Ecoregions of Nebraska and Kansas

Ecoregions denote areas of general similarity in ecosystems and in the type, quality, and quantity of environmental resources; they are designed to serve as a spatial framework for the research, assessment, management, and monitoring of ecosystems and ecosystem components. Ecoregions are directly applicable to the immediate needs of state agencies, including the development of biological criteria and water quality standards, and the establishment of management goals for nonpoint-source pollution. They are also relevant to integrated ecosystem management, an ultimate goal of most federal and state resource management agencies.

The approach used to compile this map is based on the premise that ecological regions can be identified through the analysis of the patterns of biotic and abiotic phenomena that reflect differences in ecosystem quality and integrity (Wiken, 1986; Omernik, 1987, 1995). These phenomena include geology, physiography, vegetation, climate, soils, land use, wildlife, and hydrology. The relative importance of each characteristic varies from one ecological region to another regardless of the hierarchical level. A Roman numeral hierarchical scheme has been adopted for different levels of ecological regions. Level I and level II divide the North American continent into 15 and 52 regions, respectively (Commission for Environmental Cooperation Working Group 1997). At level III, the continental United States contains 104 regions (United States Environmental Protection Agency [US EPA], 2000). However, depending on the objectives of a particular project, ecoregions may be aggregated within levels of the hierarchy for data analysis and interpretation. Explanations of the methods used to define the US EPA's ecoregions are given in Omernik (1995), Griffith and others (1994), and Gallant and others (1989).

This level III and IV ecoregion map was compiled at a 1:250,000-scale; it depicts revisions and subdivisions of earlier level III ecoregions that were originally compiled at a smaller scale (US EPA, 1999; Omernik, 1987). This poster is the product of a collaborative effort primarily between the US EPA Region VII, the US EPA National Health and Environmental Effects Research Laboratory (Corvallis, Oregon), the Nebraska Department of Environmental Quality (NDEQ), the Nebraska Game and Parks Commission (NGPC), the Kansas Biological Survey (KBS), the Kansas Geological Survey (KGS), the Kansas Department of Health and Environment, Division of Environment (KDHE), Kansas Department of Wildlife and Parks (KDWP), the United States Department of Agriculture - Natural Resources Conservation Service (NRCS) (formerly the Soil Conservation Service), and the United States Department of the Interior - U.S. Geological Survey (USGS) - Earth Resources Observation Systems (EROS) Data Center.

This project is associated with an interagency effort to develop a common framework of ecological regions. Reaching that objective requires recognition of the differences in the conceptual approaches and mapping methodologies that have been used to develop the most commonly used existing ecoregion-type frameworks, including those developed by the USFS (United States Forest Service) (Bailey and others, 1994), the US EPA (Omernik, 1987, 1995), and the NRCS (United States Department of Agriculture - Soil Conservation Service, 1981). As each of these frameworks is further developed, the differences between them lessen. Regional collaborative projects such as this one in Nebraska and Kansas, where agreement can be reached among multiple resource management agencies, is a step in the direction of attaining commonality and consistency in ecoregion frameworks for the entire nation.

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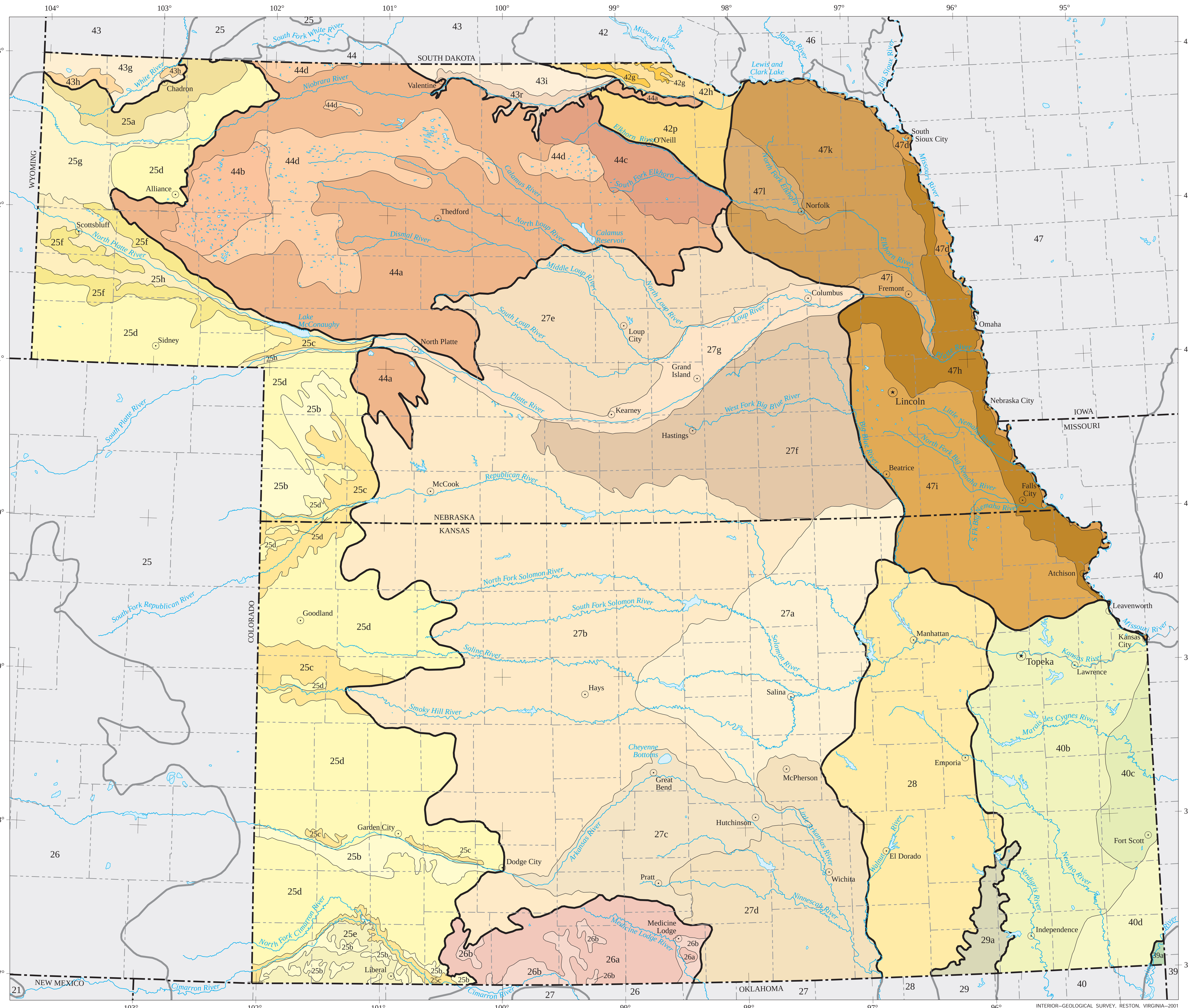

