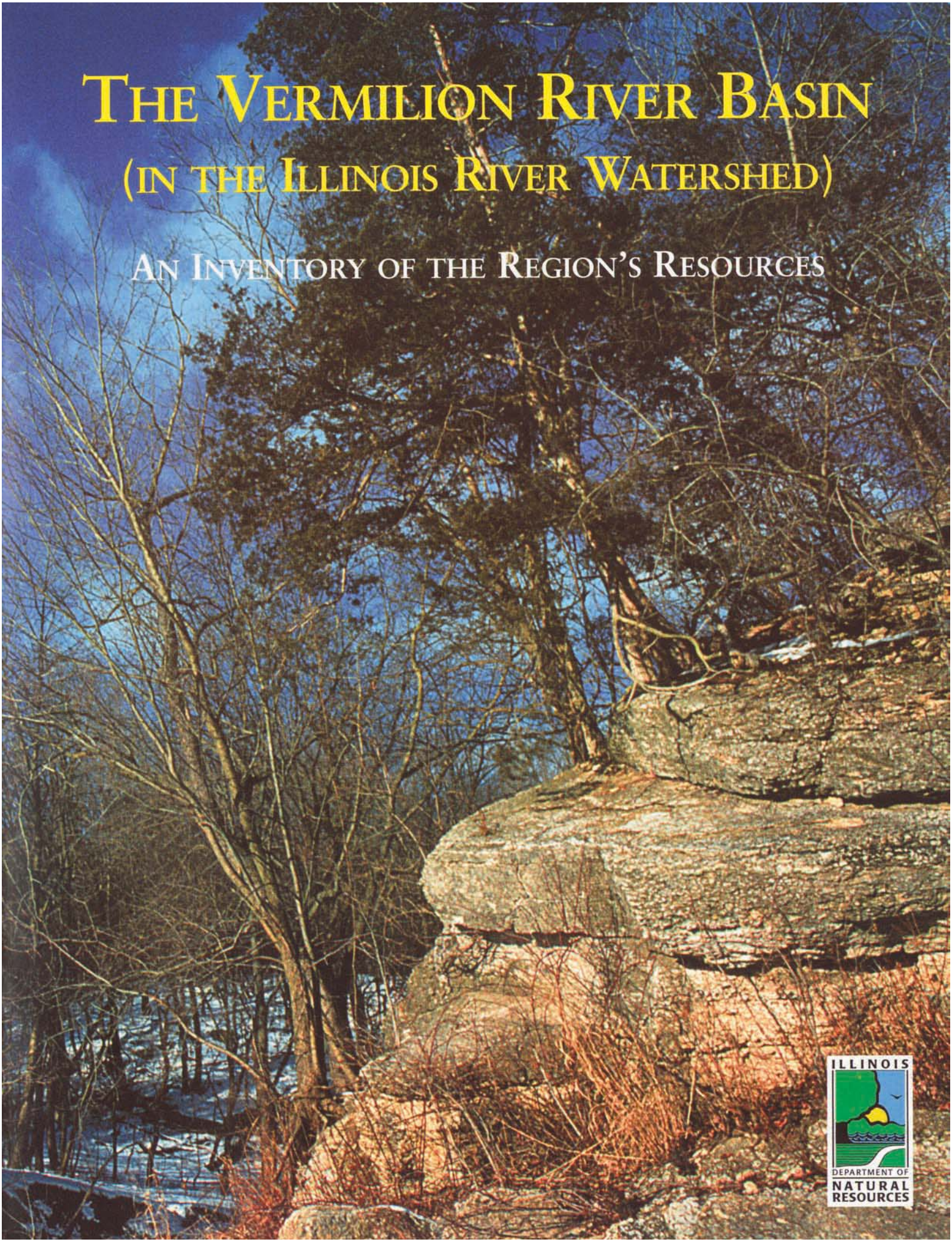
The Vermilion River Basin
(in the Illinois River Watershed)

An Inventory of the Region's Resources



ILLINOIS
DEPARTMENT OF
NATURAL
RESOURCES

About This Report

The Vermilion River Basin (in the Illinois River Watershed): An Inventory of the Region's Resources is a product of the Critical Trends Assessment Program (CTAP) and the Ecosystems Program of the Illinois Department of Natural Resources (IDNR). Both are funded largely through Conservation 2000, a State of Illinois program to enhance nature protection and outdoor recreation by reversing the decline of the state's ecosystems.

Conservation 2000 grew out of recommendations from the 1994 CTAP report, *The Changing Illinois Environment*, the 1994 Illinois Conservation Congress, and the 1993 *Water Resources and Land Use Priorities Task Force Report*.

The Critical Trends report analyzed existing environmental, ecological, and economic data to establish baseline conditions from which future changes might be measured. The report concluded that:

- the emission and discharge of regulated pollutants over the past 20 years has declined in Illinois, in some cases dramatically;
- existing data suggest that the condition of natural systems in Illinois is rapidly declining as a result of fragmentation and continued stress;
- data designed to monitor compliance with environmental regulations or the status of individual species are not sufficient to assess ecological health statewide.

The Illinois Conservation Congress and the Water Resources and Land Use Priorities Task Force came to broadly similar conclusions. For example, the Conservation Congress concluded that better stewardship of the state's land and water resources could be achieved by managing them on an ecosystem basis. Traditional management and assessment practices focus primarily on the protection of relatively small tracts of land (usually under public ownership) and the cultivation of single species (usually game animals or rare and endangered plants and animals). However, ecosystems extend beyond the boundaries of the largest parks, nature preserves, and fish and wildlife areas. Unless landscapes are managed on this larger scale, it will prove impossible to preserve, protect, and perpetuate Illinois' richly diverse natural resource base.

Because more than 90% of the state's land area is privately owned, it is plainly impossible for Illinois governments to acquire resources on the ecosystem scale. Therefore, the Task Force and the Congress called for public agencies and private landowners to cooperate in a new approach to natural resource protection and enhancement. If landowners can protect, enhance, or restore precious natural resources through enlightened private management, the need for public acquisition can be reduced.

The Congress and the Task Force agreed that this new approach ought to be:

- organized on a regional scale;
- voluntary and based on incentives;
- guided by comprehensive and comprehensible ecosystem-based scientific information;
- initiated at the grassroots rather than in Springfield.

Finally, the Congress and the Task Force agreed that natural resource protection need not hamper local economic development but can enhance it through tourism and outdoor recreation.

CTAP described the reality of ecosystem decline in Illinois, while the Congress and the Task Force laid out principles for new approaches to reversing that decline. Conservation 2000, designed to achieve that reversal, has implemented a number of their recommendations by funding several programs, one of which is IDNR's Ecosystems Program. The program redirects existing department activities to support new resource protection initiatives such as Ecosystems Partnerships. These partnerships are coalitions of local and regional interests seeking to maintain and enhance ecological and economic conditions in local landscapes. A typical Ecosystem Partnership project merges natural resource stewardship (usually within a given watershed) with compatible economic and recreational development.

(continued on inside back cover)

A Project of the Critical Trends Assessment Program

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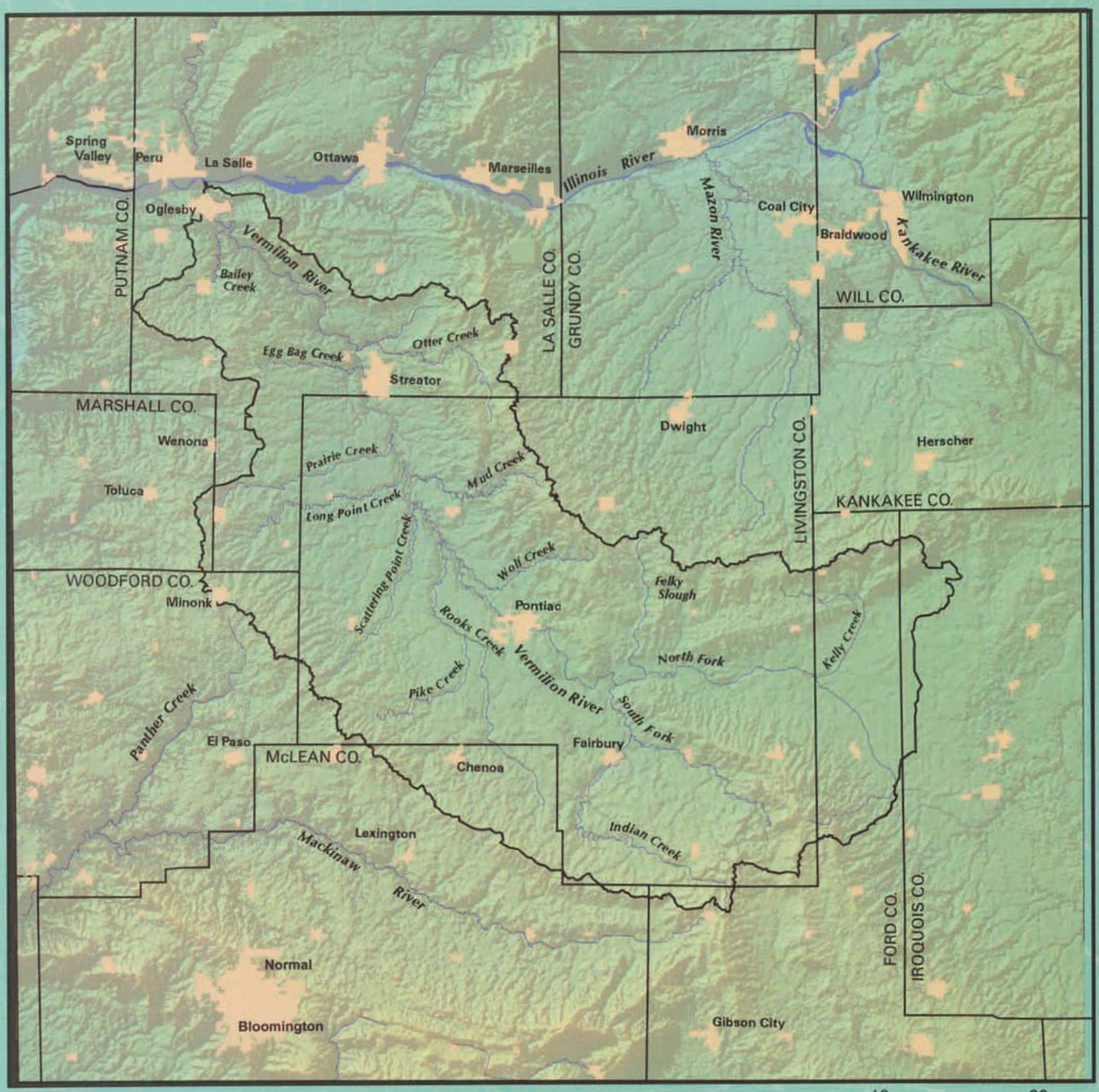
Landforms in the Vermilion River Basin



