedrock outcrops along the river bluffs and in interior ravines. Some of the soils of the Southern Section are derived from bedrock and are acidic.

PLANT COMMUNITIES

FOREST: At the time of settlement the Ozark Division was almost entirely forested. The forests of the Northern Section consist in part of red oak, sugar maple, basswood, and Ohio buckeye on the mesic sites, with white oak, black oak, and hickories on the ridge tops. Beech and tuliptree occur in the mesic forests of the Central Section. The forests of the Southern Section contain a rich assemblage of tree species including cucumber-tree, blackgum, butternut, black walnut, and bitternut hickory in addition to red oak, sugar maple, basswood, white oak, black oak, Ohio buckeye, beech, and tuliptree. Yellow-wood occurs in the Southern Section in Alexander County. A mixed association of white oak, red oak, sycamore, American elm, river birch, wild black cherry, and cottonwood is found along the stream floodplains throughout the division. Stands of shortleaf pine are found in the Southern Section and as far north as Piney Creek in Randolph County.

PRAIRIE: Loess hill prairies are common on the river bluffs in the Northern Section of the Ozark Division but are rare in the Southern Section and absent from the Central Section. These prairies have a similar species composition to that of loess hill prairies of the Middle Mississippi Border Division, with little bluestem and side-oats grama dominating; but they have several species of plants that are restricted to this division in Illinois.

AQUATIC HABITATS

The Ozark Division has few aquatic habitats. Ponds occur in some of the sinkholes. Springs occur at cave entrances and at the bases of some of the bluffs. Creeks are the commonest aquatic feature of the division.

DISTINCTIVE FAUNA

The plains scorpion, eastern narrow-mouthed toad, and eastern coachwhip are restricted in Illinois to the Northern Section of the Ozark Division, while the spring cavefish, northern blacktail shiner, and scarlet snake are known only from the Southern Section. The northern flat-headed snake oc-

curs in both the Northern and Southern sections but is found nowhere else in the State.

a NORTHERN SECTION

The Northern Section is distinguished from the other sections of the Ozark Division by its limestone bedrock, numerous caves and sinkholes, unique plant and animal species, and forest composition. Plant species unique to this section are the reticulate-seeded spurge, stiff bedstraw, Missouri black-eyed susan, and small heliotrope. These plants grow in hill prairies or on exposed limestone ledges.

PRINCIPAL NATURAL FEATURES

FOREST: Dry upland, mesic upland, floodplain.

LOESS HILL PRAIRIE

BEDROCK: Sinkholes, caves, limestone outcrops.

TOPOGRAPHY: Sinkhole plain, ravines, river bluffs, floodplain.

AQUATIC HABITATS: Sinkhole ponds, creeks, springs.

SPECIAL FEATURES: Ozark "limestone glade" plants, distinctive reptiles and amphibians.

b CENTRAL SECTION

The Central Section of the Ozark Division is distinguished because of its sandstone bedrock, forest composition, and distinctive flora. Distinctive plants of this section include Harvey's buttercup, large-flowered rock-pink, and Bradley's spleenwort. These species apparently entered Illinois from the Missouri Ozarks after Illinoian glaciation.

PRINCIPAL NATURAL FEATURES

FOREST: Dry upland, mesic upland, floodplain.

BEDROCK: Sandstone outcrops.

TOPOGRAPHY: Hills, ravines, stream canyons, floodplain.

AQUATIC HABITATS: Creeks.

SPECIAL FEATURE: Ozarkian floral element.

c SOUTHERN SECTION

The Southern Section of the Ozark Division is distinguished by its bedrock, topography, glacial history, unique fauna, forest composition, and distinctive southern and Ozarkian flora. Black

spleenwort, shortleaf pine, azalea, and big-leaf snowbell-bush are part of the distinctive floral element.

PRINCIPAL NATURAL FEATURES

FOREST: Dry upland, mesic upland, floodplain.

LOESS HILL PRAIRIE

BEDROCK: Outcrops.

TOPOGRAPHY: Steep ravines, river bluffs, floodplain.

AQUATIC HABITATS: Creeks, springs, sink-hole ponds.

SPECIAL FEATURES: Ozarkian floral element, spring cavefish.

12 LOWER MISSISSIPPI RIVER BOTTOMLANDS DIVISION

The Lower Mississippi River Bottomlands Division includes the Mississippi River and its floodplain from Alton to the Thebes Gorge. The Mississippi River is muddy here due to the silt load brought in by the Missouri River. Its fish fauna contains a distinctive assemblage of silt-tolerant plains species.