25 Western High Plains
- 25a Pine Ridge Escarpment
- 25b Rolling Sand Plains
- 25c Moderate Relief Rangeland
- 25d Flat to Rolling Cropland
- 25e Rolling Cropland and Range
- 25f Scotts Bluff and Wildcat Hills
- 25g Sandy and Silty Tablelands
- 25h North and South Platte Valley and Terraces

26 Southwestern Tablelands
- 26a Cimarron Breaks
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27 Central Great Plains
- 27a Smoky Hills
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- 27d Wellington-McPherson Lowland
- 27e Central Nebraska Loess Plains
- 27f Rainwater Basin Plains
- 27g Platte River Valley

28 Flint Hills
- 28 Flint Hills

29 Central Oklahoma/Texas Plains
- 29a Cross Timbers

39 Ozark Highlands
- 39a Springfield Plateau

40 Central Irregular Plains
- 40b Osage Cuestas
- 40c Wooded Osage Plains
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42 Northwestern Glaciated Plains
- 42g Ponca Prairie
- 42h Southern River Breaks
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43 Northwestern Great Plains
- 43g Semiarid Pierre Shale Plains
- 43h White River Badlands
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44 Nebraska Sand Hills
- 44a Sand Hills
- 44b Alkaline Lakes Area
- 44c Wet Meadow and Marsh Plain
- 44d Lakes Area

47 Western Corn Belt Plains
- 47d Missouri Alluvial Plain
- 47h Nebraska/Kansas Loess Hills
- 47i Loess and Glacial Drift Hills
- 47j Lower Platte Alluvial Plain
- 47k Northeastern Nebraska Loess Hills
- 47l Transitional Sandy Plain

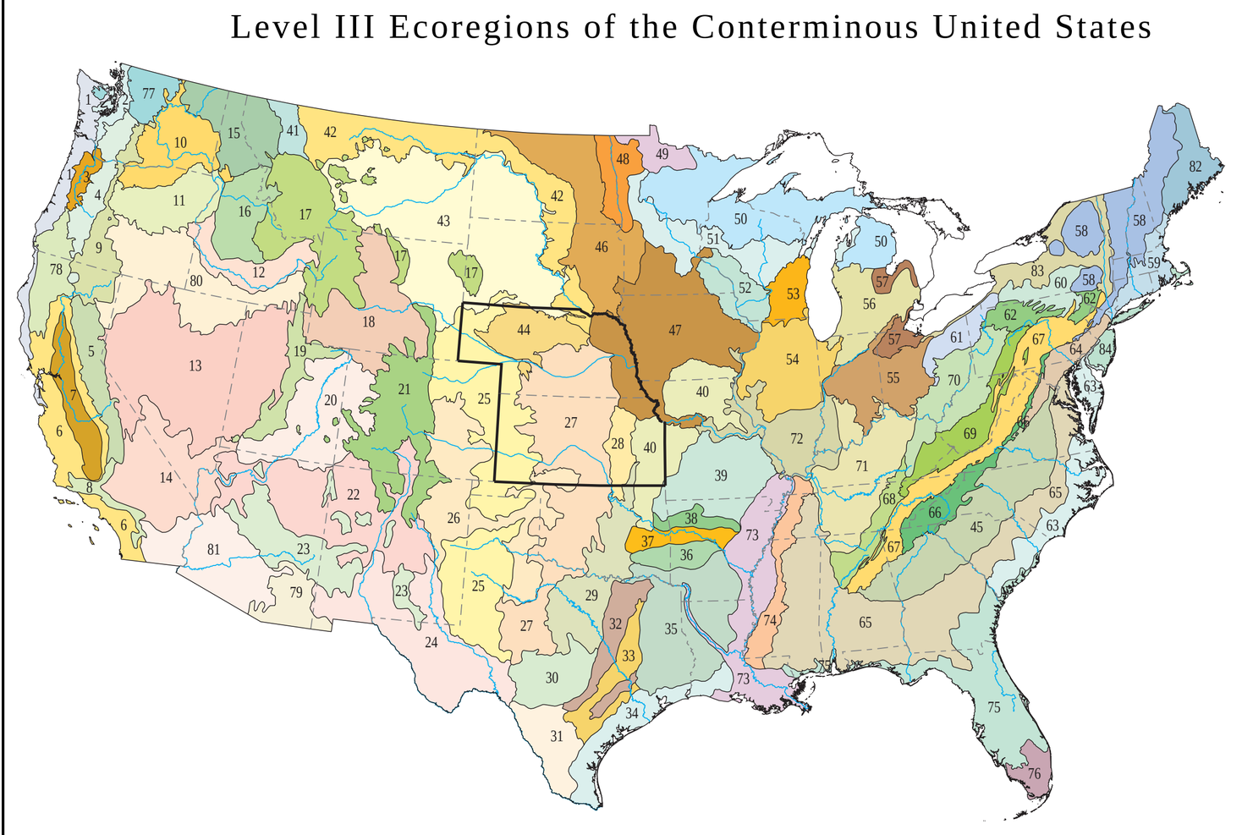
Level III ecoregion — Level IV ecoregion — County boundary — State boundary

SCALE 1:1 950 000

20 10 0 40 80 mi
40 30 20 10 0 80 160 km

Albers equal area projection
Standard parallels 38° N and 42° N

Level III Ecoregions of the Conterminous United States



PRINCIPAL AUTHORS: Shannen S. Chapman (Dynamac Corporation), James M. Omernik (US EPA), Jerry A. Freeouf (USFS), Donald G. Huggins (KBS), James R. McCauley (KGS), Craig C. Freeman (KBS), Gerry Steinauer (NGPC), Robert T. Angelo (KDHE), and Richard L. Schlepp (USDA, NRCS).