Lisa Smith, Illinois State Geological Survey

Philip L. Nixon

Native forests exist along streams that meander through the Vermilion River basin.

The Vermilion River Basin

An Inventory of the Region's Resources

"It was a wonderful country. All was new. Strange sounds greeted our ears. The piping note of the prairie squirrel as he dropped from his erect position, and sought the protection of his hole close by our path; the shrill note of the plover, scattered in countless numbers, fitfully starting and running over the prairie the constant roaring of the prairie cock; the mad scream of the crooked-billed curlew as we approached its nest; the distant whoop of the crane; the pump sounding note of the bittern; the lithe and graceful forms of the deer, in companies of three to five, lightly bounding over the swells of the prairie...all were new and strange: it seemed a new creation that we had entered."

ELMER BALDWIN, IN THE HISTORY OF LA SALLE COUNTY, *1877*

The landscape as seen by early settlers of the Vermilion River watershed has changed dramatically. The sea of prairie that once dominated the watershed has been largely replaced by a prosperous agricultural system, and scattered farmsteads dot the rolling hills where Native Americans used to tread. Forests subsist near the rivers and creeks that meander through the region, a reminder of days gone by and a refuge for wildlife. Many species that once were plentiful, such as the buffalo and the wolf, are now absent from the area while other rare species, such as the red-shouldered hawk and the forked aster, are protected in state parks and nature preserves.

Rates of habitat loss and degradation here are similar to or exceed rates for the state as a whole. Agriculture dominates land use, covering more than 90 percent of the land. Nevertheless, the area has a rich history and is home to species that inhabit only a few other places in the state. By encouraging conservation practices and restoring lost habitat, the area could begin to rebuild its natural areas.

THE SETTING

The Vermilion River basin consists of 19 sub-basins that are formed by creeks and other sources of contour in the landscape. Livingston and La Salle

Michael R. Jeffords

The red-shouldered hawk is an Illinois threatened species that occurs in the area.

counties dominate the watershed, though small portions of Ford, Iroquois, Marshall, McLean, and Woodford counties are also represented. The maximum elevation is 833 feet above sea level, and the land gently rolls to an elevation of 440 feet where the Vermilion River pours into the Illinois River in La Salle County near Oglesby.

The climate is continental, with seasonal changes and a wide range of temperature extremes, from crisp winters to balmy summers. Summer temperatures generally peak in the range of 80–90 degrees Fahrenheit and winter temperatures commonly dip to the teens and 20s. Precipitation is heaviest during the mid-summer, perfect for growing crops.

The 1,331-square-mile area is clearly divided into upland regions primarily utilized for their agricultural potential, and the forested corridor of the Vermilion River that is host to a wide range of plant and animal species. Most of the basin lies in the Grand Prairie Natural Division; the Upper Mississippi River and Illinois River Bottomlands Natural Division is represented by only 21.7 acres in the northern reaches of the area.

The watershed of the Vermilion River is quite flat, though the geographical relief becomes greater the closer one gets to the Illinois River. More than 69 percent of the land has zero-to-two percent slope, with the majority of the remainder having a two-to-four percent slope.

More than 100 years ago local resident Elmer Baldwin (see sidebar, page 9) described the setting: "Standing on a swell of the prairie on a clear day in early summer, the luxuriant grass waving in the wind, the shadows of the summer clouds fitfully chasing each other on beyond the power of vision, the observer could fancy the ocean restored and the long swells again in motion; or, taking a stand in one of the numerous points of timber which extended either way from the large streams, an open grove, clear of underbrush and covered with a green sward, and the view taking in the alteration of timber and prairie, a scene was presented that for extent, beauty and grandeur art can never expect to imitate..."

GEOLOGY

"There are few localities in the State where nature has bestowed with a more lavish hand such riches of mineral wealth as lie beneath the soil of La Salle County."

ELMER BALDWIN, IN THE HISTORY OF LA SALLE COUNTY, *1877*

The glaciers of the Pleistocene began molding the landscape in this area nearly two million years ago. The remnants of the oldest glacial episodes

Michael R. Jeffords

The weathering action of water has produced this cave in a sandstone ledge.

Michael R. Jeffords

Stone outcroppings are visible along the Vermilion.

have been eroded away, and much of the bedrock in the Vermilion River basin is now covered in part by sediments from the Wisconsin Episode, the last glacier to enter Illinois. The surface of the area is by no means "set in stone;" erosion and other geological processes still slowly alter the landscape day after day, year after year.

The sediments that form the parent material for soils around the Vermilion River come from several sources. Glacial deposits, including till and outwash, are major sediment types found here. Till is a mixture of various-sized rocks and debris left behind by glacier recession, and outwash is a mixture of sand and gravel washed from glacial ice in meltwater streams. Several of the till deposits were molded into moraines, or arc-shaped hills, that form some of the boundaries of the basin. In addition to glacial sediments, the soil is developed in silt and clay lacustrine deposits left behind by dried up lakes as well as loess, or silt, that has been blown into the area. This loess is a major constituent of much of the soil in the Vermilion River basin. Though excellent for growing crops, loess is easily swept away by wind and water, and thus, soil erosion is a major problem for the farms surrounding the Vermilion.

In 1909 Christopher C. Strawn, editor of *The History of Livingston County*, described the soil of the Vermilion River basin as "deep black alluvial loam of almost inexhaustible fertility, with a porous subsoil of clay and gravel." Nineteen different soil types can be found here, reflected in the diversity of habitats present. In general, these soils can be divided into two categories: rich organic soils originating from prairies and the thinner soils associated with forests.

In addition to providing the framework for agriculture, the geology of the Vermilion River basin is also the basis for recreation and industry. Five natural areas are of geologic interest—the St. Peter Sandstone cliff of Matthiessen State Park, the exposures of the Pennsylvanian System at Margery C.

The Area at a Glance

Δ The Vermilion River basin consists of 19 sub-basins that are formed by creeks and other sources of contour in the landscape.

Δ Livingston and La Salle counties dominate the watershed, though small portions of Ford, Iroquois, Marshall, McLean, and Woodford counties are also represented.

Δ The 1,331-square-mile area is clearly divided into upland regions primarily utilized for agriculture, and the forested corridor of the Vermilion River that is host to a wide range of plant and animal species.

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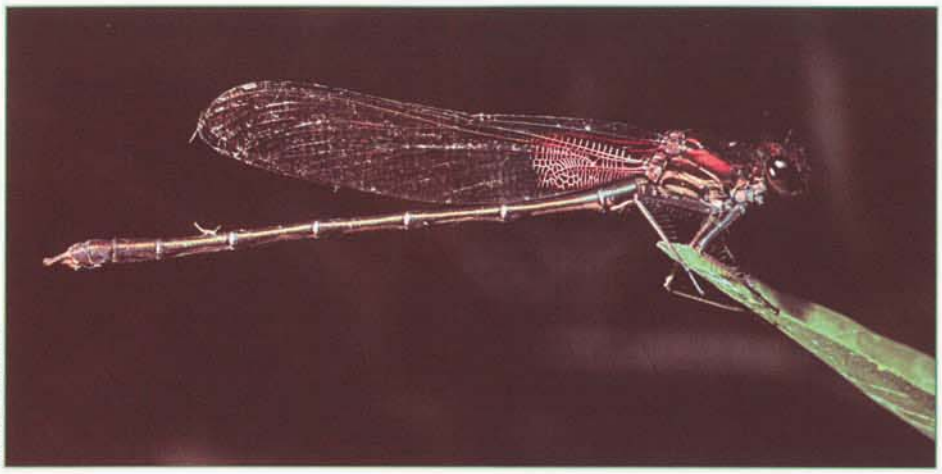


Michael R. Jeffords

The American rubyspot is a damselfly that is abundant along the high-quality streams in the region.