The Northern Section (the American Bottom) originally contained prairies, marshes, and forest. The Southern Section was densely forested. The forests of this division contain a greater number of tree species than the forests of the Upper Mississippi River, including some southern lowland species.

TOPOGRAPHY

The broad bottomlands of the Lower Mississippi River Bottomlands Division were formed by glacial flood waters. Since the retreat of the glaciers the river has meandered through this broad floodplain, and many meander scars and oxbow lakes remain.

SOILS

The soils are generally fine textured, with areas of both sandy, well drained soils and clay soils with poor internal drainage. The soils of this division have developed from alluvium.



PLANT COMMUNITIES

FOREST: Except for areas of wet prairie and marsh in the Northern Section, the division was entirely forested in presettlement times. The bottomland forests on the light soils include silver maple, ashes, American elm, honey locust, sugarberry, and pecan. Beech, basswood, and red buckeye grew as associated species on the loamy soils in the Southern Section; but most of these soils, being better drained and fertile, have been cleared for agriculture. Bottomland forests on heavy soils of the Southern Section are dominated by pin oak, overcup oak, Shumard oak, and cherrybark oak in association with kingnut hickory, sugarberry, and sweetgum. Bottomland swamps in the Southern Section are dominated by pumpkin ash, swamp cottonwood, Drummond's red maple, and water locust. Bald cypress grows in the Southern Section as far north as the southern edge of Union County. Tupelo and some other coastal plain species are absent.

PRAIRIE: There were relatively large areas of wet and mesic prairie in the Northern Section of the Lower Mississippi River Bottomlands Division, but most have been drained for agriculture.

MARSH: The Northern Section contained large marshes dominated by river bulrush, cattail, lotus, and pickerelweed. Some of the marshes remain, even though much of the area is organized into drainage districts.

AQUATIC HABITATS

The silt-laden Mississippi River below the Missouri River provides aquatic habitats somewhat different from those of the upper Mississippi River. Oxbow lakes and sloughs are common features of the bottomlands. The springfed swamps of northwestern Union County provide a unique habitat for several species of fish.

DISTINCTIVE FAUNA

The herpetofauna of the Lower Mississippi River Bottomlands Division is similar to that of the bottomlands of the Coastal Plain Division. It includes the western cottonmouth, green water snake, green treefrog, western bird-voiced treefrog, and mole salamander. The fish fauna of this division includes several species not found elsewhere in Illinois. The bantam sunfish is found only in the springfed swamps in northwestern Union County; and the Alabama shad, plains minnow, sturgeon chub, flathead chub, and sicklefin chub are found in the Mississippi River. The banded pigmy sunfish is known only from the springfed swamps of this division and from the bottomland swamps of the Coastal Plain Division.

a NORTHERN SECTION

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

PRINCIPAL NATURAL FEATURES

FOREST: Bottomland.

PRAIRIE: Wet, mesic.

MARSH

TOPOGRAPHY: River floodplain, meander scars.

AQUATIC HABITATS: Oxbow lakes, Mississippi River.

b SOUTHERN SECTION

The bottomland forests of the Southern Section contain a greater number of tree species, including some bottomland swamp species typical of the coastal plain. The composition of the forests in this section varies with the soils.

PRINCIPAL NATURAL FEATURES

FOREST: Bottomland on heavy soils, bottomland on light soils, bottomland swamp.

TOPOGRAPHY: River floodplain, meander scars.

AQUATIC HABITATS: Oxbow lakes, Mississippi River.

SPECIAL FEATURE: Springfed swamps.

13 SHAWNEE HILLS DIVISION

The Shawnee Hills extend across the southern tip of the State from Fountain Bluff on the Mississippi River to the Shawneetown Hills near the mouth of the Wabash River. This unglaciated hill country is characterized by a high east-west escarpment of sandstone cliffs forming the Greater Shawnee Hills and a series of lower hills underlain by limestone and sandstone known as the Lesser Shawnee Hills. Ori-



ginally this division was mostly forested and considerable forest remains to the present time. There are a number of distinctive plant species restricted to this division of Illinois.

BEDROCK

The Greater Shawnee Hills form a band along the northern edge of the division and consist of massive Pennsylvanian sandstone strata that dip northward toward the Illinois Basin. The range of hills averages 10 miles wide and borders the Lesser Shawnee Hills to the south. The Lesser Shawnee Hills are underlain by Mississippian limestone and sandstone, and sinkholes and caves are locally common features. Mineralized faults containing fluor spar and zinc, silver, and other metals exist in the eastern part of the Shawnee Hills Division. Iron deposits are found in Hardin County. There is a dome containing an igneous rock core in western Hardin County, and outcrops of igneous rock occur in the Lesser Shawnee Hills Section.

