

THE SUGAR-PECATONICA RIVERS BASIN

AN INVENTORY OF THE REGION'S RESOURCES



ABOUT THIS REPORT

The Sugar-Pecatonica Rivers Basin: 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 six-year State of Illinois initiative 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. And Conservation 2000, designed to achieve that reversal, has implemented a number of their recommendations, drawing on \$100 million to fund nine programs in three state agencies.

One of these programs 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

THE SUGAR-PECATONICA RIVERS BASIN

AN INVENTORY OF THE REGION'S RESOURCES

1999



George H. Ryan, Governor
State of Illinois



Brent Manning, Director
Illinois Department of Natural Resources



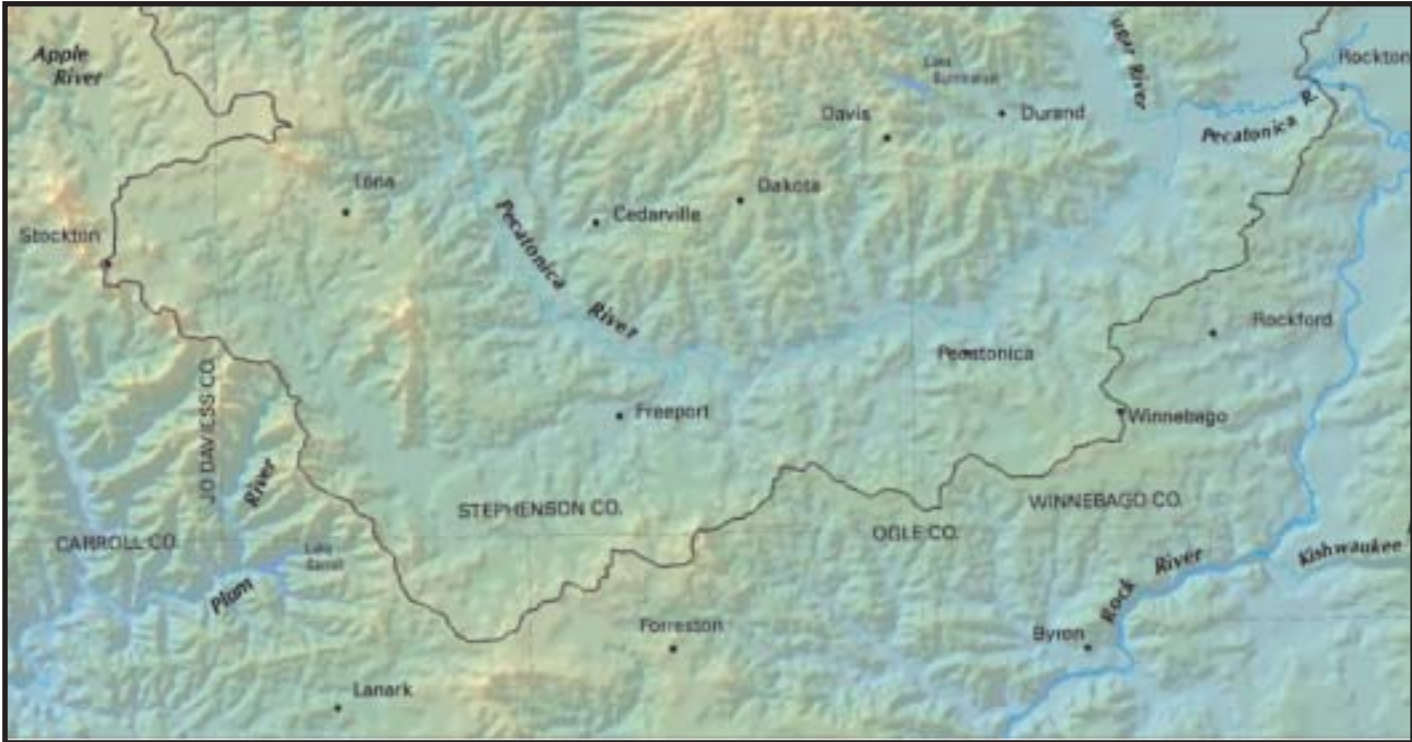
Published by the Illinois Department of Natural Resources
Office of Realty and Environmental Planning

Printed by the authority of the State of Illinois

5M/PRT 3044723

Printed with soy ink on recycled and recyclable paper

Sugar-Pecatonica Rivers Basin Landforms



Elevations in feet above mean sea level



The Sugar-Pecatonica Rivers Basin

An Inventory of the Region's Resources



Joel Dexter

Sugar River at Colored Sands Forest Preserve

Beginning in 1838, officials in the then-territory of Wisconsin asserted that the watershed of the Pecatonica River and the Sugar River, its main tributary, and the rest of Illinois' northernmost 14 counties belonged to the Badger State. The land had in effect been stolen by Illinois, Wisconsin argued, when Illinois inaccurately set its state boundaries in 1818. The legal dispute was resolved in 1848 when Wisconsin

officially surrendered its claims to northern Illinois. Ecologically, however, the region remains a creature of Wisconsin. The rivers rise in that state before curving south and east into Illinois, where the two streams, now conjoined, meet the Rock River at Rockton. What happens upstream in Wisconsin has more effect on the rivers (especially the Sugar) than what happens in Illinois. And the climate of the watershed, which lies more than

400 miles north of Cairo, Illinois, is as different from that town's as Kentucky's is from Wisconsin's.

This part of Illinois also differs from central and southern counties in terms of its human culture. It was settled not by Kentuckians and Carolinians, as happened to the south, but by Scandinavians, Yankees, and German settlers from Pennsylvania. These were people undeterred by winter. The newcomers also had a different

attitude toward the land than that of the slash-and-burn farmers who settled the southern Illinois frontier a generation earlier. Back home they had learned how to farm thinly soiled, hilly country like this without wasting it. Today the verdant pastures dotted with dairy cows (and towns dotted with cheese makers) still give the area a marked Wisconsin flavor.

THE FACE OF THE LAND

While linked hydrologically and geographically, the Sugar and the Pecatonica rivers have distinct personalities. The Pecatonica is slow and turbid, a quintessential Illinois river. The faster, clearer waters of the Sugar run over a bed of mostly rock and sand — a Wisconsin river in character as well as origins.

The two rivers drain 796 square miles of Illinois, most of it in Stephenson and Winnebago counties. This part of Illinois is known to naturalists as the Rock River Hill Country. In most other parts of the state, preglacial bedrock is buried beneath dozens, even hundreds of feet of clays, gravels, and sands left behind by the ice sheets. Here surface deposits are thinner, less than 20 feet on average. The general contours of the landscape that existed before the ice came are still discernible in the surface, much as the form of a sleeping person can be detected beneath a thin blanket.