Carlson Nature Preserve and the Deer Park South Geological Area, and the La Salle Limestone exposures at the La Salle South Geological Area and the Ocoya Geological Area. Other mineral resources are of economic interest—a number of mining operations extract crushed stone, sand, gravel, and clay, with crushed stone being the most important with 11 active quarries. The area also lies on one of the thickest coal beds in Illinois and, while no coal mines operate here today, coal mining played an important role in creating many of the cities in the region (see sidebar, page 16).

WATER RESOURCES

"[The Vermilion] is a rapid stream, with high bluffs and narrow bottoms; the scenery along its banks for several miles from its mouth is very grand and imposing. The strata which compose its bluffs are rich in fossils, and the geologist and lover of nature will be well paid for a trip along its rugged banks."

ELMER BALDWIN, IN THE HISTORY OF LA SALLE COUNTY, *1877*

The Vermilion River, called the Aramoni by the Native Americans who once inhabited this area, travels 114 miles from its headwaters in Ford and Livingston counties to where it feeds into the Illinois River near Oglesby. Geological evidence suggests that the river originated as the drainage for an ancient lake that dried thousands of years ago. Two tributaries, the North Fork in the panhandle of Ford County, and the South Fork in southeastern Livingston County, meld the headwaters of the Upper Vermilion north of Fairbury in Livingston County. From this point, the Vermilion runs 75 miles northwest into the Illinois River.

Michael R. Jeffords

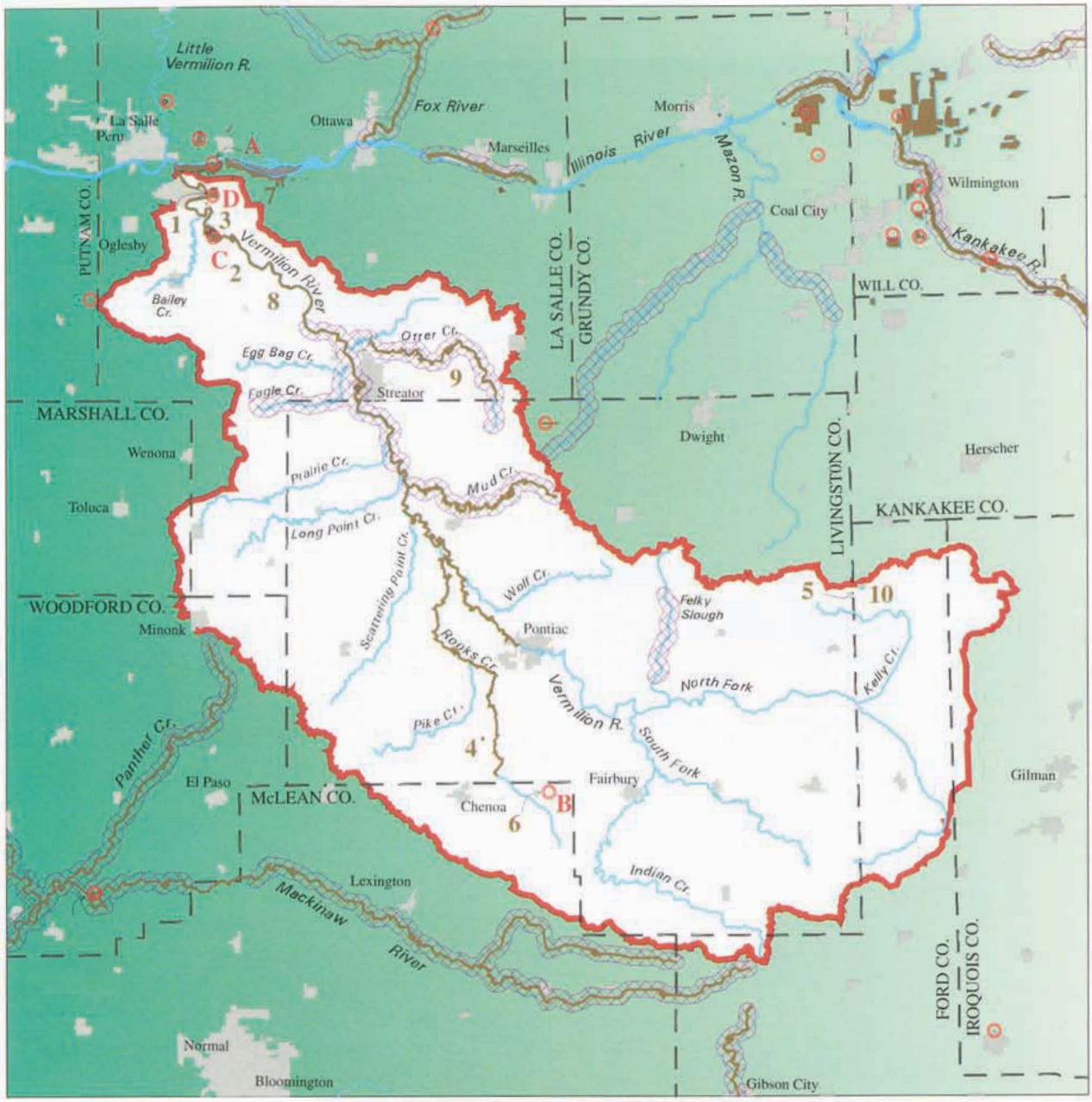
The Vermilion River

For the most part, humans have not altered the course of the Vermilion River. It is the contour of the land and the climate of the area that affect the height and speed of the river. The river valley is deeply entrenched and most defined near the mouth of the river, where the slope of the land increases and the current is fastest. Between Oglesby and Streator, the river valley is less than half a mile wide, but gets somewhat broader and progressively less defined the closer you get to the headwaters. Typically, about 35 inches of rain fall here every year, and fluctuations in rainfall significantly influence the water level of the Vermilion River and its tributaries.

The basin contains 70 lakes, and four of the five lakes that are larger than 30 acres are former quarries. Wetlands were once a major ecological component of the upland regions, but landscape alterations for farming have left very few; today wetlands comprise only 0.6 percent (4,861 acres) of the land. These wetlands are protected by federal, state, and local legislation, indicating their importance to the natural environment.

Water quality in the Vermilion River basin is generally good, despite the widespread use of fertilizers and pesticides. In fact, 76 miles of streams in the region have been classified as high-quality "biologically significant streams" that should be protected and managed because of outstanding biological characteristics. These streams are Otter Creek (20.4 miles), Eagle Creek (9.1 miles), Mud Creek (18.1

Natural Areas and Nature Preserves



N

Illinois Nature Preserves

- A. Starved Rock
- B. Weston Cemetery Prairie
- C. Margery C. Carleson
- D. Matthiessen Dells

A Nature preserve

1 Natural area

Biologically significant stream

Illinois Natural Areas Inventory Sites

1. Matthiessen
2. Margery C. Carlson
3. Deer Park South Geological Area
4. Ocoya Geological Area
5. English Prairie
6. Weston Cemetery Prairie
7. Starved Rock East
8. Vermilion River—Illinois Drainage
9. Otter Creek
10. Don Gardner's Prairie Restoration

Scale 1:595584

0 25 Miles

0 35 Kilometers

A STUDY IN DIVERSITY

R. Reber

Don Gardner's seven-acre prairie restoration near Kempton, in northern Ford County

From viceroy butterflies to velvet ants, shooting stars to side oats gramma, Don Gardner's prairie is a study in diversity. Don's seven-acre prairie restoration is located southeast of Kempton, in northern Ford County. When his great-grandfather settled the land in the 1870s, it was prairie. During the first half of the twentieth century, dairy cattle grazed on the site.

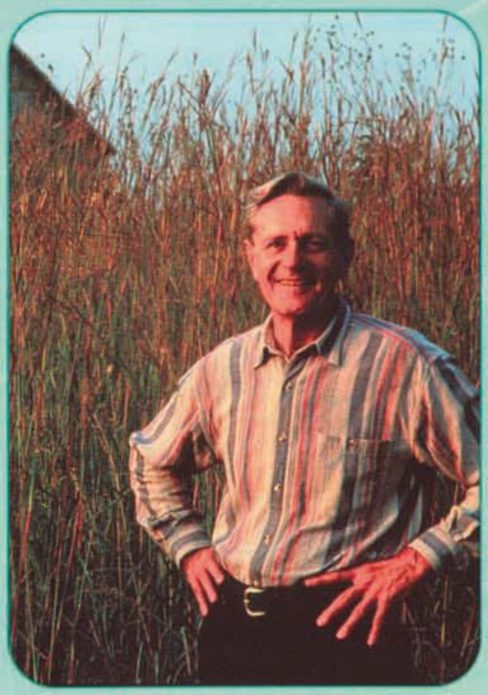
As a youngster Don explored along the railroad just west of the property where he encountered remnant prairie plants such as big bluestem and shooting star. Once he became an adult, his dental career left little time for prairies. When grazing ended in 1965, the pasture evolved into an "old field" and in 1974 Don began restoring it to prairie. Like his pioneering ancestors, Don also was a pioneer—in prairie restoration, then a new field with little information or expertise available.