TOPOGRAPHY

The topography of the Shawnee Hills Division is very rugged, with many bluffs and ravines. The north slopes of the Greater Shawnee Hills Section are relatively gentle; but the south slopes consist of many escarpments, cliffs, and overhanging bluffs. Streams have eroded canyons in the sandstone. The Lesser Shawnee Hills average about 200 feet lower than the Greater Shawnee Hills. The Lesser Shawnee Hills have local areas of sinkhole topography.

SOILS

The soils are derived mainly from loess. Narrow bands of moderately developed deep loess soils occur along the Mississippi River in Jackson County and along the Ohio River in eastern Hardin County; however, most of the soils are derived from thinner loess and are strongly developed. Claypan and fragipan layers are frequent.

PLANT COMMUNITIES

FOREST: At the time of settlement most of the Shawnee Hills Division supported forest, and considerable land remains timbered. Most of the upland forests are dominated by white oak, black oak, and shagbark hickory with post oak, black-jack oak, scarlet oak, and pignut hickory on dry sites. Deep mesic ravines have a forest community of red oak, beech, tuliptree, bitternut hickory, sugar maple, and white ash with black walnut,

butternut, Ohio buckeye, and basswood occasional. The floodplain forests also contain sycamore, Kentucky coffeetree, sugarberry, and honey locust.

PRAIRIE: The Lesser Shawnee Hills Section contains limestone glades which support a dry prairie vegetation like that of hill prairies in western Illinois, but with the addition of such southern plants as wild blue sage and heart-leaved tragia.

AQUATIC HABITATS

The Shawnee Hills Division has numerous clear rocky streams and creeks. Sinkhole ponds are found in the Lesser Shawnee Hills Section.

DISTINCTIVE FAUNA

The streams support several distinctive fishes including blackspotted topminnow, spottail darter, and stripetail darter. The latter species is restricted to extreme southeastern Illinois.

a GREATER SHAWNEE HILLS SECTION

The Greater Shawnee Hills Section is distinguished by its sandstone bedrock, topography, and distinctive plants. Filmy fern, Virginia saxifrage, small-flowered rock-pink, thread-leaved evening primrose, synandra, French's shooting star, and small-flowered alumroot are some of the distinctive plants of this section. French's shooting star and small-flowered alumroot are abundant in their restricted habitats and may have persisted since preglacial times. Deep ravines and sandstone ledges along the larger streams support relict northern plants such as clubmosses, sphagnum, and barren strawberry. Except for synandra, these distinctive plants are absent from a seemingly suitable habitat in the glaciated area of southwestern Williamson County.

PRINCIPAL NATURAL FEATURES

FOREST: Dry upland, mesic ravine, floodplain.

BEDROCK: Outcrops, faults.

TOPOGRAPHY: Bluffs, ravines, stream canyons, floodplain, overhanging cliffs.

AQUATIC HABITATS: Creeks.

SPECIAL FEATURE: Northern relict plants, preglacial relict plants.

b LESSER SHAWNEE HILLS SECTION

The Lesser Shawnee Hills Section is distinguished by its limestone bedrock and sinkhole topog-

raphy. The fluorspar deposits near Cave in Rock and Rosiclare in Hardin County are world famous. Caves are common features of the limestone bluffs. Distinctive plants of this section are wild mock-orange and great chickweed.

PRINCIPAL NATURAL FEATURES

FOREST: Dry upland, mesic ravine, floodplain.

LIMESTONE GLADES

BEDROCK: Sinkholes, caves, sandstone outcrops, limestone outcrops, igneous outcrops, mineralized faults.

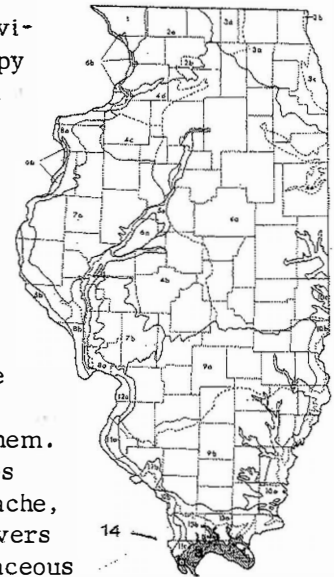
TOPOGRAPHY: Sinkhole plain, interior bluffs, river bluffs, ravines, floodplain.