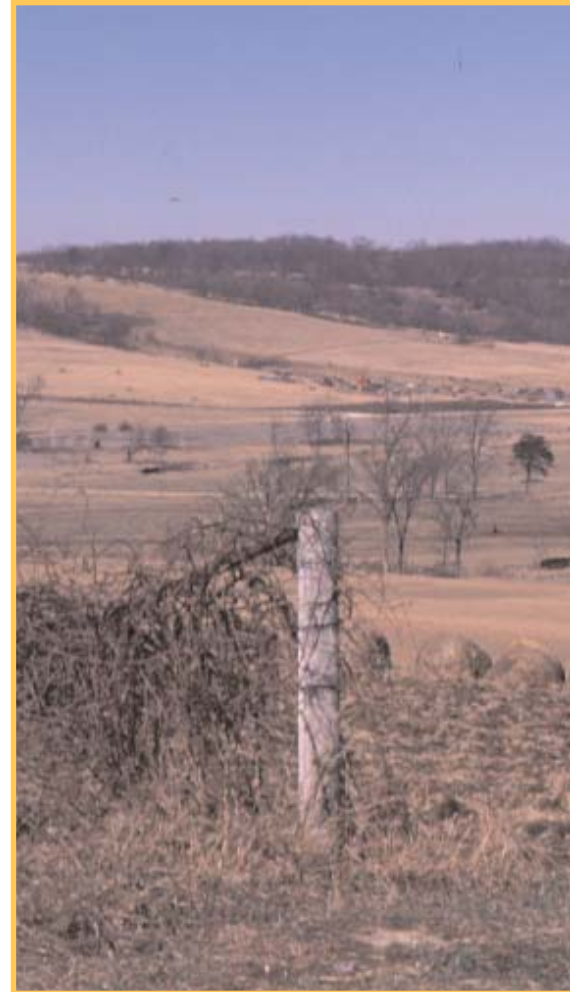
The surface is broken by an intricate network of streams — an efficient drainage system but an inefficient setting for grain farming. The land has always been better suited to dairying and other forms of animal husbandry, and today still has relatively more grasslands such as hay fields and pastures than the row-crop districts of central Illinois. Indeed, only one Illinois county

has more grassland, measured in both acreage and percentage terms, than does Stephenson County, which is the state's leader in the production of forage crops for livestock.

That kind of farming tends to stress land less than does intensive, continuous cropping of corn or soybeans. Less stress on the land means less stress on the rivers that run through it. The Pecatonica's water quality is excellent, with its ability to support aquatic life impaired to only a minor degree. This is a significant improvement since the early 1970s, when the Pecatonica's water quality was judged only "fair." Farms — whose fields are the source of phosphorous runoff from fertilizers — and sewage plants are the major remaining pollution sources, although some local observers feel that recently constructed large hog farms have increased pollution risks in the area.

Thirty-four of its 40 tributaries are in as good or better condition than the Pecatonica. In Winnebago County, ten miles of Raccoon Creek and the Sugar River upstream from Otter Creek have been designated as "Biologically Significant Streams" because they support especially diverse life. In Crane Grove Creek south of Freeport, the blacknose shiner was still found as of 1991. Once widespread in northern Illinois, this fish thrives in clear vegetated lakes and in the pools of creeks and small rivers, usually with sandy bottoms. Most such waters elsewhere have become so clouded by silt that the blacknose shiner cannot feed and reproduce.

The region also has some of the most extensive riparian, or river-side, wetlands left in northern Illinois. Extensive marshes flank the lower Pecatonica between Freeport and Rockton, and Richland Creek from



Orangeville southward to near the old oxbow lake known as Ducks Misery. The bottoms of the Sugar River and Raccoon and Otter creeks harbor large tracts of marsh, floodplain forest, sedge meadow, and wet sand prairie. Shrub swamps sprout in abandoned river channels that dot the region; representative ones include the Sugar River Alder Site and the Pecatonica River Forest Preserve.

The geographic areas within which all living things make their homes — what scientists term natural ranges — are largely limited by climate and geology. Where climate zones overlap, the ranges of plants and animals overlap too. Like the rest of Illinois, the



Joel Dexter

The Area at a Glance

The Sugar and the Pecatonica rivers drain 796 square miles of Illinois, most of it in Stephenson and Winnebago counties — a part of Illinois known to naturalists as the Rock River Hill Country.

Ecologically the region is a creature of Wisconsin. Surface deposits are thin (less than 20 feet on average) so the general contours of the preglacial landscape are still discernible in today's surface.

The region is well-suited to dairying and other forms of animal husbandry. The sale of livestock accounts for 70% of the region's total annual receipts from agriculture — unusually high for Illinois. In 1994 Stephenson County led all Illinois counties in such receipts.

Only one Illinois county has more grassland than does Stephenson County, which is the state's leader in the production of forage crops for livestock.

The Sugar-Pecatonica region differs from the typical Illinois farm region — 40% of the agricultural land is grassland. Between 1990 and 1994 the region averaged \$57 million in annual crop receipts and \$142 million in livestock receipts. Stephenson County is a statewide leader in livestock receipts and in the production of milk cows. Above, farmland near Freeport.

Sugar-Pecatonica region lies at the crossroads of continental climate zones. Certain prairies in the eastern part of the region harbor plant species typical of the northern great plains. Many local birds are much more common to the American South, including the yellow-throated warbler (especially common among the sycamores at the Sugar River Forest Preserve) and

white-eyed vireo. Most of the plants that are rare in the Sugar-Pecatonica watershed are common to the north and west, but here dwell precariously on the edge of their natural ranges.

Local geologic conditions are not typical for Illinois. Bedrock that lies near the surface and deposits of sand washed off glaciers both host natural communities that are rare. Dolomite

Michael Jeffords



Above, a marigold marsh at Lake Le-Aqua-Na State Park. Right, the badger is one of the more unusual species found in the watershed.

prairies grow atop shallow-lying bedrock of that limestone-like stone, and the eastern parts of the region have some of the best such prairies left in Illinois. The sandy areas between Sugar River and Raccoon Creek support several communities adapted to that now-scarce environment.

Diverse habitat tends to support diverse living things. More than 1,000 species of plants, including subspecies and varieties, are found here. (The number may be higher; the number of plant species must be estimated, as there are almost no botanical records for Stephenson County outside of the plants cataloged in its nature preserves.) Thus nearly 40% of all the plant species native to Illinois grow in an area that makes up only 1.37% of

the state's territory.