He began gradually, putting in small plots each year. The plot size was determined by the amount of seed he had collected that year, and he collected only central Illinois seed within a 125-mile radius of his site. For the first three years weedy annuals were all he could see in his prairie. It was almost enough to discourage him. But then he attended a prairie conference where he met Dr. Robert Betz from Northeastern Illinois University who had a fledging restoration project that mirrored his own. After touring Dr. Betz' project, Don returned home and found that by looking closely he could see little seedlings through the weedy annuals. But the hard work had just begun.

The hardest part of the restoration was deciding on a tillage system. First he tried moldboard plowing and disking. This provided a fine seedbed, but too much soil disturbance and an explosion of weedy annuals. Don then tried chisel plowing and disking. Finally, he sprayed the area to be planted with Round-Up®, lightly harrowed, seeded, harrowed, and rolled. This worked the best!

By 1990, the last of 20 plots had been put in, including two controls that were never planted, but received the same management as the others. Beside efforts to remove certain persistent alien species such as white clover and yellow sweet clover, the only maintenance the prairie receives is a late-winter burning, and an early-fall combining. Today Don's prairie contains 138 native central Illinois prairie plants; 71 previously existed on this "old field" site and 67 were established during the restoration. In September 1995, Don's prairie was included in the Illinois Natural Areas Inventory as a Category V (natural community restoration site) prairie.

Since the site has been restored, red tail hawks, kestrels, dickcissels, meadowlarks, pheasants, and rabbits have increased. To Don, the wildlife is just an added benefit. Asked if he would do this again, Don doesn't hesitate. "Yes," is the quick reply. "I could have had a prairie garden but my intent involved a curiosity. I wanted more than just a collection of plants; I wanted to explore a prairie concept. The prairie is constantly changing—it is a study of succession. Yes, you can have prairie gentians, but not before black-eyed Susans. I have gained an appreciation for the prairie—its ruggedness, its interrelationships, its interdependencies, its vulnerability, and how it may serve as a metaphor for our own lives."



R. Reber

Don Gardner amongst the towering big bluestem

The Area at a Glance

Δ Loess, or silt that has been blown into the area, is a major constituent of much of the soil in the Vermilion River basin. Though excellent for growing crops, loess is easily swept away by wind and water, and thus soil erosion is a major problem for the farms surrounding the Vermilion.

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Δ A number of mining operations extract crushed stone, sand, gravel, and clay, with crushed stone being the most important with 11 active quarries.

Michael R. Jeffords

The tiger salamander is one of many animal species that thrive in restored prairie ecosystyems.

miles), Felky Slough (6.3 miles), and the Vermilion River from a tributary at T31N, R3E, Section 8 to Long Point Creek (22.3 miles).

Only two public water supplies, for Pontiac and Streator, withdraw water from surface sources, both drawing directly from the Vermilion along with additional reservoir storage. Twenty-three other communities use groundwater for their water supply; the average per capita usage is 103.9 gallons per day. Total groundwater use in the area—community, livestock, industrial, and rural domestic—amounts to 3.47 million gallons per day.

NATURAL HABITATS

"A glance at this varied surface, ranging in the quality of its soil from a deep alluvium to a barren sand, will prepare the botanist to look for a rich flora, and he will not be disappointed....."

R. WILLIAMS, IN THE HISTORY OF LA SALLE COUNTY, *1877*

Perhaps the most fascinating habitat, both for its importance to native species and its scarcity, is prairie. This lush landscape once dominated the Vermilion River basin, covering 93 percent (788,372 acres) of the area. Today only 5.2 acres of undegraded prairie remain. The majority, five acres, is mesic prairie and represents 1.8 percent of the high-quality mesic prairie in Illinois. The remaining one-fifth of an acre is dry-mesic prairie and represents 0.3 percent of all the dry-mesic prairie in the state. Conservation-minded residents, however, are attempting to restore prairie to the landscape. One of the best-documented restoration efforts is Don Gardner's Prairie Restoration in Ford County (see sidebar, page 6).

Elmer Baldwin wrote in his 1877 manuscript, "Whence came the prairie? What peculiar conditions caused this region to grow grass alone, while all others grow timber?" The presettlement ecology was in a delicate balance of forest and prairie, and fire was one of the agents that maintained that balance. Fire periodically decimated forest species that encroached into the open prairie, but only temporarily subdued species that thrived in the prairie ecosystem. Indeed, our understanding of the prairie ecosystem has increased dramatically since Baldwin's day. Now we know that a prairie is a complex and diverse assemblage of organisms and not simply "grass." In a high-quality prairie, Indian grass, shooting stars, purple coneflowers, and downy gentians flourish; meadowlarks and American kestrels fly over the windswept waves of vegetation; and tiger salamanders scurry through the undergrowth. These, and many other species, are what make the prairie an ecosystem that many citizens would like to see restored throughout the state.

The low slope of much of the upland areas of the basin makes for poor drainage, and in presettlement times wetlands covered about one-third of the counties that make up the Vermilion area. Today the landscape

Michael R. Jeffords

Pale purple coneflower grows in prairie remnants and restorations.

ELMER T. BALDWIN

Elmer T. Baldwin was born in Litchfield County, Connecticut, in 1806. He taught school, managed a store, and farmed in Connecticut until 1835 when he headed west to settle Illinois. Baldwin traveled by boat and train through the Great Lakes region, until he reached the small village of Chicago. From here Baldwin and his companions walked to Ottawa, Illinois. After trudging through the swamps of the Chicago region for several days, Baldwin and his company first laid eyes on the rolling prairie. "We strained our eyes to take in its extent, till the effort became painful. We descanted again and again upon its beauty, and richness..." He had found his home.

In that same year, Baldwin purchased land in what is now Farm Ridge, Illinois. A statesman and historian, he served as a Justice of the Peace of the Vermilion Precinct for 14 years, was Postmaster for 20 years, served on the Board of Supervisors of La Salle County for six years, and helped to govern the Farm Ridge Township. In 1856 Baldwin was elected to the state House of Representatives, and continued to serve in the House and in the State Senate on and off for 17 years. He died on November 18, 1895.

Perhaps his greatest contribution to the citizens of Illinois and La Salle County was documenting the era in his *History of La Salle County*. Here he provided vivid descriptions of the events, natural history, and developing industry of his time—descriptions that give twenty-first century residents a glimpse at the past.

has been altered so that wetlands drain more efficiently, and crops are now grown on much of the land that once was too wet to farm. Less than two percent (4,681 acres) of the original 270,538 acres of presettlement wetland remains, 0.6 percent of the current land cover compared to 3.2 percent statewide. Many of the remaining wetlands are associated with the corridors surrounding waterways; more than half are floodplain forests.

Between the forest and the prairie was once a unique type of habitat that is currently absent from the Vermilion River basin: the oak savanna.

The Area at a Glance

Δ The Vermilion River, called the Aramoni by the Native Americans who once inhabited this area, travels 114 miles from its headwaters in Ford and Livingston counties to where it feeds into the Illinois River near Oglesby. Geological evidence suggests that the river originated as the drainage for an ancient lake that dried thousands of years ago.

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Δ Water quality in the Vermilion River basin is generally good.

MATTHIESSEN STATE PARK

Michael R. Jeffords

A staircase is provided for hikers into the canyon on one of several trails at Matthiessen.

Philip L. Nixon

A waterfall at the end of a canyon in Matthiessen State Park

As one hikes from the top of the cliffs into the canyon at Matthiessen State Park, the cool damp air is a peaceful and refreshing respite from the summer heat, and the rushing sound of the river and waterfalls clears the mind. Ferns that thrive in the cool damp soil of the inner canyon cover the ground, and the air is alive with swallows and butterflies.

Matthiessen State Park began with 176 acres purchased by Frederick William Matthiessen, who made his fortune near La Salle-Peru in the late 1800s. After his death, the land was donated to the State of Illinois and the resulting park was named in his honor. Since then the park has expanded to 1,938 acres and encompasses several natural areas that are now scarce in Illinois. The focus of the park is the steep canyon and the interesting rock formations caused by the ceaseless flowing of water between Matthiessen Lake and the Vermilion River. In the park, 47 species of birds are summer residents. The area is habitat for the state-threatened northern white cedar and is nesting habitat for the state-threatened veery.