AQUATIC HABITATS: Sinkhole ponds, creeks.

SPECIAL FEATURE: Fluorspar deposits.

14 COASTAL PLAIN DIVISION

The Coastal Plain Division is a region of swampy forested bottomlands and low clay and gravel hills that is the northernmost extension of the Gulf Coastal Plain Province of North America. Bald cypress-tupelo gum swamps are a unique feature of this division in Illinois as are many southern animals and plants found within them. The division encompasses the bottomlands of the Cache, Ohio, and Mississippi rivers and hills capped by Cretaceous and Tertiary sand, gravel, and clay. It has a relatively mild climate, the warmest in the State. The two sections distinguish between upland and lowland environments.



GLACIAL HISTORY

The Coastal Plain Division was never subjected to Pleistocene glaciation, but it has been influenced by glacial floodwaters. Glacial Lake Cache was formed in the valleys of the Cache and Ohio rivers during a late stage of glaciation. Pleistocene deposits form the terraces in the bottomlands of the rivers.

BEDROCK

The Cretaceous Hills Section is composed of unconsolidated sediments of Cretaceous and Ter-

tiary sands, gravels, and clays. The bedrock of the Bottomlands Section is deeply buried by alluvium.

TOPOGRAPHY

The Bottomlands Section of the Coastal Plain Division consists of the broad floodplain at the confluence of the Ohio and Mississippi rivers, the broad floodplain of the Cache River, and the terraces and meander scars in the floodplains. The topography of the Cretaceous Hills Section is steep to rolling.

SOILS

The soils of the uplands are derived from relatively thin loess and in a few places from gravel. Some areas in the eastern part of the Cretaceous Hills Section have gravel exposures. The soils of the Bottomlands Section range from Recent alluvium to older terrace soils. The terrace soils tend to be hardpan clays; but areas of sand occur, especially in the western part of the section. The alluvial soils are generally heavy except near the rivers.

PLANT COMMUNITIES

FOREST: The presettlement vegetation of the Coastal Plain Division was mostly forest. The upland forests of the Cretaceous Hills Section are similar to those of the Shawnee Hills with black oak, white oak, red oak, cherrybark oak, blackgum, tuliptree, shagbark hickory, and pignut hickory the common trees. In the extreme western end of these hills beech and cucumbertree are also found. A large stand of native chestnuts formerly grew near Olmsted in Pulaski County. Mesic ravines along the Ohio River contain southeastern floral elements that include the silverbell.

The bottomland forests consist in part of Shumard oak, cherrybark oak, swamp white oak, swamp chestnut oak, pin oak, overcup oak, kingnut hickory, shagbark hickory, bitternut hickory, ashes, sweetgum, blackgum, honey locust, sugarberry, pecan, wild black cherry, and catalpa. Beech, tuliptree, and cucumbertree grow on the better drained bottomland soils. Pin oak is the commonest tree on the heavier terrace soils, along with post oak and willow oak. Silver maple and American elm grow along the streams.

The bottomland swamps of this division contain an association of bald cypress, tupelo gum, swamp cottonwood, Drummond's red maple, water locust, pumpkin ash, and overcup oak. Water

hickory and planer-tree are occasional on better drained soils.

PRAIRIE: The Cretaceous Hills Section contained small dry prairies on the uplands of the eastern part and mesic prairies in some of the broad creek bottoms. The few persisting remnants indicate that little bluestem was the dominant species of the dry upland prairies and that big bluestem, Indian grass, and gama grass were the dominant species of the mesic prairies. Prairie dropseed and cord grass are absent from the prairies of the Cretaceous Hills Section.

SOUTHERN SEEP SPRING BOG: Seep springs in the eastern end of the Cretaceous Hills Section are very acidic. They are generally dominated by sedges, royal fern, lady fern, and cinnamon fern and may contain large areas of sphagnum moss. These seep springs contain a distinctive southeastern flora which includes netted chain fern, screw-stem, and incomperata sedge.

AQUATIC HABITATS

The aquatic habitats of the bottomlands of the Coastal Plain Division include rivers, creeks, oxbow lakes, and sloughs. The Cretaceous Hills have creeks and seep springs.