Seventeen species of reptiles are known or are thought likely to occur in the region, as are 14 species of amphibians, including the uncommon blue-spotted salamander that inhabits the Colored Sands Bluff (on the Sugar River) and Pecatonica Bottoms nature preserves. Aquatic life is considered moderately diverse by experts; the list includes 65 species of fish, 20 of native freshwater mussels, and 11 species of large crustaceans known as malacostracans. The latter numbers are estimates, as the Sugar-Pecatonica watershed is probably the least well-known drainage system in Illinois with respect to aquatic macroinvertebrates. For example, while 20 species of freshwater mussels have been record-

ed in local waters, individuals of only six of them have been collected alive in the past 20 years. It is not clear whether this reflects a loss of mussel diversity or merely the fact that little collecting has been done in that time, although the relatively low recorded number of other species — aquatic insects, snails, clams, and so on — probably owes more to scant field data than to scant life.

The region once teemed with large mammals. Forty-five species of mammals are still known or are likely to occur here, including some that are unusual in most of Illinois. For many years, Lake Le-Aqua-Na, north of Lena in Stephenson County, was the

Natural Areas Inventory Sites, Nature Preserves, and Biologically Significant Streams

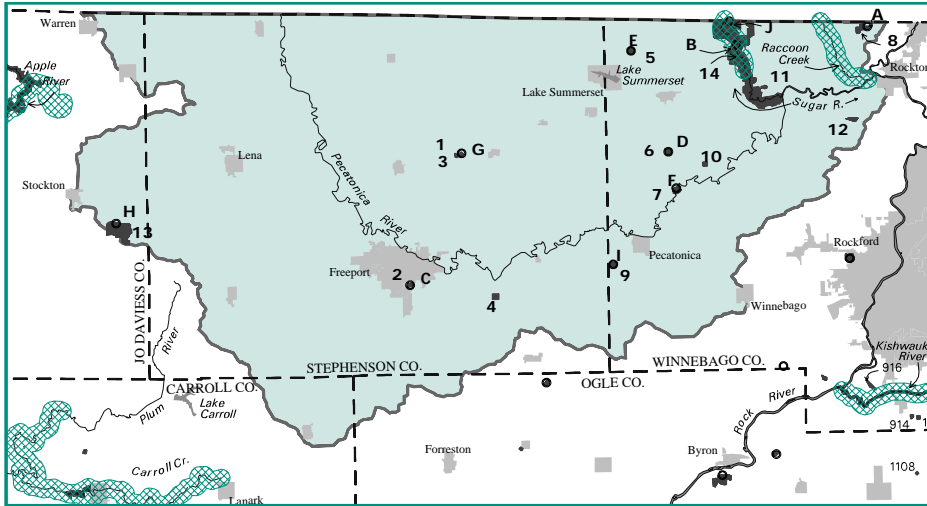
The Area at a Glance

The Pecatonica's surface water quality is excellent, with its ability to support aquatic life only slightly impaired — a significant improvement since the early 1970s, when the Pecatonica's water quality was judged only "fair." Thirty-four of its 40 tributaries are in as good or better condition.

Ten miles of Raccoon Creek and the Sugar River upstream from Otter Creek have been designated as "Biologically Significant Streams" because they support especially diverse life.

Wetlands cover roughly 16,000 acres of the Sugar-Pecatonica watershed. This is about 3% of the land area overall — a slightly smaller proportion than in the state as a whole. They include some of the most extensive river-side wetlands left in northern Illinois.

Like the rest of Illinois, the Sugar-Pecatonica region lies at the crossroads of continental climate zones. Many local plant and animal species are more typical of the northern great plains or the American South.



Illinois Natural Areas Inventory Sites

1. Dakota Prairie
2. Freeport Prairie
3. Afolkey Road Prairie
4. Freeport Southeast Geological Area
5. Laona Heights Forest Preserve
6. Hatley Memorial Forest Preserve
7. Pecatonica Bottoms
8. Rockton Bogg
9. Summer Prairie
10. Durand Southeast Geological Area
11. Shirland Railroad Prairie
12. Owen Center Road Prairie
13. Ward's Grove
14. Sugar River

Illinois Nature Preserves

- A. Rockton Township Bog
- B. Colored Sands Bluff
- C. Freeport Prairie
- D. Hartley Memorial
- E. Laona Heights
- F. Pecatonica Bottoms
- G. Wirth Prairie
- H. Wards Grove
- I. Wilson Prairie
- J. Sugar River Alder Site



= Biologically Significant Stream

= Nature Preserve

= Natural Area





Michael Jeffords

The American bittern, the sandhill crane (left), and the yellow-headed blackbird (cover) are three of the bird species that were familiar to early settlers and may still be seen in the Sugar-Pecatonica watershed, although the numbers of each are much reduced.

The Colored Sands Bluff Nature Preserve in Winnebago County includes plants such as the bearberry (below) which prefers sandstone outcrops and sand deposits.



only state park where badgers could be seen in the wild. The secretive animals are also occasionally spotted at the Wilson Prairie Nature Preserve in Winnebago County. River otters have been sighted locally at least eight times since 1992, and a bobcat was spotted northwest of Ridott in 1992. In 1996, students from Highland College at Freeport found a dead porcupine while hiking on the Pecatonica Prairie Path in Stephenson County. Whether this animal was a stray or a member of an established population that moved down from Wisconsin is not known.

Parts of both the Sugar and Pecatonica rivers are bordered by a complex archipelago of woodlots that offers food and shelter to many kinds of birds. The wetlands between Pecatonica and Shirland alone host more than four dozen species of birds. Among them are species rare in Illinois, such as the pied-billed grebe and the Virginia rail. In all, approximately 260 bird species regularly appear in the Sugar-Pecatonica water-

shed — nearly nine of every ten of the species found anywhere in Illinois. Records of the bird-banding station set up in 1967 at the Colored Sands Bluff Nature Preserve (which has tagged more than 85,000 birds) confirm that the Sugar River is an important rest stop for migrating birds. In addition, more than 136 bird species breed

here, from the wild turkey to the tufted titmouse, including virtually all the forest songbirds typically found at this latitude. Among the breeding species are 25 that are considered rare.

DWINDLING DIVERSITY

This wealth of life persists in spite of the fact that the forests, savannas, prairies, and wetlands of the Sugar-Pecatonica watershed are being altered or destroyed as fast or faster than in

Blackhawk's Last Battle in Illinois

Courtesy of Illinois State Historical Library



Black Hawk (Ma-Ka-Tai-me-she-kia-kaik — “Black sparrow hawk” — in the language of his people) was born in Sauk village, the site of today’s city of Rock Island, in 1767. He and the rest of the Sauk were banished from Illinois in 1831 under the terms of a dubious treaty signed in 1804. Abandoning their centuries-old plots, they went into exile in Iowa. Unable to feed themselves on what was still unbroken prairie, they spent a hungry winter. In 1832 they crossed back into Illinois on an expedition to plant corn in their traditional camp near Prophetstown.