The unique cliffs of St. Peter Sandstone that form the walls of the canyon are intriguing to geologists and naturalists alike. Though thick layers of St. Peter Sandstone lie beneath much of Illinois, they pene-

trate the surface in only a few places, one of which is at the Dells of Matthiessen State Park. Unique species such as the state-threatened cliff goldenrod require the rare sandstone outcrops of Matthiessen and the surrounding regions as habitat. While the St. Peter Sandstone, which is more than 90 percent silica, is renowned for its use in glass-making and other industries, at Matthiesson it is prized as the foundation for a rare ecosystem.

Atop the sandstone bluffs lies sandy soil that is shaded by black oak, white oak, red cedar, and several species of pines. Some of the canopy trees are as old as 120 years. The terrain is more even here and the hiking paths are easier to negotiate. Many relict species of trees like white pine and Canada yew are found in this area of the park. Brought south by glaciers, these species are characteristic of more northern habitats. Farther from the bluffs the earth is made of stone from different geologic periods, the soil becomes thicker, and the species composition begins to change. Burr oak and hickory make up the canopy here, shading the bracken ferns and American witch hazel shrubs while providing structure for the acrobatics of black-capped chickadees, nuthatches, and squirrels. Away from the river the dense shade of the forest gives way, and blue flashes of indigo buntings can be glimpsed while brilliant red sumac bushes usher in the coming winter.

Michael R. Jeffords

A frozen waterfall at Matthiessen State Park

The Area at a Glance

Δ Seventy-six miles of streams in the region have been classified as high-quality "biologically significant streams"—Otter Creek (20.4 miles), Eagle Creek (9.1 miles), Mud Creek (18.1 miles), Felky Slough (6.3 miles), and the Vermilion River from a tributary at T31N, R3E, Section 8 to Long Point Creek (22.3 miles).

Δ Rates of habitat loss and degradation here are similar to or exceed rates for the state as a whole. Agriculture dominates land use, covering more than 90 percent of the land.

Δ Prairie once dominated the Vermilion River basin, covering 93 percent (788,372 acres) of the area. Today only 5.2 acres of undegraded prairie remain.

Δ The presettlement ecology was in a delicate balance of forest and prairie, and fire was one of the agents that maintained that balance. Fire periodically decimated forest species that encroached into the open prairie, but only temporarily subdued species that thrived in the prairie ecosystem.

Michael R. Jeffords

Downy woodpeckers are common in the wooded areas of the Vermilion basin.

Michael R. Jeffords

Mayapples pop through the leaf litter on the forest floor.

Savannas are characterized by an open canopy with widely spaced, fire-tolerant oak trees towering over a range of prairie grasses and forbs. The oak savanna is now one of the rarest ecosystems in the Midwest. Evidence suggests that dry-mesic savanna and mesic savanna were both present in the basin before the transition to agriculture took place.

In the forested portions of the watershed, oaks, hickory, and white ash offer shade, and downy woodpeckers, great-horned owls, black-capped chickadees, raccoons, and opossums thrive. The occasional bellwort splashes yellow color into the green undergrowth of the 18,795 acres of forested landscape. This amount is about a third of the pre-settlement forest and 2.2 percent of the current land cover. Today's forests are primarily located along stream channels where the steep slopes have preserved the land from the plow. Of the remaining high-quality dry-mesic upland forest left in Illinois, 1.8 percent, or 79 acres, are found here. Driving through the northern portions of the area, one can always locate the Vermilion River by spying a tree line in the distance.

FLORA AND FAUNA

"The fauna of this locality...appear, from the testimony of the French explorers and other sources, to have existed in immense numbers. It was a country prolific of animal life—but limited in species."

R. WILLIAMS, IN THE HISTORY OF LA SALLE COUNTY, *1877*

Today, 45 of the 59 species of mammals known in Illinois (76 percent) occur here, as do 11 species of amphibians and 12 of reptiles (28 percent and 20 percent, respectively). The river and its tributaries support 54 species of fishes, 29 of bivalves, and 12 of crayfish. Approximately 256 species of birds can be found in the basin, 85 percent of the total number of bird species in Illinois. Of these, 121 breed or have bred here. Although the bird species that live here are ecologically diverse, the list of breeding species is not as extensive as some other areas in Illinois, and many species, especially those that depend on forests or wetlands, are rare. A fairly rich vegetation community still exists here—896 plant species have been recorded, which is 28 percent of the plant species found in Illinois.

The continuous destruction of habitat has imperiled many species of plants and animals in Illinois. In the Vermilion basin, 41 species are listed by the state as being threatened or endangered (T&E species). One of these species, the bald eagle, is also listed as federally threatened. Seven plants and 27 birds are on the state T&E list, as are three species of fishes and three species of mussels. The only listed mammal that might occur is the state-threatened river otter; it has been sighted near the area and could potentially colonize the Vermilion as its numbers increase in the state.

Each type of habitat represented in the area is important to at least one species that is threatened or endangered. For example, four T&E birds are associated with the fragments of prairie left in the area—the northern harrier, upland sandpiper, loggerhead shrike, and Henslow's sparrow. Numerous other prairie species were lost with the transition to agriculture. The American brooklime, an endangered plant, relies on a seep in one of the state parks, and the red-shouldered hawk, brown creeper, and pied-billed grebe all depend on wetlands within the area.

The Vermilion River itself is important to rare organisms in the state. The greater redhorse and river redhorse are scarce in Illinois, and the Vermilion River is one of a few streams that still harbor these fish. The greater redhorse requires large creeks and rivers with clean rocky substrates and the river redhorse prefers fast-flowing water over rocky substrate. Other species with special status that reside within the Vermilion are the slippershell, spike, and rainbow mussels.

Arbor vitae, cliff goldenrod, fibrous-root sedge, forked aster, hairy woodrush, and red-berried elder are all threatened or endangered plants that occur in the forested areas surrounding the Vermilion River, and the red-shouldered hawk and brown creeper also use the forest as key habitat. Formerly extirpated from Illinois, the wild turkey has been re-established in the area near Fairbury, Matthiessen State Park, and Humiston Woods, providing hope to conservationists wanting to reintroduce other species that were lost here.

Many of these species find refuge in state parks, nature preserves, and natural areas. Matthiessen State Park contains 1,365 acres of forest along the northern edge of the basin, and four nature preserves cover an additional

Michael R. Jeffords

Eastern box turtles can be found in the Vermilion watershed.

Michael R. Jeffords

Bellwort adds a splash of yellow to forest floors in the area.

204 acres. Each of the preserves falls within one of 11 designated natural areas, which total 432 acres. Three sites, totaling 84 acres, are considered high-quality, undegraded sites that closely resemble their presettlement conditions. They include remnants of dry-mesic (dryish) prairie, mesic prairie, and dry-mesic upland forest.

THE PEOPLE OF THE VERMILION RIVER BASIN

"Early settlers in La Salle County found large numbers of objects that had once belonged to earlier occupants of the land. Arrowheads were the most common find. These historical remnants serve as proof of the diversity of peoples who have lived here before us."

DR. L. N. DIMMICK, IN LA SALLE COUNTY, THE RIVERS AND THE PRAIRIES, 1991

Although only 0.25 percent of the Vermilion River basin has been surveyed by archaeologists, the 433 investigated

The Area at a Glance

Δ The low slope of much of the upland areas of the basin makes for poor drainage, and in presettlement times wetlands covered about one-third of the counties that make up the Vermilion area. Today the landscape has been altered so that wetlands drain more efficiently, and crops are now grown on much of the land that once was too wet to farm. Less than two percent (4,681 acres) of the original 270,538 acres of presettlement wetland remains.

Δ The 18,795 acres of forested landscape is about a third of the presettlement forest and 2.2 percent of the current land cover. Today's forests are primarily located along stream channels where the steep slopes have preserved the land from the plow.

Δ Today, 45 of the 59 species of mammals known in Illinois (76 percent) occur here, as do 11 species of amphibians and 12 of reptiles (28 percent and 20 percent, respectively).

Δ The river and its tributaries support 54 species of fishes, 29 of bivalves, and 12 of crayfish.

PIONEER CEMETERIES

Michael R. Jeffords

Weston Cemetery in McLean County, which has never been plowed, is an island of native prairie vegetation in an area dominated by field crops.

In the southern part of the Vermilion River watershed, at the northeastern edge of McLean County, lies a cemetery that has quietly endured for 130 years. Founded in 1870 by several McLean County citizens, Weston Cemetery was not widely used and eventually the five acres of land were deeded to Yates Township. Today the cemetery is far more than a memorial to early Illinoisans; it is a significant biological "snapshot" of the presettlement landscape of the region. Judging from soil characteristics and the plant community, this cemetery has never been plowed and the plant fauna are representative of the tallgrass black-soil prairie that once dominated Illinois. Big bluestem, Indian, prairie panic, prairie drop-seed and porcupine grasses are all prevalent here, and shooting star, prairie gentian, and compass plant, among other wildflowers, paint color into this small but remarkable plot of land. The rare species of wildflowers and grasses present at the cemetery prompted the citizens of Yates Township to dedicate it as the Weston County Prairie Nature Preserve.