COLLABORATORS AND CONTRIBUTORS: Steven R. Walker (NDEQ), Kenneth R. Bazata (NDEQ), Sharon W. Waltman (USDA, NRCS-National Soil Survey Center [NSSC]), William J. Waltman (USDA, NRCS-NSSC), Roger Kanable (USDA, NRCS), Steven C. Schainost (NGPC), Craig Engelhard (USDA, NRCS), James W. Merchant (Center for Advanced Land Management Information Technologies [CALMIT], University of Nebraska, Lincoln [UNL]), Virginia L. McGuire (USGS), Chris Mammoliti (KDWP), James L. Stubbendieck (UNL), David A. Mortensen (UNL), Thomas Wardle (Nebraska Forest Service), David T. Lewis (UNL), Robert F. Diffendal Jr. (Nebraska Conservation and Survey Division-Nebraska Geological Survey) and Jeffrey A. Comstock (OAO Corporation).

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25. Western High Plains

In the rain shadow of the Rocky Mountains, the Western High Plains ecoregion is characterized by a semi-arid to arid climate, with annual precipitation ranging from 13 to 20 inches. Higher and drier than the Central Great Plains to the east, much of the Western High Plains comprises a smooth to slightly irregular plain having a high percentage of dryland agriculture. Potential natural vegetation is dominated by drought tolerant shortgrass prairie and large areas of mixedgrass prairie in the northwest, especially in Nebraska. Center pivot irrigation, relying on ground water from the High Plains Aquifer, has increased dramatically in recent decades. Natural gas deposits, found in the south, yield a majority of natural gas produced in the midwest.

Dryland agriculture with winter wheat as the primary crop is common in the Western High Plains (25).

25a Dramatic sandstone and siltstone bluffs, escarpments, areas of exposed bedrock, and Ponderosa pine woodlands are characteristic of the **Pine Ridge Escarpment**, distinguishing this region from the more level shortgrass and mixedgrass prairies of other Western High Plains regions. Ponderosa pine, in association with mixedgrass prairie, are found throughout the escarpment area on ridge tops, north-facing and east-facing slopes and, in lesser density, on south-facing and west-facing slopes.

25b The sandy plains and dune areas of the **Rolling Sand Plains** are a divergence from the mostly loess covered plains of adjacent ecoregions. Sandy soils, formed from eolian deposits, support a land use mosaic of primarily rangeland with areas of irrigated agriculture. Sandsage prairie was the potential natural vegetation type, different from the shortgrass and mixedgrass prairie of other neighboring level IV ecoregions in the Western High Plains.

25c The **Moderate Relief Rangeland** ecoregion is typified by irregular plains with slopes greater than the surrounding flat and rolling plains of 25d. Land use is predominantly rangeland, in contrast to the cropland or mosaic of cropland and rangeland of surrounding ecoregions. Soils are silty and clayey loams, formed from eolian sediments, shallower than the thicker loess-capped uplands of 25d. The region's area is limited in Nebraska and has its greatest extent in Kansas and Colorado.

25d Dryland farming with areas of irrigated cropland agriculture are extensive throughout the **Flat to Rolling Cropland** ecoregion. Winter wheat is the main cash crop, with smaller acreages in forage crops. The flat to rolling plains of this region are smoother, more level and generally have thicker loess-mantled uplands than other Western High Plains regions. Loess deposits are thickest in southwestern Nebraska and northwestern Kansas, and thinnest in the north and south. The northernmost extent of this region, just west of the Sand Hills, has a very thin loess layer with more silty and sandy soils than in the southern portion of the region.

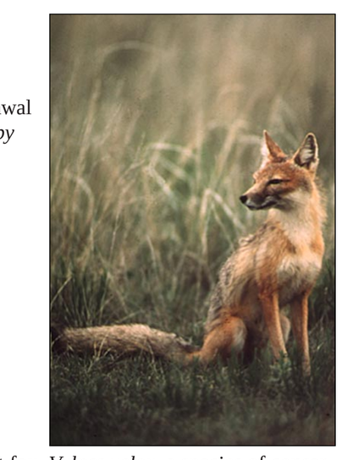
25e A land use mosaic of irrigated and dryland agriculture, rangeland, and areas of bare ground are characteristic of the **Rolling Cropland and Range**. This region has a higher concentration of irrigated cropland and a different mix of crops: more corn, soybeans, and alfalfa than the more northern 25d. Soils are formed in eolian material derived from sediments similar to 25d, but sandier and with a thinner loess layer.

25f Bluffs, escarpments, and areas of exposed bedrock typify the **Scotts Bluff and Wildcat Hills** ecoregion. Rangeland and woodland vegetation dominate this region, a contrast to the cropland and irrigated agriculture of adjacent 25h. Sandy and loamy soils, derived from Miocene sandstone and siltstone, support a combination of mixedgrass prairie and Ponderosa pine woodlands on ridge tops and side slopes.

25g The **Sandy and Silty Tablelands** ecoregion is characterized by tablelands with areas of moderate relief, a more arid climate, with average annual precipitation ranging from only 14 to 17 inches, and a shorter growing season than most other regions in 25. Land use is predominantly rangeland, a contrast to the more extensive agriculture of neighboring 25d. Soils in this region are fine sandy and silty loams to fine sands and are formed from weathered Oligocene and Miocene sandstone (Ogallala and Arikaree Formations, and upper White River Groups). Potential natural vegetation is mainly mixedgrass prairie with scattered areas of Sand Hills prairie.