Black Hawk’s band of 1,000 — most of them women, children, and old men — alarmed white settlers. Militiamen and braves fought a series of often ugly skirmishes across northern Illinois and southern Wisconsin that came to be known, somewhat grandly, as the Black Hawk War.

The final Illinois “battle” of the campaign to drive the Indians west of the Mississippi occurred at Kellogg’s Grove, a settlement on a mail route between Peoria and Galena. In June 1832, approximately 50 Sauk routed 300 or so ill-disciplined white troops. A dozen whites died. The young Abraham Lincoln, who had volunteered as a militiaman, was one of the party that found and buried the bodies of five of the victims. The sight of their freshly scalped heads in the morning light, he recalled years later, was “frightful” and “grotesque.”

Black Hawk’s attempt to wrest the Rock River country away from the Americans was doomed; his defeat marked the end to armed Indian resistance to Euro-American domination in the Great Lakes region. A monument to the militiamen, seen as defenders of the frontier, was erected at Kellogg’s Grove and dedicated in 1886. It still stands atop a hill overlooking the Yellow Creek Valley.

The Area at a Glance

Some of the best dolomite prairies left in Illinois grow atop shallow-lying bedrock in the sandy areas between Sugar River and Raccoon Creek.

More than 1,000 plant species, including subspecies and varieties, are found in the region, meaning nearly 40% of Illinois’ native plant species grow in an area that makes up only 1.37% of its territory.

Seventeen species of reptiles are known or are thought likely to occur in the region, as are 14 species of amphibians, including the uncommon blue-spotted salamander.

Its moderately diverse aquatic life includes 65 species of fish, 11 species of large crustaceans, and 20 of native freshwater mussels. However, individuals of only six of the last have been collected alive in the past 20 years.

Illinois as a whole. In the presettlement era, prior to the arrival of large numbers of Euro-American settlers beginning about 1820, an estimated 36% of the land area of the Sugar-Pecatonica watershed was woods, with the rest covered by prairie or some other type of grassland. Today, 6-7% of the Sugar-Pecatonica watershed is forested, and many of these woods differ in character and quality from the presettlement forests. Dryish oak-hickory forest, with its park-like open understory, once festooned most west- to south-facing slopes and uplands. To see one today, one must visit a nature preserve such as Oakdale Nature Preserve, south of Freeport, or the Hartley Memorial Nature Preserve in Winnebago County.

An estimated 325,000 acres of prairie once grew in the Sugar-Pecatonica watershed. As late as the 1920s, extensive patches of prairie still grew between the towns of Warren and Nora. Remnant prairies were cut by local farmers for forage (the old Hay Bridge across the Sugar River was on the route to one such haying ground) and school kids used to be able to pick wild prairie flowers to decorate graves on Memorial Day. Today only small remnants of prairie exist anywhere in the Sugar-Pecatonica watershed, most of them along present and former railroad rights-of-way such as the Pecatonica Prairie Path between Freeport and Rockford. While much grassland remains (roughly 180,000 acres), most of it is in the form of hayfields, roadside grassy strips, or pastures of cool-season grasses native to Europe and Asia.

Presettlement wetlands varied in type from forested bottomlands to grassy marshes. Wetlands of all types once covered perhaps 6% of Stephenson County and 14% of

Winnebago County. Most were drained so they could be farmed. Today wetlands cover roughly 16,000 acres of the Sugar-Pecatonica watershed — about 3% of the land area overall, which is a slightly smaller proportion than in the state as a whole. As noted, most modern wetlands linger in stream corridors in the form of bottomland forest and shallow marshes.

Forests have fared only slightly better. Trees were the source of fuel and lumber for houses, barns, and fences; one of the first substantial buildings to go up in every frontier community was a saw mill. Trees were an industrial raw material too — a paper mill once operated in Rockton. The early railroads — and northern Illinois was the site of Illinois' first successful railroads —

were built and run on trees. The laying of track alone required huge amounts of hardwood timber for ties. In a typical deal, the Illinois Central Railroad in 1857 bought approximately 995 acres of wooded land next to the Pecatonica River at McConnell, from which logs were floated or barged downriver to Freeport, where the company was laying track. About 6.5% of the region is still wooded. This is much less than the 30% of presettlement forest area that exists statewide.

In the 1970s, the Illinois Natural Areas Inventory found 14 natural areas of statewide significance in the Sugar-Pecatonica watershed. These areas represent a dozen natural community types and cumulatively occupy more than 3,600 acres — a sizable area compared to a city park but very small



Michael Jeffords

Reed canary grass is a problem in the area. This exotic species invades wetland habitats and forms monotypic stands, greatly reducing biodiversity and limiting habitat for wildlife. It is the dominate species in many of the floodplain forest and marsh habitats, particularly in the eastern two-thirds of the area.

compared to the larger landscape of which they are the only remnants. Land in urban use in Stephenson County alone covers three times this area. Presettlement natural communities not only have dwindled in size but have been degraded in terms of ecological quality. Sites that meet the INAI's strictest standards for ecological integrity amounted to fewer than 86 acres, which is about one one-hundredth of one percent of the region's area. More specifically:

- Fewer than nine acres of the region's prairie remains in high-quality ecological condition. The rest has been altered, ecologically, by weed killers (applied routinely along railroad rights-of-way) or encroached upon by trees and shrubs, although careful management might restore some of these degraded prairies' former complexity and diversity.

- Of the roughly 16,000 acres of wetlands left in the region, only 17 acres are of high quality. Reed canary grass is an aggressively-growing non-native that is found today in almost all the region's wetland habitats. The plant is regarded as the most serious threat to biodiversity in those communities; the marshes and floodplain forests in the eastern two-thirds of the Sugar-Pecatonica watershed are especially affected.

- Savanna is a forest-in-the-prairie ecosystem in which scattered large trees (usually oaks) dominate an open landscape of prairie grasses and flowering plants. Probably a major feature of the 1820 landscape of the Sugar-Pecatonica watershed, savannas made attractive grazing lands, and many were damaged by livestock. Savannas are a product of dynamic natural forces. "Protecting" them, perversely, usually destroys them.

Several degraded savannas occur along the Sugar River, for example, but young trees once kept at bay by wildfires now flourish, and these once-open woods must today be classified as upland forests.