In *The Directory of Illinois Nature Preserves* there are at least 18 pioneer cemeteries that have been dedicated as Nature Preserves. Many were established in the mid-1800s and used for 100 years or less, then left virtually untouched for years. In several cases, these cemeteries are the only representatives of the flora that once inhabited certain regions of the Grand Prairie Natural Division. Today a variety of organizations have adopted these cemetery preserves and are managing them with techniques such as prescribed burning and exotic species removal.

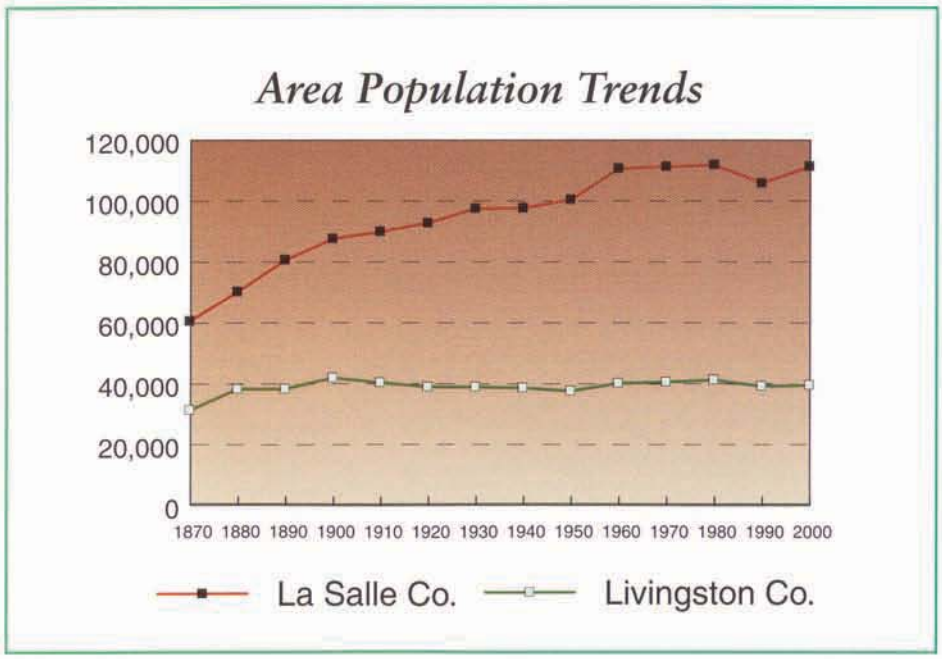
Havens for the native prairie species that once dominated the state, these small tracts have persisted amidst a sea of corn and soybeans, offering hope to conservationists who are trying to restore other prairies. The Weston Cemetery Prairie Nature Preserve, and others like it, will allow future generations to catch a glimpse of presettlement Illinois prairie.

sites suggest that humans have probably inhabited the area for more than 12,000 years, although most settlement occurred in the post-glaciation period. Until the mid-1800s, the area was inhabited primarily by sub-tribes of the Illinois, though reports of other tribes, particularly the Iroquois, are mentioned in many of the histories of the area. By 1835, all of the remaining Native Americans had been moved to reservations west of the Mississippi, and European settlers and their descendents would dominate the area from this time forward.

According to the 2000 Census, the two main counties through which the Vermilion flows, La Salle and Livingston, are home to 151,187 people, a little more than one percent of the state's population. Together the two counties have grown by 64 percent since 1870, far less than the state as a whole, which grew 389 percent. Much of this has to do with the fact that the area is predominately rural—less than 60 percent of residents live in cities. Nevertheless, urban land use has increased by 42 percent between 1982 and 1995, primarily in the two major cities of Pontiac and Streator.

One of the first settlers in Livingston County was Jesse Fell. Fell walked to Illinois from Pennsylvania in 1831 and at one time owned much of the land where Pontiac now stands. He bankrolled many of the early buildings in the city, assisted the establishment of the Illinois State Reformatory (now the Pontiac Correctional Center), and planned the route that trains still travel on their way through Pontiac today. Fell named the city after the great Native American chief and the county after Edward Livingston, the statesman who denounced the secession of South Carolina. The city of Pontiac supplied much of the lumber for the county's homesteads as well as for the wood-burning locomotives of the Chicago and Alton Railroad, which brought people and businesses to the area. For this reason, Pontiac owes much of its early prosperity to the lumber industry.

Coal was the motivator behind the creation of Streator. Coal miners had



The Area at a Glance

Δ Approximately 256 species of birds can be found in the basin, 85 percent of the total number of bird species in Illinois. Of these, 121 breed or have bred here.

Δ A fairly rich vegetation community still exists here—896 plant species have been recorded, which is 28 percent of the plant species found in Illinois.

Δ Forty-one species that occur here are listed by the state as being threatened or endangered.

Δ The Vermilion River is one of a few streams in Illinois that still harbor the greater redhorse and river redhorse. Other species with special status that reside within the Vermilion are the slippershell, spike, and rainbow mussels.

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Matthiessen State Park contains 1,365 acres of forest along the northern edge of the basin, and four nature preserves cover an additional 204 acres. Each of the preserves falls within one of 11 designated natural areas, which total 432 acres.

ISGS photo archives

Coal and clay were undercut by hand in La Salle County during January of 1912.

ISGS photo archives

Number 2 coal southwest of Ottawa, La Salle County, within 50 feet of the Illinois River, was photographed in 1967. This may have been the site mentioned in the Marquette records of 1673–1674.

COAL COUNTRY

With 41,000 square miles of coal, Illinois has some of the largest deposits in the country. In *The Past and Present of La Salle County, Illinois*, published in 1877, the editors describe the extent of the coal deposits in Illinois. "Could we sell the coal in [Illinois] for one-seventh of one cent a ton it would pay the national debt. Converted into power, even with the wastage in our common engines, it would do more work than could be done by the entire race, beginning at Adam's wedding and working ten hours a day through all the centuries till the present time, and right on into the future at the same rate for the next 600,000 years."

Also in 1877, historian Elmer Baldwin described the coal deposits in the Vermilion basin. "Over the south part, and more than half of [La Salle County], the drift rests upon the carboniferous or coal formation, being the northern termination of the great coal field of the State. Its northern limit is a little north of the Illinois River, but most of it north of the valley of the Illinois and east of Ottawa, with few exceptions, lies upon the St. Peters Sandstone, approaches the outcrop, and is of little importance. The importance of coal embraced

in the county is almost unlimited in amount, generally of excellent quality, and its value, present and prospective, can hardly be overestimated."

By 1958, when the last of the coal mines shut down, almost 10 square miles of coal had been removed from the Vermilion River watershed. Much of the underground mining in this area occurred between 1883 and 1958, though many of the underground mines ceased operation in the 1920s. The two largest underground mining operations were at Streator and near Oglesby, where the Vermilion approaches the Illinois River. Surface mining—heavy machinery scrapes away the earth that lies over a coal deposit and removes the exposed coal—began to displace underground mining in the last two decades of mining here.

Though no coal mines currently operate in the area, mining was a driving force behind many area towns. Once a mine was opened, people would arrive from the east looking for work. Unorganized towns would develop around settlements, and stores and shops would begin to spring up to serve the growing population. Before long the railroad would arrive at the largest mining operations, and with the railroad came more people. Mining towns filled with European immigrants and often became cultural melting pots. For example, English, Welsh, and Scottish immigrants comprised much of Streator's population in 1860. By 1874, the town's population had grown to more than 4,000, and "People of many nationalities had flocked in, gone to work, and built homes" (from Paul Angle's *A Biography in Black*). Theaters, fairs, and circuses were common in this booming town, as were a host of businesses and trades. All of the prosperity was tied to the bountiful coal mines of the area. Ultimately, coal production slowed as society's demand for fuel shifted from coal to gas and oil. As the mines shut down, many towns stopped growing and the towns without alternative industries faltered.

The Area at a Glance

Δ Three sites, totaling 84 acres, are considered high-quality, undegraded sites that closely resemble their pre-settlement conditions. They include remnants of dry-mesic (dryish) prairie, mesic prairie, and dry-mesic upland forest.