25h The **North and South Platte Valley and Terraces** region is part of the extensive Platte River system. Historically, large volumes of water from spring snowmelt would swell the river system, depositing silty and sandy alluvium in the floodplain. This runoff created the wide alluvial valley and associated terraces. Flood control and reservoir projects have regulated the spring flooding and now cropland agriculture with extensive irrigation is the predominant land use, especially along the North Platte. Crops include sugar beets, dry beans, corn, and potatoes, with alfalfa and forage crops more common in terraced areas.

Dry stream beds are common in the Western High Plains (25). Low annual precipitation combined with ground water withdrawal for irrigated agriculture have increased the occurrence. *Photo by Craig Freeman, Kansas Biological Survey*



The Swift fox, *Vulpes velox*, a species of conservation concern, was once abundant throughout the shortgrass prairie. *Photo by Mike Blair, Kansas Department of Wildlife and Parks*

The Green toad, *Bufo debilis*, has limited habitat in the arid Western High Plains (25). *Photo by Mike Blair, Kansas Department of Wildlife and Parks*

Engelmann's goldenweed, *Oönopsis engelmanii*, a member of the sunflower family, is endemic to the Western High Plains (25). *Photo by Craig Freeman, Kansas Biological Survey*

26. Southwestern Tablelands

During the Permian Period several thousand feet of brick-red shales, siltstone, sandstones, and gypsum were deposited in this region. Erosion has exposed these deposits giving the region its characteristic red butte and mesa appearance. Unlike most adjacent Great Plains ecoregions, little of this region is in cropland and much of its elevated tableland area is in sub-humid grassland and semiarid rangeland. The region has many spring-fed streams, and stream bottoms tend to be sandy, and the water is more mineralized than in adjacent regions.

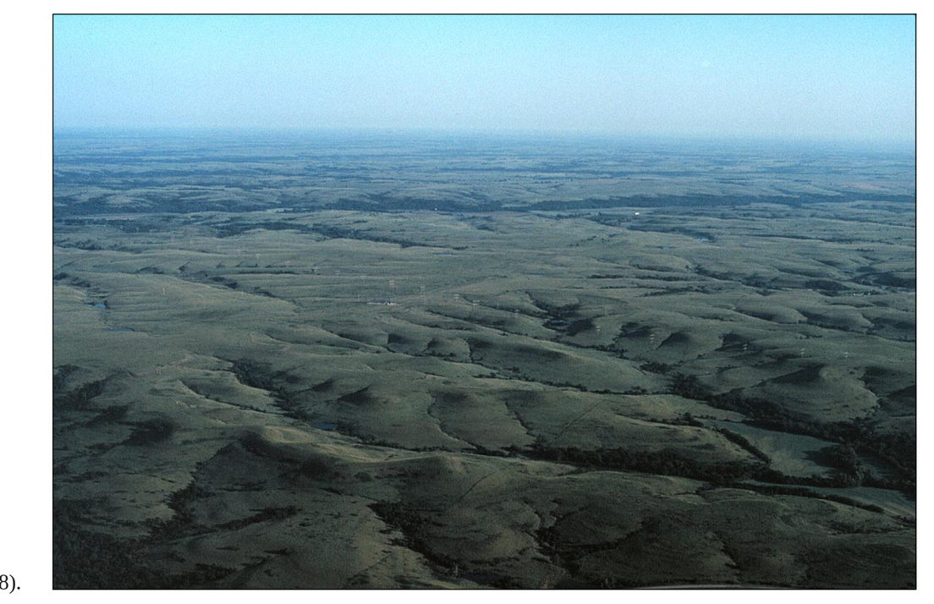
26a Irregular, dissected slopes, bluffs, and gypsum-capped red buttes typify the **Cimarron Breaks**. Cedar hills prairie and bluestem grama prairie cover much of the rugged landscape. Rangeland and grassland are the dominant land use and land cover with cattle grazing throughout the area.

26b The **Flat Tablelands and Valleys** region is more level than the irregular slopes of adjacent 26a. Soils are silty alluvium and more sandy than the reddish-brown silts and loams of the Cimarron Breaks. Cropland is much more common in this region, with forage crops grown on the level tabletop areas.

The red, gypsum-capped buttes and scattered eastern red-cedar typify the Cimarron Breaks (26a).

28. Flint Hills

28 The Flint Hills ecoregion is the largest remaining intact tallgrass prairie in the Great Plains. This region is characterized by rolling hills composed of shale and cherty limestone, rocky soils, and by humid, wet summers. Average annual precipitation ranges from 28 to 35 inches. The Flint Hills marks the western edge of the tallgrass prairie. Erosion of the softer Permian limestone has left the more resistant chert (or flint) deposits, producing the hilly topography and coarse soils of the area. This rocky surface is difficult to plow; consequently, the region has historically supported very little cropland agriculture. The natural tallgrass prairie still exists in most areas and is used for range and pasture land. However, some cropland agriculture has been implemented in river valleys and along the periphery of the Flint Hills, especially in the northwest corner where the topography is more level. This northwest edge is transitional between the cherty, rocky soils of the Flint Hills (28) and the silty, loamy, loess-formed soils of the Smoky Hills (27a).



Rolling, cherty hills and tallgrass prairie typify the Flint Hills (28).

27. Central Great Plains

The Central Great Plains are slightly lower, receive more precipitation, and are somewhat more irregular than the Western High Plains (25) to the west. Once a grassland, dominated by mixedgrass prairie with scattered low trees and shrubs in the south, much of this region is now in cropland, with the eastern boundary of the region marking the eastern limit of the major winter wheat growing area of the United States. Subsurface salt deposits and leaching contribute to the high salinity found in some streams.

A mix of irrigated and dryland cropland is found throughout the Central Great Plains (27).