The changes made to the natural systems of the Sugar-Pecatonica watershed since 1820 are massive. More than 91% of its land area is covered by farm fields, city lots, artificial lakes and ponds, tree plantations, and the like that support what ecologists term "cultural" or human-shaped communities of plants and animals. Small mammals such as voles and ground squirrels make homes in rights-of-way and fields of small grains, the spotted sandpiper breeds in local abandoned gravel pits and strip-mine ponds, and red-tailed hawks, assorted sparrows, and meadowlarks frequent its grasslands. The only population of clay-colored sparrows known in all of Illinois has nested for several years on a Christmas tree farm west of Rockton.

Farm fields and Christmas tree farms are more environmentally benign uses of land than are parking lots. However, they are not native habitats, nor especially diverse ones. And while some species of animals can adapt quickly to the physical changes in a newly agricultural landscape, they cannot adapt so easily to the schedules of their new environment. Because hay is harvested before young ground-nesting birds such as bobolinks are ready to leave their nests in the fields, a large percentage of the birds are killed each year by mowing machines.

It is to long-established natural habitats that plant and animal species are most perfectly adapted. When natural habitat is lost, the local populations of these plants and animals

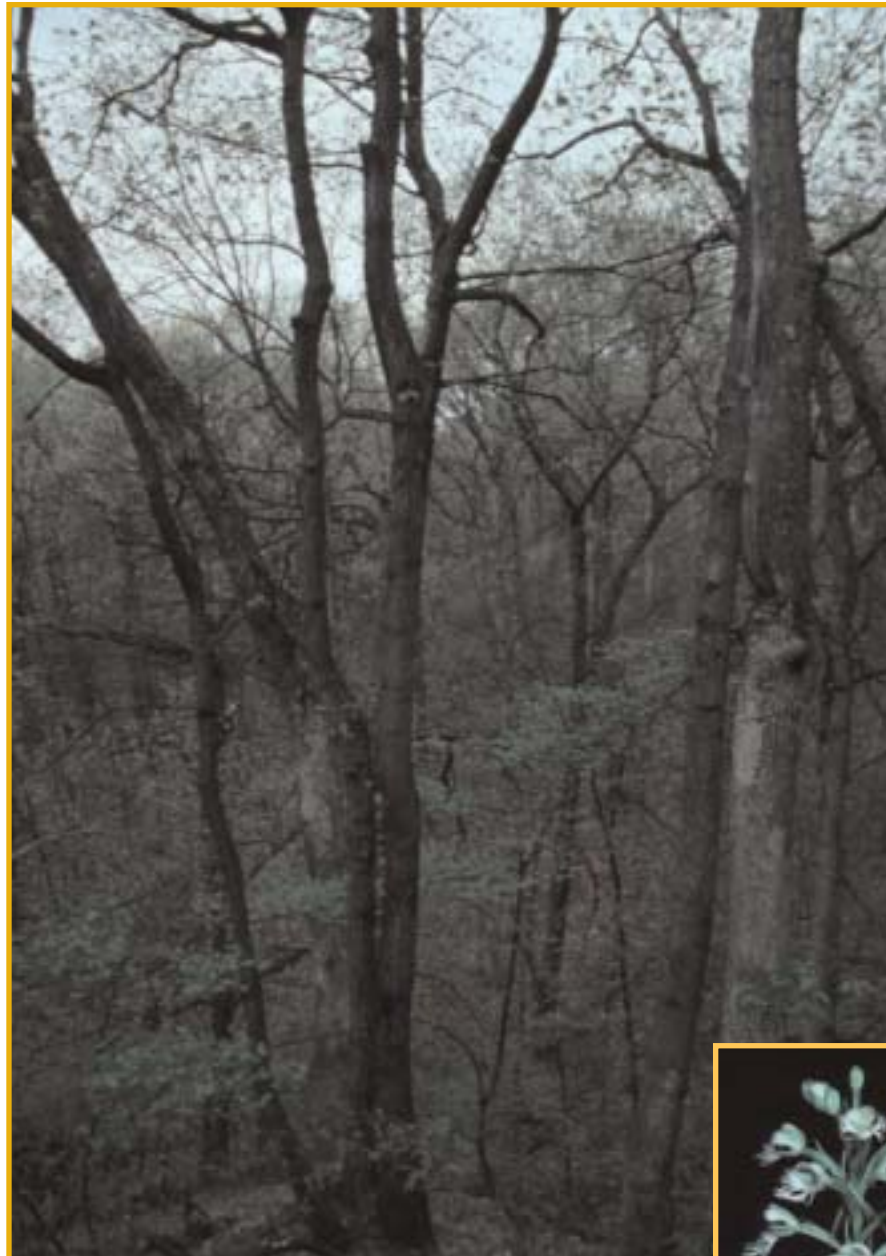
The Area at a Glance

Forty-five species of mammals are still known or are likely to occur here, including species unusual in Illinois such as the badger and the river otter.

Approximately 260 bird species regularly appear in the region — nearly nine of every ten of the species found anywhere in Illinois. The wetlands between Pecatonica and Shirland alone host more than four dozen species of birds. Among the breeding species are 25 that are considered rare.

The changes made to the natural systems since 1820 are massive. More than 91% of today's land area is occupied by farm fields, city lots, artificial lakes and ponds, tree plantations, and the like. Many bird species that once bred locally are today only visitors, because their preferred habitat has become scarce.

The forests, savannas, prairies, and wetlands of the Sugar-Pecatonica watershed are being altered or destroyed as fast or faster than in Illinois as a whole.



Michael Jeffords

Dryish oak-hickory forest, (above) with its park-like open understory, once festooned most west- to south-facing slopes and uplands. To see one today, one must visit a nature preserve such as Oakdale Nature Preserve, south of Freeport, or the Hartley Memorial Nature Preserve in Winnebago County.

The prairie white-fringed orchid (right) was once widespread in northern Illinois prairies and wetlands, but today it is rare enough that its survival in the U.S. is considered threatened.



tend to decline too. Many of the bird species that were familiar to early settlers may still be seen in the Sugar-Pecatonica watershed, but the numbers of each are much reduced. Many species that once bred locally are today only visitors, because the habitat they prefer for nesting has become scarce. These include the American bittern, the sandhill crane, and the yellow-headed blackbird.

At least 70 species of all kinds whose survival is considered threatened or endangered in Illinois occur in the region, including four that are also thought to be in jeopardy in the whole U.S. The list includes 30 plant species. (Several other species are known from sites close by the Sugar-Pecatonica watershed, and may grow in similar habitats within it.) Among them is the prairie white-fringed orchid. This plant once was widespread in northern Illinois prairies and wetlands, but today it is rare enough that its survival in the U.S. is considered threatened. The Sugar-Pecatonica watershed is not a haven of rare plants, as local plant species make up only about 8% of the total on state and federal lists. On the other hand, a majority (79%) of the state's T&E bird species may be found in the region at some time during the year.