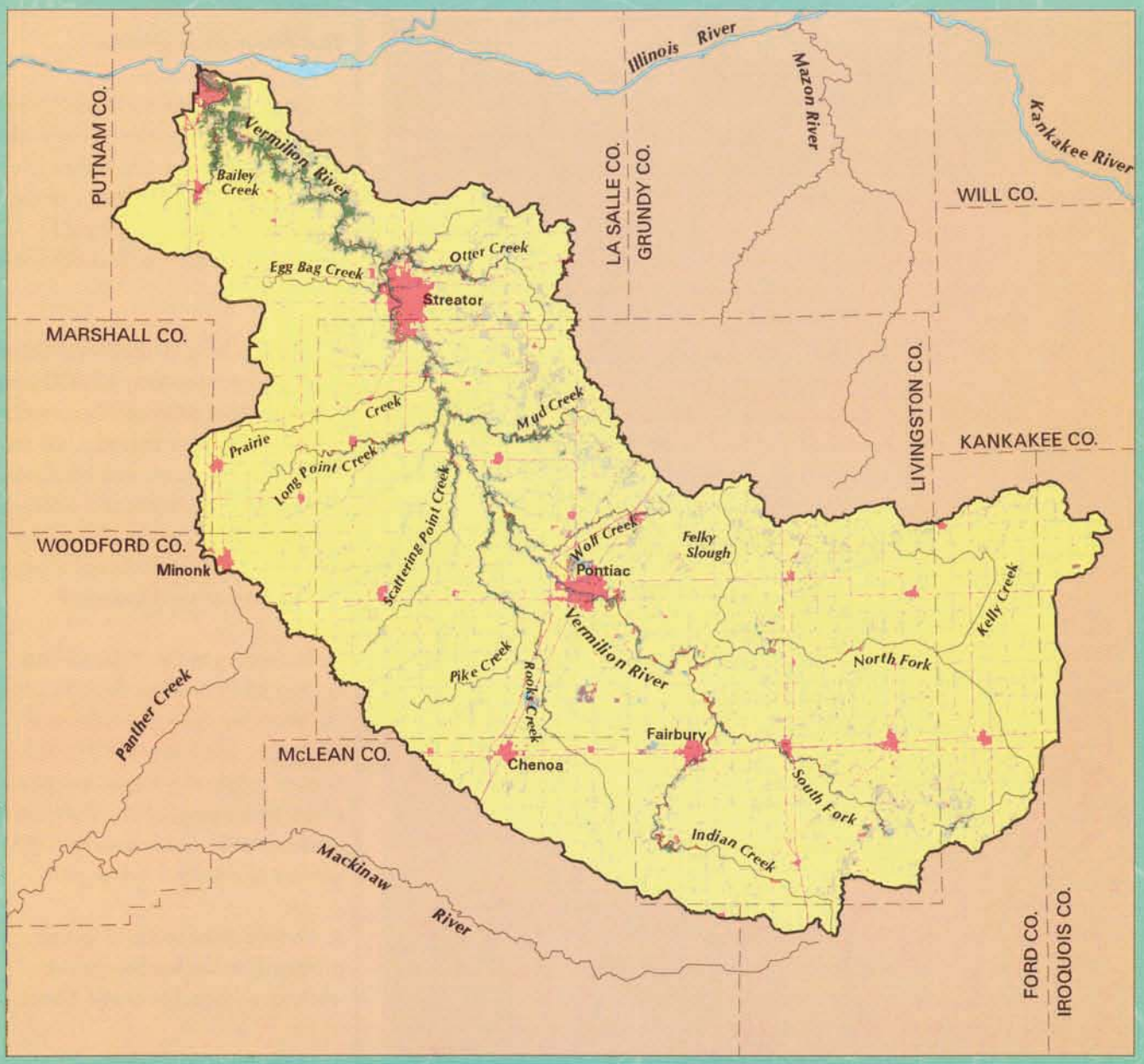
Δ Humans have probably inhabited the area for more than 12,000 years, although most settlement occurred in the post-glaciation period. Until the mid-1800s, the area was inhabited primarily by sub-tribes of the Illinois. By 1835, all of the remaining Native Americans had been moved to reservations west of the Mississippi.

Δ According to the 2000 Census, the two main counties through which the Vermilion flows, La Salle and Livingston, are home to 151,187 people, a little more than one percent of the state's population. The area is predominately rural—less than 60 percent of residents live in cities.

Δ Pontiac owes much of its early prosperity to the lumber industry, while coal helped to create Streator.

Δ In the two-county area, 70 percent of the employment is in La Salle County, where jobs have been shifting from manufacturing to service positions in recent years. In the smaller economy of Livingston County, manufacturing jobs have actually grown by 22 percent.

Land Cover



Lisa Smith, Illinois State Geological Survey

Source: Critical Trends Assessment Landcover Database of Illinois 1991-1995, IDNR 1995.

0 10 20 Miles

N

- cropland
- rural grassland
- forest and woodland
- urban and built-up land
- wetland
- lakes and streams
- barren and exposed land
- outside assessment area
- assessment area boundary
- county boundary
- subbasin boundary
- river or stream

Michael R. Jeffords

The great horned owl frequents the forested portions of the Vermilion watershed.

settled in the area before there was even a town. John O'Neil first named the town Hardscrabble, a name that was later changed by the town to honor Dr. Worthy L. Streator, who financed the area's first large-scale mining operation. Dr. Streator hired Colonel Ralph Plumb to manage his Vermilion Coal Company, and Col. Plumb subsequently developed several of the coal mines that breathed economic and social prosperity into Streator. The colonel was also responsible for platting out the quickly developing town, organizing the incorporation of the town, and establishing a town government. Today, coal mining is absent from Streator and the town relies on manufacturing and service-related industries as its economic base.

In the two-county area, 70 percent of the employment is in La Salle County, where jobs have been shifting from manufacturing to service positions in recent years. In the smaller economy of Livingston County, however, manufacturing jobs have actually grown by 22 percent, contrary to state and national trends. Agriculture also remains important in Livingston County and provides the third largest share of earnings for its workers. Even so, in the two-county area the number of farms has fallen by 31 percent over the past 22 years.

Outdoor recreation is focused around the river corridors and the parks and natural areas that often accompany them. Matthiessen State Park is the only major state site in the Vermilion River basin, although several high-profile sites, including Starved Rock State Park and the Illinois and Michigan Canal, are nearby. Throughout the 1990s, attendance at Matthiessen State Park averaged about 400,000 people yearly.

Sales of hunting and fishing licenses in the region are down from what they were in the late 1980s, as they are statewide. Deer are the most popular game—though hunters also pursue

The Area at a Glance

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Δ Matthiessen State Park is the only major state site in the Vermilion River basin, although several high-profile sites, including Starved Rock State Park and the Illinois and Michigan Canal, are nearby.

Δ Corn and soybeans together make up more than 99 percent of the crop receipts in the two-county area. In 2000, La Salle and Livingston counties were numbers three and four for corn production in the state, and Livingston County produced the second highest number of bushels of soybeans.

Δ Livingston County is the third highest producer of hogs in the state.

Michael R. Jeffords

Oak trees bloom as spring returns to the Vermilion basin.

pheasants, rabbits, squirrels, doves, and coyotes—and fishing for large and smallmouth bass and crappies is considered to be fair in the Vermilion River.

AGRICULTURE

"[The steel bladed plow] has more than doubled the capacity of the people for the production of farm crops, and lifted the burden of slavish toil from the shoulders of the laboring millions. It will make the farmer's occupation one of the fine arts, and engineering skill and scientific knowledge the qualification required in a farm hand, rather than the rude muscular strength required by the old system."

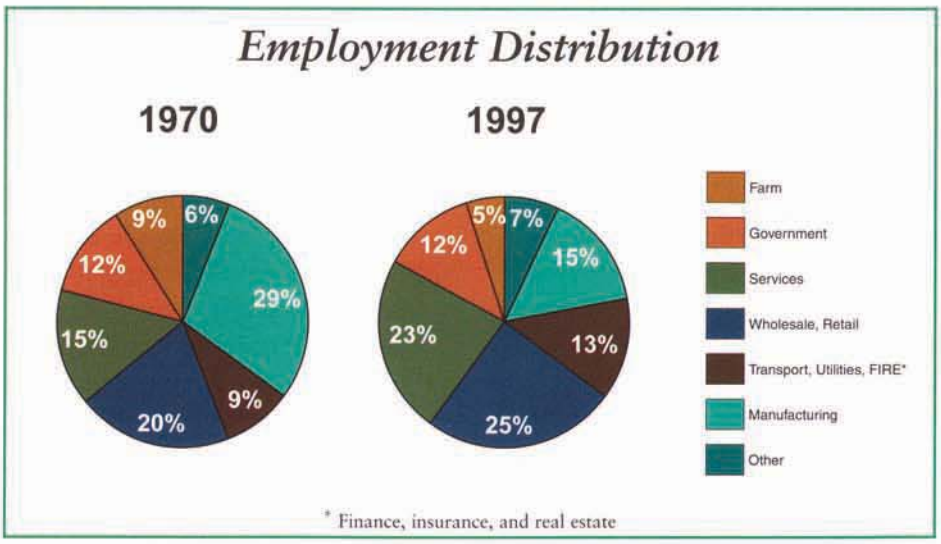
ELMER BALDWIN, IN THE HISTORY OF LA SALLE COUNTY, *1877*

Two problems had to be solved before the area's prairie could be tapped for its rich and fertile soil. First, the prairie had to be drained. The level slope of the land did not allow water to flow off quickly into creeks and streams, and a lot of valuable land was submerged during the growing season. In Livingston County alone, 12,000 miles of drainage tiles were installed, more than in any other county of its size in the United States and, according to *The History of Livingston County*, "a distance greater than the combined length of the three greatest rivers in the world, the Nile, the Amazon and the Mississippi." Understandably, among the first industries to arise on the prairie were tile-making facilities.

Second, the prairie had to be broken. As it was, the thick prairie soil would stick to the plows, necessitating frequent cleanings. John Deere solved this problem when he fashioned the first self-polishing, steel-bladed plow from a piece of scrap metal in his workshop in Grand Detour, Illinois. This allowed the prairie to be tilled, and Illinois has been prominent in U.S. agriculture ever since.