27a The **Smoky Hills** ecoregion is an undulating to hilly dissected loess plain with sandstone hills underlain by the Dakota Formation. The region is transitional, with a variable climate and potential natural vegetation ranging from tallgrass prairie in the east to mixedgrass prairie in the west. Soils are silty and loamy, and formed in loess, which is thinner than in neighboring 27b, and with areas of sandy soils formed in sandstone. Land use consists of cropland and grassland with dryland winter wheat as the principal crop. Average annual precipitation ranges from 24 to 28 inches, greater than in 27b to the west.

27b The **Rolling Plains and Breaks** ecoregion was historically a mixedgrass prairie. Today, a mosaic of cropland agriculture and rangeland occurs throughout the region. Soils are silty, well drained, deep, and moderately permeable; formed in loess on uplands. The dissected plains, with broad, undulating to rolling ridge-tops are a contrast to the smoother Western High Plains (25) to the west and the broad, flat regions to the north (27g and 27f). In Kansas, this region contains extensive oil deposits.

27c The undulating to rolling sand plains of the **Great Bend Sand Prairie** are a contrast to the loess-mantled regions of 27a and 27b. A mantle of windblown sand, sandy outwash, and dunes supports a potential natural vegetation of sand prairie bunchgrass. Center pivot irrigation is implemented to a greater degree here than in surrounding regions.

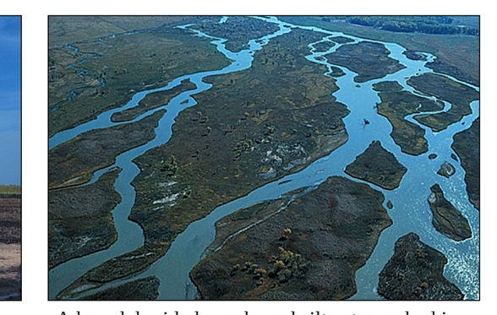
27d The flat lowland topography of the **Wellington-McPherson Lowland** distinguishes this region from the sand hills of 27c to the northwest, the undulating prairie of 27a to the north, the rolling hills of 28 to the east, and the tablelands of 26 to the southwest. Loess and river valley deposits support extensive cropland agriculture of winter wheat and grain sorghum. The area is also underlain by shale, gypsum and salt from ancient Permian seas, most notably the Hutchinson salt member, which is mined for salt, and the northern area contains the alluvial Equus beds, an important aquifer.

27e The rolling dissected plains of the **Central Nebraska Loess Plains** have a deeper, calcareous, loess layer than adjacent regions, increasing to more than 60 feet toward the Sand Hills. These silty soils support a natural vegetation of mixedgrass prairie and areas of red-cedar savanna intrusion in the west. land use/land cover is a mosaic of rangeland and cropland with less cropland than surrounding regions in the Central Great Plains. However, irrigated agriculture is increasing in this region.

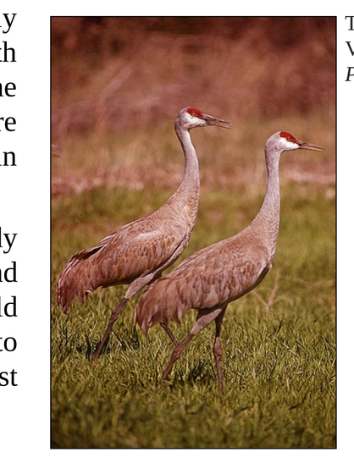
27f Historically, the flat to rolling loess-covered plains of the **Rainwater Basin Plains** encompassed one of the largest concentrations of natural wetlands found in Nebraska. Surface water drainage in this region is poorly developed, resulting in numerous closed watersheds that drain into low depressional areas. Located in the North American Central Flyway, this region contains important wetland habitat used during waterfowl migration. Most of the wetlands have been drained for cultivation and now relatively few areas remain. In addition, cropland agriculture practices and extensive irrigation have contributed to problems with ground water contamination and major changes in ground water levels.

27g The **Platte River Valley** region is a flat, wide alluvial valley with shallow, braided stream channels on a sandy bed; a contrast to the dissected loess-covered plains of neighboring regions 27b and 27e. The alluvial sand and silty soils support cultivated cropland with much of it in center pivot irrigation. Historically, seasonal flooding would scour the valley, inhibiting any significant growth of hardwood riparian vegetation, creating sandbar habitat important to many migrating and nesting bird species. Today, with flood control and extensive water withdrawal for irrigation, most of the former river channel is occupied by hardwood trees.

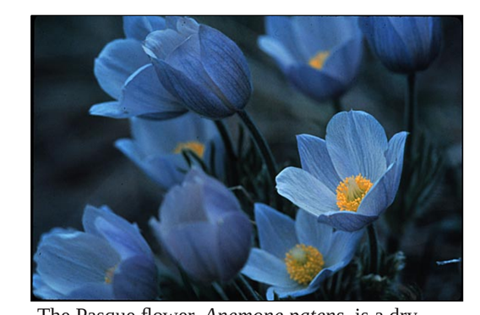
Oil wells can be found throughout the southern areas of the Rolling Plains and Breaks (27b) region.



A broad, braided, sandy and silty stream bed is characteristic of the Platte River Valley (27g). *Photo by Nebraska Game and Parks Commission*



The Sandhill crane, *Grus canadensis*, uses the Platte River Valley (27g) for nesting and feeding during the early spring migration. *Photo by Nebraska Game and Parks Commission*



The Pasque flower, *Anemone patens*, is a dry mixedgrass species found in areas like the Central Nebraska Loess Plains (27e). *Photo by Nebraska Game and Parks Commission*

29. Central Oklahoma/Texas Plains

The Central Oklahoma/Texas Plains ecoregion is a transitional area between prairie vegetation to the west and forested regions to the south. Kansas contains the northern extent of the region. Oak savanna and forests are common on the sandy, dry soils. The thick Pennsylvanian-aged sandstone has been eroded into a series of hills that exhibit more relief than the surrounding Osage Cuestas (40b) but less relief than the larger hills of the Flint Hills (28).