As with animals, plants adapted to unusual ecological niches tend to become rare as those niches become rare. Most of the T&E plants in the Sugar-Pecatonica watershed are denizens of prairies and wetlands, which are among the most altered of presettlement environments. The sandy Rockton Bog Nature Preserve in the Raccoon Creek drainage

area in Winnebago County is especially rich in rare plants. The swath of sandy soils between the Sugar River and Raccoon Creek in Shirland Township in northwestern Winnebago County never extended farther than four miles wide and twelve miles long. The sand communities that developed there, such as those at Colored Sands Bluff Nature Preserve in Winnebago County, include plants such as the bearberry, which prefer sandstone outcrops and sand deposits.

Saving species usually means saving habitat. More than 4,200 acres have been set aside as parks and preserves in the Sugar-Pecatonica watershed, mostly by county governments. Public ownership affords some measure of protection to local plant and animal populations. (The Pecatonica River Forest Preserve, for instance, is used mainly for environmental education.) Apart from the ten Illinois Nature Preserves within the watershed, however, nature protection is not the exclusive purpose of these areas. Also, many of the region's best natural areas remain on private land. Fortunately, many local families have longstanding traditions of stewardship. Much of the land being bought by the Winnebago County Forest Preserve District has been expertly tended by conservation-minded private owners for decades, as were several of the state nature preserves donated for public use by their owners.

THE HUMAN PRESENCE

People have lived in the Sugar-Pecatonica watershed for as long as there have been people in Illinois. Archeologists have not surveyed the region systematically, but nonetheless have found traces of 480 sites occupied by humans. The inventory includes an unusual number of sites that date back

to the era when humans first arrived in what is now Illinois, when Paleo-Indians, who made camps in the region some 12,000 years ago, hunted its mastodons and giant bison.

As tree cover varied with swings in climate, Native Americans adapted to the environment by altering the location and timing of their food gathering. They also adapted the environment to their needs. By burning off grasses to clear ground for their hunting parties, for example, Native Americans were a major factor in the spread of prairies.

The economy developed by Euro-American settlers was also dependent on local natural resources, although it exploited different resources than those used by the Native Americans. The first Europeans to occupy the region were the French, who set up fur trading posts on the rivers. (The remnants of one such post were recently discovered in the Macktown Forest Preserve.) The farmers who followed them obviously depended on natural resources of soil and water, while early manufacturing depended on the water mill and the wood-fired boiler.

The most valuable resource taken from the earth these days is water. Sandstone is naturally porous, and limestone and dolomite that lies near the surface here becomes porous when it is cracked by exposure to weather. Water accumulates in such fractured rock, and these aquifers of saturated bedrock are tapped by wells throughout the area. Some local sandstone aquifers yield more than 1,500 gallons of water per minute (gpm), although typical yields are closer to 10-25 gpm — enough to supply a house, as the region's average resident uses about 86 gallons per day.

Towns such as Freeport and Pecatonica draw water from wells in

The Area at a Glance

Approximately 7% of the Sugar-Pecatonica watershed is forested, and many of these woods differ in character and quality from the much more extensive presettlement forests.

An estimated 325,000 acres of prairie once grew in the Sugar-Pecatonica watershed. Fewer than nine acres remains in high-quality ecological condition.

The Illinois Natural Areas Inventory found 14 natural areas of statewide significance in the region; representing a dozen natural community types, they cover more than 3,600 acres. However, sites of the highest ecological integrity covered fewer than 86 acres, or about one one-hundredth of one percent of the region's area.

Aggressive reed canary grass is a most serious threat to biodiversity in the marshes and floodplain forests in the eastern two-thirds of the Sugar-Pecatonica watershed.

Corridors, Then and Now



Jamie Johannsen

The Whitman Trading Post in Macktown Forest Preserve is an original building dating from the 1830s. It is considered the first settlement in Winnebago County.

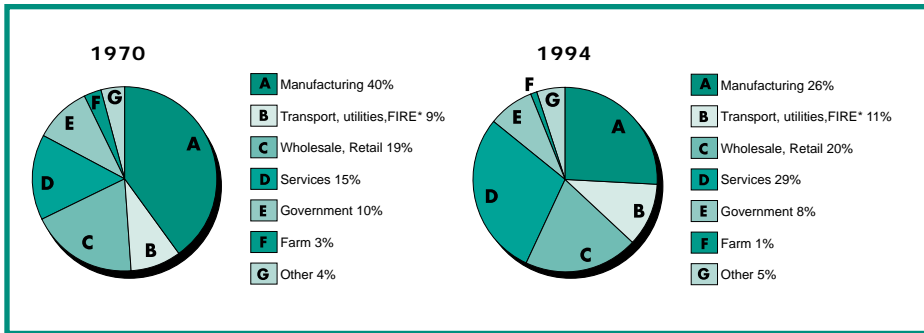
Wherever people concentrated in the pioneer society of the Sugar-Pecatonica watershed, business could be done. For example, when Euro-American settlement began in the 1830s, cross-country traffic tended to concentrate at points on rivers that were easiest to ford. William “Tutty” Baker, credited as the founder of Freeport, built a trading post on the banks of the Pecatonica River, where he offered a free ferry service. (The first bridge was not built at this point until 1843.) Vermonter Stephen Mack was the first non-native to make a permanent settlement in what is now Winnebago County, in a cabin (later augmented by a trading post and tavern) about a half-mile above the mouth of the Pecatonica River at a site subsequently called “Bird’s Grove” and “Macktown.”

Roads were crude, and they offered little advantage to cross-country trade in this part of Illinois. Neither did rivers. Goods in those days flowed west to Galena, while the rivers flowed east. However, rivers were convenient alternatives when it came to moving goods locally. In the days before railroads, Stephenson County businessman Albert McDaniels loaded grain on rafts that were pulled by horse to markets in Freeport. In the 1860s, J. Walter Linderman operated a steamboat on the Pecatonica River that hauled wood to the fireplaces and stoves of Freeport.

In addition to floating rafts and steamboats, river water pushed the blades of waterwheels connected to

grinding stones and saw blades. The force of falling water was, with animals, the only source of industrial power in the days before steam engines. Streamside mills for grinding corn and wheat into flour and sawing logs were as common in the countryside along the Sugar and Pecatonica rivers as convenience stores are today. By 1840, Stephenson County’s 2,800 people kept five grist mills and nine saw mills busy. At McConnell’s Grove in the 1840s, three mills stood within a mile of town. Water also powered local factories like Pells Manny’s shop at the mouth of Waddams Creek about a mile south of McConnell, where he made such popular farm machines as the “Manny Header” and “Manny Reaper.”