DISTINCTIVE FAUNA

The herpetofauna of the swampy lowlands of the Coastal Plain Division is similar to that of the Lower Mississippi River Bottomlands Division and includes the western cottonmouth, green water snake, green treefrog, western bird-voiced treefrog, and mole salamander. The range of the dusky salamander in Illinois is essentially restricted to the Cretaceous Hills Section.

a CRETACEOUS HILLS SECTION

The Cretaceous Hills Section encompasses the rolling hills of unconsolidated Cretaceous and Tertiary sands, gravels, and clays. Found in these hills are fossil beds from the Cretaceous period.

PRINCIPAL NATURAL FEATURES

FOREST: Dry upland, mesic upland.

PRAIRIE: Dry, mesic.

SOUTHERN SEEP SPRING BOG

BEDROCK: Cretaceous and Tertiary sands, gravels and clays, Cretaceous fossil beds.

TOPOGRAPHY: Steep to rolling hills.

AQUATIC HABITATS: Creeks, seep springs.

b BOTTOMLANDS SECTION

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

PRINCIPAL NATURAL FEATURES

FOREST: Floodplain, terrace, swamp.

TOPOGRAPHY: Terrace ridges, floodplain, meander scars.

AQUATIC HABITATS: Backwater swamps, sloughs, oxbow lakes, creeks, rivers.

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APPENDIX

SCIENTIFIC NAMES OF PLANTS CITED IN TEXT
Following Jones (1963)