29a A dense growth of blackjack oak, post oak, and oak savanna blankets the sandstone hills of the **Cross Timbers**, separating this region from the tallgrass prairies of the Flint Hills, and the mosaic of oak-hickory forest and tallgrass prairie of the Osage Cuestas to the east. Thick sandstone-capped uplands with shale outcrops are common. Soils tend to be sandier, somewhat shallower, and drier than in surrounding regions. Woodland and rangeland are the predominant land cover/land use of this region, a change from the cropland/grassland mix that occurs to the east and the more extensive rangeland found in the Flint Hills (28) to the west.

Oak savanna is characteristic of the Cross Timbers (29a) region.

39. Ozark Highlands

The Ozark Highlands ecoregion is a hilly and densely forested area that covers large parts of Missouri, Arkansas, and a small area in Oklahoma and Kansas. This area is not as agricultural as bordering regions; less than one fourth of the core and half or more of the periphery of this region has been cleared for pasture and cropland. Humid, wet summers are typical and precipitation is generally greater than 40 inches per year. Mississippian-aged rocks, including the Warsaw and Keokuk cherty limestones, are geologically much older than strata in adjacent northern regions.

39a The **Springfield Plateau** is a small region in Kansas. Woodlands and oak-hickory forests blanket the area and are supported by the cherty, silty, moist, and acidic soils. These soils are also highly leached, producing the least fertile area of all ecoregions in Kansas. Historically, lead and zinc mining occurred in this part of Kansas evidenced today by large remnant "chat" piles of crushed rock, which still remain where mining occurred.

The Springfield Plateau (39a) is mostly woodland although some areas have been cleared for pastureland and limited cropland.

40. Central Irregular Plains

The Central Irregular Plains ecoregion has a variety of land use types and tends to be topographically more irregular than the Western Corn Belt Plains (47) to the north, where most of the land is in crops. The potential natural vegetation of the region is a mosaic of tallgrass prairie and oak-hickory forest, with more forested areas than 47. The climate is humid with rainfall averaging 28 to 40 inches per year, most of it falling during the growing season. Soils also differ from the Western Corn Belt Plains (47) mainly by the relative absence of glacial drift and a thinner loess mantle. The Pennsylvanian surface rock strata provide material for building stone and the manufacturing of cement and ceramics. Oil and gas fields are extensive in Kansas and Oklahoma and coal has been mined in numerous locations in the region.

A combination of cropland, woodland, and grassland covers the gently rolling topography of the Central Irregular Plains (40).

40b The **Osage Cuestas** region is a gently undulating cuesta plain composed of several alternating layers of sandstone, limestone, and shale. Topography is distinct from the more dramatic rolling hills of the Flint Hills to the west. Potential natural vegetation ranges from a mosaic of mostly tallgrass prairie in the west to a mixture of tallgrass prairie and oak-hickory forest in the east, with floodplain forests along streams. The moist, silty clay loams are formed in material weathered from limestone and shale, and support a land use composite of cropland, woodland, and grassland/rangeland.

40c The **Wooded Osage Plains** is a broad transition region, shifting from a mosaic of prairie and woodland to a more extensive woodland land cover. Forest density generally increases from west to east, especially in Missouri, and land use reflects this change in the mosaic of woodland, cropland, and grassland/rangeland, with less cropland than in neighboring 40b. Precipitation, 38 to 40 inches per year, tends to be greater than in the Osage Cuestas. Soils are similar to 40b, but with a greater density of forest type soils. In addition, the limestone present in the subsurface bedrock strata is greater than in the Osage Cuestas (40b).

40d The **Cherokee Plains** region is a flat erosional plain with more poorly drained and less fertile soils than in 40b and 40c. Hardpan or claypan prairie types are common and found where soils have an impermeable or only slightly permeable, silty clayey subsoil below the loamier surface layer. Sites are seasonally wet and usually become extremely dry during the summers. Coal strip mining has been extensive and mine tailings still exist in some areas.

42. Northwestern Glaciated Plains

The Northwestern Glaciated Plains ecoregion is a transitional area between the generally more level, moister, more agricultural Northern Glaciated Plains (46) to the east and the generally more irregular, drier, Northwestern Great Plains (43) to the west and southwest. The western and southwestern boundary roughly coincides with the limits of glaciation. Nebraska contains only the southernmost tip of this region, an area that just dips into the central northeast portion of the state. This area is transitional with little, if any, glacial influence evident within Nebraska.

42g The unglaciated level to rolling plains of the **Ponca Plains** distinguish this region from the dissected topography of 42h. Row crop agriculture including soybeans, corn, and alfalfa cover the landscape. Soils are silty to loamy, tend to be sandier than 42h, and are derived from soft sandstone and Cretaceous Pierre Shale.

42h The broken topography of the **Southern River Breaks** in Nebraska is an extension of a larger region in South Dakota. The dissected hills and high relief canyons border major rivers and associated alluvial plains. This region is more heavily wooded than surrounding regions. A combination of riparian vegetation, mixedgrass prairie, and scattered woodlands provides excellent habitat for wildlife. Soils are clayey, derived from weathered Cretaceous shale, and are not as sandy as surrounding regions.

42p The **Holt Tablelands** ecoregion is a transitional area between the loamy, glaciated regions with loess soils to the east and the Sand Hills in the west and south. This region shares many characteristics with the Nebraska Sand Hills (44); however, climate, physiography, and land use are more similar to those of the Northwestern Glaciated Plains (42). Cropland agriculture occurs on the more level tablelands and in areas with loamy soils, whereas grassland is found in areas of greater relief.

Hay and forage crops are grown in areas with more loamy soils and level topography in the Northwestern Glaciated Plains (42).