Corn and soybeans together make up more than 99 percent of the crop receipts in the two-county area. In 2000, La Salle and Livingston counties were numbers three and four for corn production in the state, and Livingston County produced the second highest number of bushels of soybeans. A peak production year was 1994, when 98.8 million bushels of corn were produced in the two counties, a big increase since the turn of the century when *The History of Livingston County* boasted, "[Livingston County] has few, if any, equals in the world, in the production of the valuable cereals.... The acreage of corn in the county in 1907 was over 285,000 acres, and the yield was nearly 12,000,000 bushels." In 2000, Livingston County produced more than 42.2 million bushels of corn on the same amount of acreage planted in 1907.

Elmer Baldwin described the grasses that would make livestock production an economic industry in the basin. "The wild grass of the prairies, in its primitive state, made excellent pasture and hay. With the range the early settlers had, their cattle would put on more flesh, and in less time, than on any other pasture, either wild or tame. The upland grass, which for many years formed the staple feed for stock, was a good article, but immensely inferior to the choice virgin pastures which greeted the herds of the first comers." Livestock is still an important industry in the Vermilion River basin, though cattle are primarily raised on a variety of cultivated pasture grasses rather than the once prevalent prairie grasses.



Average annual livestock inventory includes 168,000 hogs and 38,000 head of cattle, which account for 2.6 percent of Illinois' livestock production. Livingston County is the third highest producer of hogs in the state.

PROBLEMS AND SOLUTIONS

The ecological issues facing the Vermilion River basin are similar to those facing other areas of the state. Habitat loss and degradation head the list, along with water quality issues.

Restoring Ecosystems

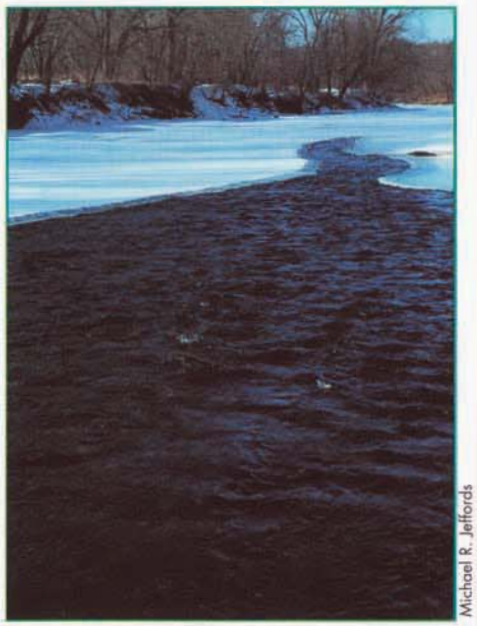
Once gone, rare habitats are difficult to restore. Conservationists have discovered this as they attempt to restore the prairie that once was prevalent throughout the region. Some of the largest impediments to the restoration of certain habitats are the lack of knowledge concerning the biological communities (i.e., species present and their abundance) in the presettlement Vermilion River basin, and the inability of small fragments of restored land to support certain natural communities. Furthermore, many restoration projects lack the time and funding critical to effectively re-establish native habitats.

Exotic Species

Of the 860 plant species found in the Vermilion River watershed, 19.2 percent (172 species) are non-native. Once introduced, these species are nearly impossible to exterminate, and some, such as Queen Anne's lace, reed canary grass, and teasel, take advantage of the disturbed landscape and achieve pest status. A variety of options are available to dampen the impact of exotic plants on natural communities, but many of these options, such as herbicides and burning, are as detrimental to the native plants as they are to the exotics. Biological control programs are being developed for several invasive weeds in Illinois; these programs rely on plant-specific natural enemies to reduce populations, and have been encountering good success around the country.

Regulating Nitrate Levels in the Vermilion River

While nitrate levels in the Vermilion River are usually at acceptable levels, the two cities that rely on the river for their water supply—Pontiac and Streator—use off-channel reservoirs to reduce the risk of water contamination. Originally built to augment water supply, the reservoirs are refilled when nitrates in the river are low, and provide water to the cities when nitrate levels in the river are high. Government subsidies have also enabled property



Michael R. Jeffords

The Vermilion River in winter

The Area at a Glance

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Δ Of the 860 plant species found in the Vermilion River watershed, 19.2 percent (172 species) are non-native. Once introduced, these species are nearly impossible to exterminate, and some achieve pest status.

Δ The loess that makes the upland regions so productive is also susceptible to erosion. Strip tilling is beginning to be adopted by some farmers to prevent erosion here.

Δ Streambank erosion is also a problem, and several tactics are being used to combat it, such as planting vegetated filter strips that help hold streambanks together.

Δ Local groups are working to address ecological issues and preserve and restore the area's ecological riches. One of their efforts is Humiston Woods Nature Center in Livingston County. It contains the largest woods in the basin—almost 300 acres of oak-hickory woodland—as well as 23 acres of savanna, 15 acres of restored tallgrass prairie, a two-acre pond, a scout camp, and five miles of trails.

owners to plant edge-of-stream land with warm season grasses that filter certain pesticides and nutrients from run-off, before they can enter streams and rivers.

Reducing Soil Erosion

The loess that makes the upland regions of the watershed so productive is also susceptible to erosion. Tillage practices make a big difference in the amount of erosion that occurs on cropland, and strip tilling is beginning to be adopted by some farmers in the Vermilion River basin. With this technique, only thin rows of land are tilled in the fall, and seeds are planted in these rows early in the spring. Strip tilling increases soil temperature and drainage, reduces soil erosion, and allows for less fertilizer usage. Streambank erosion is also a problem here, and several tactics are being used to combat it, such as planting vegetated filter strips that help hold streambanks together. In addition, these 10–30 foot-wide filter strips provide habitat for birds and animals.

Groups such as the Vermilion Watershed Task Force are working to address these issues and to generally preserve and restore the area's ecological riches. One local effort of which the area is proud is Humiston Woods Nature Center in Livingston County. The site contains the largest woods in the basin—almost 300 acres of oak-hickory woodland—as well as 23 acres of savanna, 15 acres of restored tall-grass prairie, a two-acre pond, a scout camp, and five miles of trails. The site is popular with local groups who visit for both nature education and outdoor recreation. In the woodlands, hikers enjoy numerous ephemeral spring wildflowers such as wild columbine, Jack-in-the-pulpit, spring beauty, and blue-eyed Mary, as well as summer woodland herbs such as cluster-sanicle and sweet cicely. In the short- and tall-grass prairies visitors will see grassland species such as big bluestem, prairie compass, purple coneflower, and prairie dock, while at the pond are aquatic species such as duckweed and arrowhead.

By increasing knowledge of the habitats and natural communities in the basin (such as those found at Humiston Woods), by protecting the existing natural resources, and by developing a plan to manage restoration efforts—including controlled burning, exotic species removal, and metering habitat degradation—natural resources that have been lost can be restored. It may, however, take generations to restore what was frequently destroyed in only a day. Since the pioneer settlers of the Vermilion River basin repeatedly displayed resilience and ingenuity in overcoming the challenges presented by their eras, current residents can also meet today's challenges. Indeed, they are already moving in that direction.

Violets and spring beauties spring to life after a winter's rest.

Michael R. Jeffords

(continued from inside front cover)

In addition to coordinating IDNR programs with those of Ecosystem Partnerships, the Ecosystems Program:

- provides technical assistance to the partnerships, such as resource management plans for use by participating landowners;
- assesses resources in the area encompassed by each Ecosystem Partnership, collecting data that the local partners themselves may use to set project priorities and design projects, and supplying scientific support to ecosystem partners, including on-going monitoring of Ecosystem Partnership areas;
- funds site-specific ecosystem projects recommended by each partnership. Such projects may involve habitat protection and improvement, technical assistance, and research and education, including projects that seek to expand the relationships among natural resources, economic development, and recreation.

To provide focus for the program, IDNR developed and published the *Inventory of Ecologically Resource-rich Areas in Illinois*, and is conducting regional assessments for areas in which a public-private partnership is formed.

The Vermilion River Basin (in the Illinois River Watershed): An Inventory of the Region's Resources is based on one of these assessments, the *Vermilion River (Illinois River Basin) Area Assessment*. The assessment was compiled by staff of IDNR's Division of Energy and Environmental Assessment, Office of Realty and Environmental Planning, the Illinois State Museum, the Illinois Waste Management and Research Center, and the Illinois Natural History, State Geological, and State Water Surveys of IDNR's Office of Research and Scientific Analysis.

The *Vermilion River Area (Illinois River Basin) Assessment* and all other CTAP and Ecosystems Program documents are available from the IDNR Clearinghouse at (217)782-7498 or TTY (217)782-9175. Some are also available on the World Wide Web at:

http://dnr.state.il.us/orep/ctap and
http://dnr.state.il.us/orep/c2000

For more information about CTAP, call (217)524-0500 or e-mail at ctap2@dnrmail.state.il.us; for information on the Ecosystems Program, call (217)782-7940 or e-mail at ecoprg@dnrmail.state.il.us.

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