American elm	<i>Ulmus americana</i>	hairy grama	<i>Bouteloua hirsuta</i>
American stickseed	<i>Hackelia americana</i>	harshack	<i>Spiraea tomentosa</i>
American wintergreen	<i>Pyrola americana</i>	Harvey's buttercup	<i>Ranunculus harveyi</i>
arrowhead	<i>Sagittaria</i>	heart-leaved tragia	<i>Tragia cordata</i>
ash	<i>Fraxinus</i>	hickory	<i>Carya</i>
azalea	<i>Rhododendron roseum</i>	hibbush cranberry	<i>Viburnum trilobum</i>
bald cypress	<i>Taxodium distichum</i>	Hill's oak	<i>Quercus ellipsoidalis</i>
barren strawberry	<i>Waldsteinia fragarioides</i>	honey locust	<i>Gleditsia triacanthos</i>
basswood	<i>Tilia americana</i>	incomperta sedge	<i>Carex incomperta</i>
beach-heath	<i>Hudsonia tomentosa</i>	Indian grass	<i>Sorghastrum nutans</i>
beach grass	<i>Ammophila brevifoliolata</i>	ironweed	<i>Vernonia fasciculata</i>
bearberry	<i>Arctostaphylos uva-ursi</i>	Jack pine	<i>Pinus banksiana</i>
beech	<i>Fagus grandifolia</i>	jeweled shooting star	<i>Dodecatheon amethystinum</i>
beggar-ticks	<i>Bidens</i>	June grass	<i>Koeleria cristata</i>
big bluestem	<i>Andropogon furcatus</i>	Kalm's lobelia	<i>Lobelia kalmii</i>
big-leaf snowbell bush	<i>Styrax grandifolia</i>	Kankakee mallow	<i>Iliamna remota</i>
bigtooth aspen	<i>Populus grandidentata</i>	Kentucky coffee-tree	<i>Gymnocladus dioica</i>
bird's-eye primrose	<i>Primula mistassinica</i>	kingnut hickory	<i>Carya laciniosa</i>
bitternut hickory	<i>Carya cordiformis</i>	lady fern	<i>Athyrium angustum</i>
black ash	<i>Fraxinus nigra</i>	large-flowered rock-pink	<i>Talinum calycinum</i>
black gum	<i>Nyssa sylvatica</i>	large-leaved aster	<i>Aster macrophyllus</i>
blackjack oak	<i>Quercus marilandica</i>	leafplant	<i>Amorpha canescens</i>
black oak	<i>Quercus velutina</i>	leatherleaf	<i>Chamaedaphne calyculata</i>
black spleenwort	<i>Asplenium resiliens</i>	little bluestem	<i>Andropogon scoparius</i>
black walnut	<i>Juglans nigra</i>	long-leaved calamovilfa	<i>Calamovilfa longifolia</i>
black willow	<i>Salix nigra</i>	lotus	<i>Nelumbo lutea</i>
bladderpod	<i>Lesquerella ludoviciana</i>	low calamint	<i>Satureja arkansana</i>
bladderwort	<i>Utricularia</i>	lupine	<i>Lupinus perennis</i>
bluejoint grass	<i>Calamagrostis canadensis</i>	maple-leaf viburnum	<i>Viburnum acerifolium</i>
boneset	<i>Eupatorium perfoliatum</i>	meadow spikemoss	<i>Selaginella apoda</i>
box elder	<i>Acer negundo</i>	Missouri black-eyed susan	<i>Rudbeckia missouriensis</i>
Bradley's spleenwort	<i>Asplenium bradleyi</i>	moccasin flower	<i>Cypripedium acaule</i>
bulrush	<i>Scirpus</i>	mockernut hickory	<i>Carya tomentosa</i>
bur oak	<i>Quercus macrocarpa</i>	moschatel	<i>Aloxa moschatellina</i>
bur-reed	<i>Sparganium</i>	netted chain-fern	<i>Woodwardia areolata</i>
butternut	<i>Juglans cinerea</i>	oak fern	<i>Dryopteris disjuncta</i>
Canada yew	<i>Taxus canadensis</i>	Ohio buckeye	<i>Aesculus glabra</i>
Carey's smartweed	<i>Polygonum careyi</i>	Ohio goldenrod	<i>Solidago ohioensis</i>
catalpa	<i>Catalpa speciosa</i>	overcup oak	<i>Quercus lyrata</i>
cattail	<i>Typha</i>	pale beard-tongue	<i>Penstemon pallidus</i>
Chase aster	<i>Aster chasei</i>	pasque flower	<i>Anemone ludoviciana</i>
cherrybark oak	<i>Quercus falcata</i> var. <i>pagodaefolia</i>	Patterson's bindweed	<i>Stylisma pattersoni</i>
chestnut	<i>Castanea dentata</i>	pecan	<i>Carya illinoensis</i>
cliff goldenrod	<i>Solidago sciaphila</i>	pickerel weed	<i>Pontederia cordata</i>
clubmosses	<i>Lycopodium</i>	pignut hickory	<i>Carya glabra</i>
cinnamon fern	<i>Osmunda cinnamomea</i>	pin oak	<i>Quercus palustris</i>
colic root	<i>Aletris farinosa</i>	pitcher plant	<i>Sarracenia purpurea</i>
common reed	<i>Phragmites communis</i>	plains buttercup	<i>Ranunculus rhomboideus</i>
compass plant	<i>Silphium laciniatum</i>	planer tree	<i>Planera aquatica</i>
cord grass	<i>Spartina pectinata</i>	poison sumac	<i>Rhus vernix</i>
cottonwood	<i>Populus deltoides</i>	pondweed	<i>Potamogeton</i>
cranberry	<i>Oxycoccus macrocarpus</i>	poppy mallow	<i>Callitriche triangulata</i>
creeping juniper	<i>Juniperus horizontalis</i>	porcupine grass	<i>Stipa spartea</i>
cucumbertree	<i>Magnolia acuminata</i>	post oak	<i>Quercus stellata</i>
cylindrical blazing star	<i>Liatris cylindracea</i>	prairie dock	<i>Silphium terebinthinaceum</i>
deciduous holly	<i>Ilex decidua</i>	prairie dropseed	<i>Sporobolus heterolepis</i>
dogwood	<i>Cornus</i>	prairie smoke	<i>Geum triflorum</i>
Drummond's red maple	<i>Acer drummondii</i>	prickly pear cactus	<i>Opuntia rafinesquii</i>
dwarf birch	<i>Betula pumila</i>	primrose violet	<i>Viola primulifolia</i>
fall witch-grass	<i>Leptoloma cognatum</i>	pumpkin ash	<i>Fraxinus tomentosa</i>
false boneset	<i>Kuhnia eupatorioides</i>	purple prairie clover	<i>Petalostemum purpureum</i>
farkleberry	<i>Vaccinium arboreum</i>	purple trillium	<i>Trillium erectum</i>
filmy fern	<i>Trichomanes boschianum</i>	rattlesnake master	<i>Eryngium yuccifolium</i>
flax-leaved aster	<i>Aster linariifolius</i>	red buckeye	<i>Aesculus discolor</i>
flowering spurge	<i>Euphorbia corollata</i>	red elder	<i>Sambucus pubens</i>
French's shooting star	<i>Dodecatheon frenchii</i>	red oak	<i>Quercus rubra</i>
fringed gentian	<i>Gentiana crinita</i>	reticulate-seeded spurge	<i>Euphorbia dictyosperma</i>
fringed puccoon	<i>Lithospermum incisum</i>	river birch	<i>Betula nigra</i>
gama grass	<i>Tripsacum dactyloides</i>	river bulrush	<i>Scirpus fluviatilis</i>
goat's rue	<i>Tephrosia virginiana</i>	rock spikemoss	<i>Selaginella rupestris</i>
grass-of Parnassus	<i>Parnassia glauca</i>	rough-seeded rock-pink	<i>Talinum rugospermum</i>
great chickweed	<i>Stellaria pubera</i>	round-lobed hepatica	<i>Hepatica americana</i>
green ash	<i>Fraxinus lanceolata</i>	royal fern	<i>Osmunda regalis</i>
ground pine	<i>Lycopodium dendroideum</i>	rusty woodsia	<i>Woodsia ilvensis</i>
hackberry	<i>Celtis occidentalis</i>	sand dropseed	<i>Sporobolus cryptandrus</i>
		sand love-grass	<i>Eragrostis trichodes</i>
		sassafrass	<i>Sassafras albidum</i>
		scarlet oak	<i>Quercus coccinea</i>
		screw-stem	<i>Bartonia paniculata</i>
		scurf-pea	<i>Psoralea tenuiflora</i>