43. Northwestern Great Plains

The Northwestern Great Plains ecoregion encompasses the Missouri Plateau section of the Great Plains. This semiarid rolling plain of shale, siltstone, and sandstone is punctuated by occasional buttes, and agriculture is restricted by the erratic precipitation and limited opportunities for irrigation. Native grasslands, largely replaced on level ground by spring wheat and alfalfa, persist on the broken topography of rangeland areas. The southernmost tip of this region extends into northern Nebraska, bordering the northern edges of the Nebraska Sand Hills (44) region.

Native grasslands, used for grazing, are still found in the Northwestern Great Plains (43).

43g The rolling hills and grasslands of the **Semiarid Pierre Shale Plains** are a contrast to the dramatic bluffs and pine woodlands of the Pine Ridge Escarpment (25a) to the south. This is an arid region with average annual precipitation ranging from 15 to 17 inches, and it supports mixedgrass prairie with some localized areas of scant vegetation and sagebrush. Harsh, cold winters, a short growing season, and dry, hot summers restrict agriculture potential in this region. Soils derived from Pierre Shale are more clayey than the sandier and more silty soils of neighboring 25a and 43h.

43h The **White River Badlands** in Nebraska border the northern edges of the Pine Ridge escarpment and are southern outliers of a more extensive area in South Dakota. Formed through the erosion of the soft Brule and Chadron clays, siltstones and some sandstones, topography ranges from the sheer, highly dissected landscape of areas like Toadstool Park, to lower relief toeslopes. The landscape is broken by grass-covered, perched "sod tables" that may be grazed or tilled.

43i The level to rolling sandy plains of the **Keya Paha Tablelands** contrast sharply with the adjacent steep dune topography of the Nebraska Sand Hills (44) to the south. Soils are shallow, made up of eolian and alluvial sand deposits over sandstone, and support a combination of Sand Hills prairie and gravelly mixedgrass prairie. Millet and corn are grown on the level land, but the sandy soil limits non-irrigated agriculture.

43r The **Niobrara River Breaks** ecoregion encompasses a unique mixture of mixedgrass and Sand Hills prairies and woody vegetation from the central hardwoods, northern hardwoods, and the Rocky Mountain forests. This area is a convergence of Ponderosa pine woodland, eastern red-cedar, and a scattering of basswood, black walnut, and paper birch. The dissected river valley, with steep side slopes, contains soils ranging from sandy loams to fine sands formed from weathered sandstone, siltstone, and eolian sand, and is underlain with Pierre Shale. The woodland landscape and dissected alluvial topography provide excellent wildlife habitat.

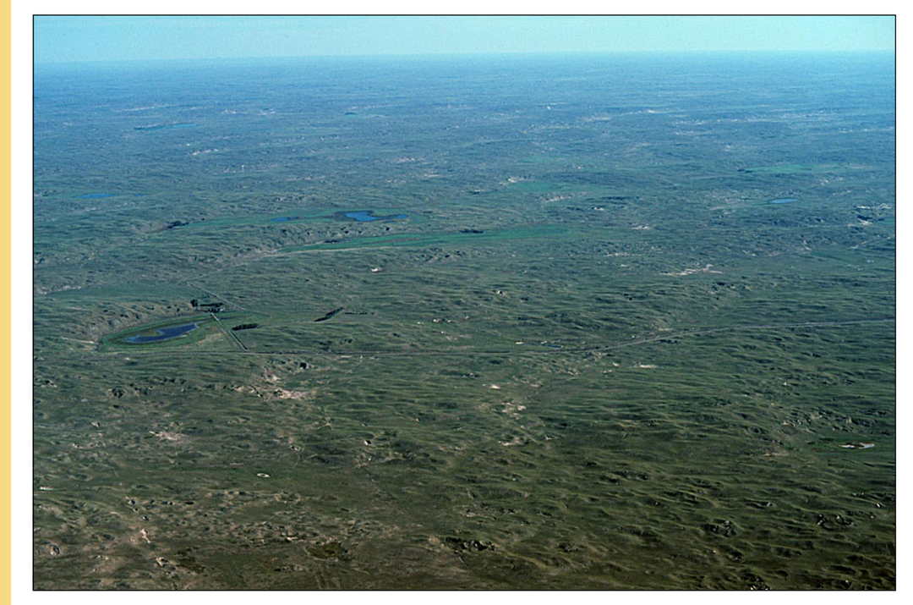
Toadstool Park, part of the White River Badlands (43h).

The Niobrara River Breaks (43r). *Photo by Nebraska Game and Parks Commission*

Pronghorn antelope, *Antilocapra americana*, are found primarily in northwestern areas like the Semiarid Pierre Shale Plains (43g). *Photo by Nebraska Game and Parks Commission*

44. Nebraska Sand Hills

The Nebraska Sand Hills comprises one of the most distinct and homogeneous ecoregions in North America. One of the largest areas of grass stabilized sand dunes in the world, this region is generally devoid of cropland agriculture, and except for some riparian areas in the north and east, the region is treeless. The area is very sparsely populated; however, cattle ranching is a tradition, and large ranches are found throughout the region. The fragile, sandy rangeland must be managed cautiously; wind erosion on denuded sand dunes can be a problem, and care must be taken to prevent overgrazing and vegetation loss. Numerous lakes and wetlands dot the region and parts of the region are without streams.



Vast grass-stabilized sand sheets and undulating sand dunes typify the Nebraska Sand Hills (44).

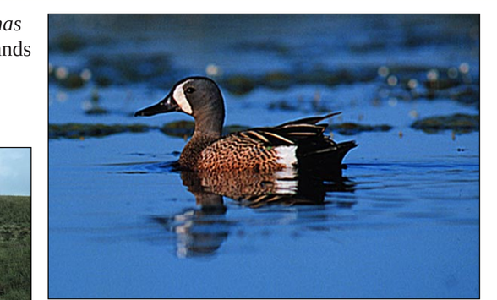
44a Expansive areas of sand sheets and undulating fields of grass-stabilized sand dunes cover the **Sand Hills.** Dune size, pattern, and alignment generally follow a west to east trending axis, with the larger dune hills in the west having local relief as great as 400 feet. Few lakes and streams are found in this area; however, ground water is accessible and is used for livestock.