Today, the Sugar and the Pecatonica, like most smallish Illinois rivers, have two principal uses. One is to dilute and carry off treated sewage. The other is recreation. As is the case in much of Illinois, public facilities for outdoor recreation are crowded into the region’s river corridors. Because of their tendency to flood, bottomlands are the only land left undeveloped, and they often are the only spots in the landscape where water and woods may still be found. Much of the appeal of these nearly wild places is the animals that people can see there. Vital habitat in themselves, the woods along rivers and streams also serve as sheltered corridors through which animals from bobcats to reptiles migrate from one isolated habitat to another. The Sugar and the Pecatonica are transport corridors again.



Changes in Area Employment Distribution

*“Other” in the charts includes construction, mining, and agricultural and forestry services

*Finance, Insurance, and Real Estate

water-bearing bedrock. The quality of such water is generally good. Being near the surface, the aquifers are quickly enough replenished by rain and snow that water does not linger long enough in the rock for minerals to dissolve in it. At the same time, there are scant surface deposits atop the bedrock to filter pollutants. This leaves shallow bedrock fairly exposed to risk of contamination from materials spilled or otherwise entering it from the surface. Areas downslope from farmed fields are among the 310,000 acres in the watershed that are considered to be at high-to-excessive risk of contamination.

Apart from water, the principal natural resource is soil, as it is in most of Illinois. In general, the quality of local soils is good. As the glaciers retreated, much of the region’s surface was buried by loess. Known to geologists as Peoria Silt, loess consists of dust-sized particles of quartz, feldspar, mica, and other minerals mixed with clays that were ground up by glacial ice. Washed out into great piles along rivers, the dust when dry was picked up by winds and carried downwind, covering the coarser till — mostly gravels and sands — left behind by the glaciers. It was the loess-covered surface that modern plants and associ-

ated microorganisms colonized, in the process creating Illinois’ famed topsoil.

While rich, topsoil in this part of the state is fairly thin. Loess piled up 150 inches deep in the western parts of the region but thins to the east, around Rockton. Indeed, the loess is so thin in places that some soils developed in till itself. In about 18% of the area, soils developed directly on exposed limestone and shale bedrock that had been broken down by weather.

Modern industrial-style farming requires soils that are not only rich in nutrients and texture but are also flat enough and extensive enough to work by machine. While almost four-fifths of the land in the Sugar-Pecatonica watershed is used for agriculture — slightly more than in Illinois as a whole — not quite three-fifths of it is used to grow crops, which is less than the statewide percentage. Most land not in row-crops is planted in forage crops or pasture grasses, both uses being more appropriate to local soils and terrain.

The same trends that affect farming across Illinois are reshaping agriculture in the Sugar-Pecatonica watershed. Farms are being consolidated. The number of acres farmed declined about 7% between 1978 and 1992, but the number of farms declined

The Area at a Glance

At least 70 species of all kinds (30 of which are plants) occur in the region whose survival is considered threatened or endangered in Illinois, including four also thought at risk in the whole U.S. A majority (79%) of the state’s T&E bird species may be found in the region at some time during the year.

More than 4,200 acres have been set aside as parks and preserves in the region, mostly by county governments.

Incomplete surveys have found traces of 480 archeological sites occupied by humans, some dating to the era when people first arrived in what is now Illinois, some 12,000 years ago.



Recreation in the area is shaped largely by the Sugar and Pecatonica rivers. Each also provides the setting for a number of state natural areas and county forest preserves. However, the only state park in the area, Lake Le-Aqua-Na State Park, is set well back from the rivers and is centered on a manmade lake.

Left, boating at Lake Le-Aqua-Na State Park; below, tubing at Sugar River Forest Preserve.

22%. Fewer farms mean fewer farmers, with the result that farming accounts for less than 1% of the employment in Winnebago and Stephenson counties. Farm earnings and farmland values continue their long-term decline relative to the manufacturing and service sectors of the economy. As early as 1970, agriculture accounted for only 1% of total earnings in the two main counties of the Sugar-Pecatonica watershed, and by 1994 it was a negligible factor in the region's economy.

Farming remains a cultural presence even as its economic presence diminishes. Many operators choose farming to live a richer life rather than to make a richer living. The terrain is well-suited to 40- to 160-acre hobby farms and eco-businesses such as stables, plant nurseries, campgrounds, truck farms devoted to specialty crops, Christmas



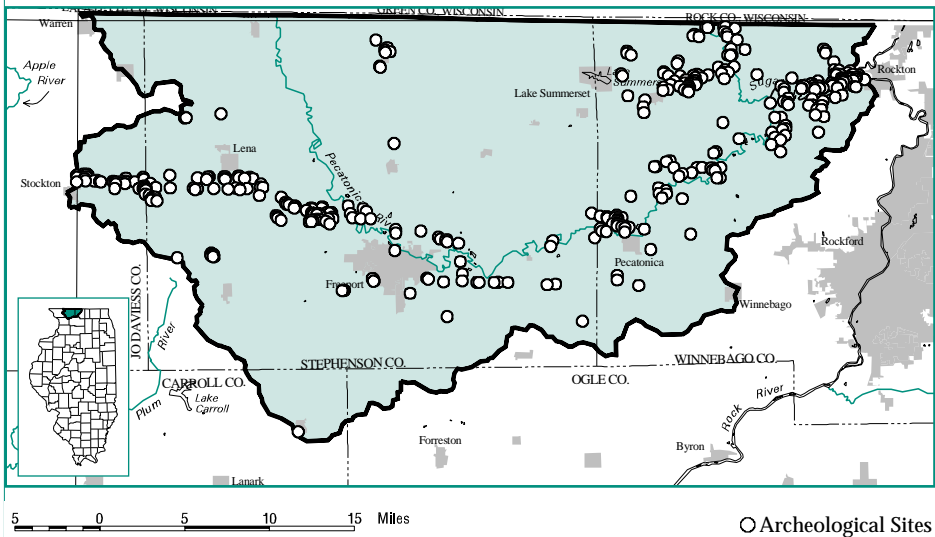
tree farms, and orchards.

Tables in the area once bore food that was shot and trapped as well as grown. Prairie chickens (known locally as stubble ducks), which used to perform their remarkable booming mating dance on grounds just west of the old Yale Bridge near today's Colored Sands Nature Preserve, were heavily hunted until the 1940s. Shooting was good

enough that hunting clubs used to line the Sugar River. The prairie chickens and passenger pigeons are gone, but hunting remains popular, with deer hunting the most popular form of that pastime.