sedge
 shagbark hickory
 shingle oak
 shortleaf pine
 Shumard oak
 shrubby cinquefoil
 side-oats grama
 silky aster
 silverbell
 silver maple
 skunk cabbage
 slippery elm
 small-flowered alumroot
 small-flowered rock-pink
 small-fringed gentian
 small heliotrope
 small white ladyslipper
 speckled alder
 sphagnum moss
 spotted monarda
 stick-leaf
 stiff bedstraw
 sugarberry
 sugar maple
 sullivantia
 sundew
 swamp chestnut oak
 swamp cottonwood
 swamp milkweed
 swamp privet
 swamp white oak
 sweet-fern
 sweet gum
 switch grass
 sycamore
 synandra
 tamarack
 thismia
 thread-leaved evening primrose
 tubercled three-awn grass
 tuliptree
 tupelo gum
 Virginia saxifrage
 water crowfoot
 water hemlock
 water hickory
 water locust
 water marigold
 water-plantain
 western ragweed
 western sunflower
 white ash
 white birch
 white camass
 white oak
 white pine
 Wilcox's panic grass
 wild black cherry
 wild blue sage
 wild mock-orange
 willow
 willow oak
 winterberry
 woodland white violet
 wood reed
 yellow birch
 yellow fringed orchid
 yellow-wood

Cyperaceae
 Carya ovata
 Quercus imbricaria
 Pinus echinata
 Quercus shumardii
 Potentilla fruticosa
 Bouteloua curtipendula
 Aster sericeus
 Halesia carolina
 Acer saccharinum
 Symplocarpus foetidus
 Ulmus rubra
 Heuchera parviflora
 Talinum parviflorum
 Gentiana procera
 Heliotropium tenellum
 Cypripedium candidum
 Alnus rugosa
 Sphagnum
 Monarda punctata
 Mentzelia oligosperma
 Galium virgatum
 Celtis laevigata
 Acer saccharum
 Sullivantia renifolia
 Drosera
 Quercus michauxii
 Populus heterophylla
 Asclepias incarnata
 Forestiera acuminata
 Quercus bicolor
 Comptonia peregrina
 Liquidambar styraciflua
 Panicum virgatum
 Platanus occidentalis
 Synandra hispidula
 Larix laricina
 Thismia americana
 Oenothera linifolia
 Aristida tuberculosa
 Liriodendron tulipifera
 Nyssa aquatica
 Saxifraga virginiana
 Ranunculus
 Cicuta maculata
 Carya aquatica
 Gleditsia aquatica
 Bidens beckii
 Alisma subcordatum
 Ambrosia coronopifolia
 Helianthus occidentalis
 Fraxinus americana
 Betula papyrifera
 Zigadenus glaucus
 Quercus alba
 Pinus strobus
 Panicum wilcoxianum
 Prunus serotina
 Salvia pitcheri
 Philadelphus pubescens
 Salix
 Quercus phellos
 Ilex verticillata
 Viola incognita
 Cinna latifolia
 Betula lutea
 Habenaria ciliaris
 Cladastis lutea