44b The **Alkaline Lakes Area** contains sand dunes and many scattered, moderately to highly alkaline lakes. These lakes are located in what is commonly referred to as the "closed basin area". This area has limited influence from ground water sources and generally is devoid of streams. The high alkalinity restricts wetland vegetation growth with the exception of more specialized, alkaline tolerant species such as certain bulrush and saltgrass species.

44c The flat, sandy plains of the **Wet Meadow and Marsh Plain** mark a transition from the dune topography and fine sandy soils of the Sand Hills in the south and west to the more gravelly and loamy regions to the east and north. Wet meadows and marsh areas blanket the region. Unlike the strictly rangeland characteristics of other Sand Hills regions, land use in 44c is a mix of rangeland, hayed meadows, and more extensive irrigated cropland.

44d The distinct **Lakes Area** contains numerous lakes that have much lower alkalinity values than are found in lakes in region 44b. Lake and ground water interaction is prevalent in this region, unlike the lakes of 44b where interaction is limited. Few large streams and rivers occur; however, many small streams have their headwaters in this region. Potential natural vegetation is a combination of Sand Hills prairie and wetland communities that are not limited to the alkaline-tolerant species of 44b. Cattle grazing is common.

Waterfowl, such as this Blue-wing Teal, *Anas discors*, are common in the lakes and wetlands of the Nebraska Sand Hills (44). *Photo by Nebraska Game and Parks Commission*



Cattle ranching is common throughout the Nebraska Sand Hills (44).

Riparian vegetation is sparse and found only along major river drainages, such as this area on the Dismal River.

47. Western Corn Belt Plains

Once covered with tallgrass prairie, over 90 percent of the Western Corn Belt Plains ecoregion is now used for cropland agriculture and much of the remainder is in forage for livestock. A combination of nearly level to gently rolling glaciated till plains and hilly loess plains, ample precipitation mainly in the growing season, and fertile, warm, moist soils make this one of the most productive areas of corn and soybeans in the world. Agricultural practices have contributed to environmental concerns, including surface and ground water contamination from soil erosion, fertilizer and pesticide applications, as well as livestock concentrations.

Extensive corn and soybean crops along with small areas of riparian vegetation along stream valleys are common on the irregular terrain of the Western Corn Belt Plains (47).

47d The **Missouri Alluvial Plain** ecoregion is part of the large, wide, alluvial valley also found in neighboring Iowa and Missouri. The generally level alluvial plain is distinct from the more irregular topography of adjacent regions 47h and 47k. Soils are deep, silty, clayey, and sandy alluvium. They support extensive cropland, some of it irrigated. Historically the river was meandering, free flowing, and spread across the floodplain. Dams, levees, and stream channelization have profoundly altered the structure and characteristics of the river valley.

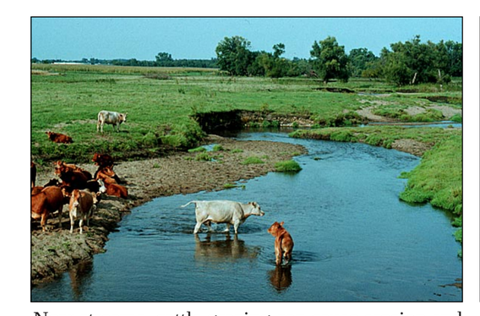
47h The greater relief and deep loess hills of the **Nebraska/Kansas Loess Hills** are markedly different from the flat alluvial valley of neighboring 47d. Dissected hills with deep, silty, well drained soils supported a potential natural vegetation of tallgrass prairie with scattered oak-hickory forests along stream valleys. Cropland agriculture is now common and ample precipitation in the growing season supports dryland agriculture, with only a few areas requiring irrigation.

47i Low, rolling loess-covered hills with areas of exposed glacial till are characteristic of the **Loess and Glacial Drift Hills**. Loess deposits are generally thinner than those in 47h, and historically there was less oak-hickory forest and more extensive tallgrass prairie than found in 47h. The flatter loess hills have a silty, clay loam soil that supports cropland, while rangeland is somewhat more extensive on the deep clay loams formed in glacial till soils.

47j The **Lower Platte Alluvial Plain** is an extension of the broad Platte River Valley (27g) to the west; however, this region is within the Western Corn Belt Plains and contains a combination of vegetation, soils, and climate more similar to other areas in 47. Silty, loamy, and sandy soils are formed from alluvium, though not as sandy as the Platte River Valley (27g) to the west. Land use is mainly cropland with areas of irrigated agriculture. Tallgrass prairie, wet meadows, and scattered riparian forests are the potential natural vegetation of the area, with forests generally denser and older than in region 27g.

47k The **Northeastern Nebraska Loess Hills** have an older, coarser loess mantle that is not as weathered as in ecoregions to the south. The climate is generally cooler with slightly less annual precipitation than in southern glaciated regions. Cropland agriculture, especially corn, is common, and there is more irrigated agriculture and pastureland, but fewer scattered woodlands than in neighboring Western Corn Belt Plains (47) regions.

47l As its name implies, the **Transitional Sandy Plain** ecoregion contains some of the characteristics of Sand Hills (44a) in the west and the glaciated regions to the east. This level to rolling plain has fine sandy loams to fine sands with soils coarser and sandier than other regions in 47. Potential natural vegetation is a combination of Sand Hills (44a) prairie, tallgrass prairie, and some wet meadows, and lacks the oak-hickory forest component found in more eastern regions.



Near streams, cattle grazing can cause erosion and water quality problems.

Tallgrass prairies were once common throughout the Western Corn Belt Plains (47).

The Sicklefin chub, *Hybopis meekii*, was once common in the deeper, muddier, and swifter current streams of the Western Corn Belt Plains (47). Impoundments and channelization have significantly altered the habitat and now this fish is a species of conservation concern. *Photo by Kansas Department of Wildlife and Parks*