blackchin shiner
 blackspotted topminnow
 Blanding's turtle
 bluebreast darter
 blue-spotted salamander
 blue-winged warbler
 Bonaparte's gull
 broad-headed skink
 bullsnake
 common scoter
 common tern
 dark-sided salamander
 dusky salamander
 eastern coachwhip
 eastern narrow-mouthed toad
 eastern plains garter snake
 five-lined skink
 flathead chub
 Franklin's ground squirrel
 giant Canada goose
 golden-winged warbler
 greater prairie chicken
 greenside darter
 green treefrog
 green water snake
 ground skink
 harlequin darter
 Illinois chorus frog
 Illinois mud turtle
 ironcolor shiner
 Kirtland's water snake
 knot
 lake chub
 lake trout
 lake whitefish
 lark sparrow
 least darter
 little gull
 long-tailed jaeger
 mole salamander
 mountain madtom
 Nashville warbler
 ninespine stickleback
 northern bigeye chub
 northern blacktail shiner
 northern crayfish frog
 northern flat-headed snake
 northern lined snake
 oldsquaw
 ornate box turtle
 parasitic jaeger
 pigmy shrew
 piping plover
 plains hognose snake
 plains minnow
 plains scorpion
 pomarine jaeger
 pugnose shiner
 red-backed salamander
 river chub
 river redhorse
 scarlet snake
 sicklefin chub
 spottail darter
 spotted turtle
 spring cavefish
 stoneroller
 striped shiner
 striptail darter
 sturgeon chub
 summer tanager
 surf scoter
 thirteen-lined ground squirrel
 weed shiner
 western bird-voiced treefrog
 western cottonmouth
 western fox snake
 western smooth green snake
 western worm snake
 white-tailed jackrabbit
 white-winged scoter

Notropis heterodon
 Fundulus olivaceus
 Emydoidea blandingi
 Etheostoma camurum
 Ambystoma laterale
 Vermivora pinus
 Larus philadelphia
 Eumeces laticeps
 Pituophis melanoleucus sayi
 Oidemia nigra
 Sterna hirundo
 Eurycea longicauda melanopleura
 Desmognathus fuscus conanti
 Masticophis flagellum flagellum
 Gastrophryne carolinensis carolinensis
 Thamnophis radix radix
 Eumeces fasciatus
 Hybopsis gracilis
 Citellus franklinii
 Branta canadensis maxima
 Vermivora chrysoptera
 Tympanuchus cupido pinnatus
 Etheostoma blennioides
 Hyla cinerea
 Natrix cyclopion Cyclopion
 Scincella laterale
 Etheostoma histrio
 Pseudacris streckeri illinoensis
 Kinosternon flavescens spooneri
 Notropis chalybaeus
 Natrix kirtlandi
 Calidris canutus
 Hybopsis plumbea
 Salvelinus namaycush
 Coregonus clupeaformis
 Chondestes grammacus
 Etheostoma microperca
 Larus minutus
 Stercorarius longicaudus
 Ambystoma talpoideum
 Noturus eleutherus
 Vermivora ruficapilla
 Pungitius pungitius
 Hybopsis amblops amblops
 Notropis venustus venustus
 Rana aerolata circulosa
 Tantilla gracilis hallowelli
 Tropidoclonion lineatum lineatum
 Clangula hyemalis
 Terrapene ornata ornata
 Stercorarius parasiticus
 Microsorex hoyi
 Charadrius melodus
 Heterodon nasicus nasicus
 Hybognathus placitus
 Centrurus carolinianus
 Stercorarius pomarinus
 Notropis anogenus
 Plethodon cinereus cinereus
 Hybopsis micropogon
 Moxostoma carinatum
 Cemophora doliata
 Hybopsis meeki
 Etheostoma squamiceps
 Clemmys guttata
 Chologaster agassizi
 Campostoma anomalum
 Notropis chrysocephalus chrysocephalus
 Etheostoma kennicotti
 Hybopsis gelida
 Piranga rubra
 Melanitta perspicillata
 Citellus tridecemlineatus
 Notropis texanus
 Hyla avivoca avivoca
 Agkistrodon piscivorus leucostomus
 Elaphe vulpina vulpina
 Opheodrys vernalis blanchardi
 Carphophis amoenus vermis
 Lepus townsendii
 Melanitta deglandi

SCIENTIFIC NAMES OF ANIMALS CITED IN TEXT

Alabama shad
 alewife
 American smelt
 bald eagle
 banded killifish
 banded pigmy sunfish
 bantam sunfish
 bison

Alosa alabamæ
 Alosa pseudoharengus
 Osmerus mordax
 Haliaeetus leucocephalus
 Fundulus diaphanus menona
 Elasmoma zonatum
 Lepomis symmetricus
 Bison bison