Outdoor recreation remains central to the experience of life in the Sugar-Pecatonica watershed. The Freeport Area Chamber of Commerce boasts

Archeological Sites



A total of 405 archaeological sites with 480 cultural components are recorded in the area. The majority of the sites are located near the Pecatonica and Sugar rivers, although there are numerous sites west of the Pecatonica River that are some distance from a major river valley.

that business professionals from across the country “appreciate the opportunity to experience small-town living in an environment where there’s a focus on recreation when the day’s work is done,” from golf, boating, and fishing to snowmobiling and cross-country skiing.

Boating (as measured in terms of the proportion of licensed craft per 1,000 residents) is not as popular as in other parts of Illinois, perhaps because the region lacks a lake large enough to accommodate ski boats and jet craft. However, its streams offer fine settings for human-powered machines. The Sugar River near the Illinois-Wisconsin state line, a popular destination for canoe clubs, is typical.

Lake Le-Aqua-Na State Park is the region’s most popular spot for outdoor fun, drawing nearly 270,000 visitors each year. (The state-owned Sugar

River Natural Area, while nearly 3,000 acres in size, is open only for nature appreciation, and the region’s county forest preserves generally allow only camping and hiking.) The park offers trails, picnic and camping spots, and boating. The two largest lakes in the region — Summerset, the centerpiece of a private recreational lake development near Durand with a population of 1,600, and Le-Aqua-Na, formed when Waddam Creek was dammed near Lena — were both built for recreation. The latter is considered an excellent fishing lake, being stocked with channel catfish, walleye, and northern pike, which augment its natural populations of largemouth bass, bluegill, and crappie.

What for decades was a drawback to life in the Sugar-Pecatonica watershed — its isolation from large cities — has in

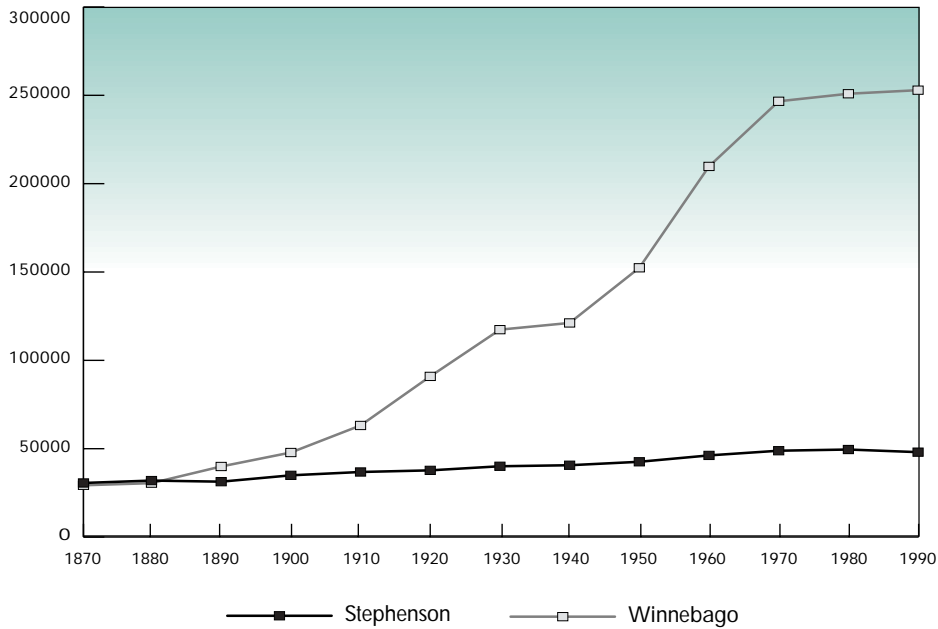
The Area at a Glance

Aquifers are formed in fractured rock that accumulates water. Some local sandstone aquifers yield more than 1,500 gallons of water per minute. The quality of such water is generally good.

Shallow bedrock aquifers, especially those downslope from farmed fields, are exposed to risk of contamination from materials spilled or otherwise entering it from the surface.

While rich, topsoil in this part of the state is fairly thin. Not quite three-fifths of the farmland is used to grow crops — less than the statewide percentage. Most of the rest is planted in forage crops or pasture grasses more appropriate to local soils and terrain.

The number of acres farmed declined about 7% between 1978 and 1992, and the number of farms declined 22%, although hobby farms and eco-businesses are popular. Farming accounts for less than 1% of the employment in Winnebago and Stephenson counties.



Area Population Trends

recent years become a boon. Comfortable cars, cheap gas, and good roads have turned what used to be a weekend expedition into a routine daily jaunt, and many people who used to visit the countryside now opt to live in it. The Freeport Chamber of Commerce describes that town’s location as having “just enough distance to the big cities of Rockford, Chicago, and Madison to make them convenient without daily traffic, noise and congestion problems.” Boosters of Durand in Winnebago County promise, “Zoos, parks, lakes, theaters, malls, all close by, but you still return to the quiet serenity of Durand at the end of your trip.”

Urbanization (in the words of the Freeport Chamber) is forcing “a dramatic change in the fabric of the community.” The railroads began to pull out of the small towns in the 1940s, marking the latter’s demise as market centers. Settlement flowed toward the region’s cities — Beloit, Rockford,

Dubuque — drawn by jobs in busy factories. Stagnation followed. Stephenson County’s population grew only 57% from 1870 to 1990 (a period in which the number of Illinoisans swelled 350%) and actually declined in the 1980s. Stephenson County is expected to grow again, if modestly, adding 4% to its numbers by 2020.

Scenic countryside near growing urban centers such as Winnebago County (whose population should grow 19% by 2020) inevitably attracts developers looking for home sites. Around Rockton, 20-acre hobby farms are giving way to 5-acre suburban estates. Freeport’s setting of wooded hills is an advantage to local firms trying to attract skilled employees from outside the area. Throughout Stephenson County, “large and elegantly styled executive homes” have been built in the wooded hills and valleys surrounding wooded Krape Park and along the fairways of local golf courses. Local subdivision names — Deer

Hills, Wildwood Estates — make clear the nature of their appeal to buyers seeking refuge from the city.

ONGOING CHANGE

The 1800s saw the wholesale remodeling of the land in the Sugar-Pecatonica watershed, from the cutting of forests and the plowing of prairies to the draining of river bottoms. Humans continue to alter the ecology of the countryside, but in less obvious ways. Changes today occur through the introduction of non-native species, the suppression of natural fires, the degradation of habitat by everything from grazing to pollution, and the fragmenting of once-connected habitats.

Non-native species Of the region’s plant species, about 16% were introduced from other places and became naturalized. Unhampered in their new environment by the predators or diseases that kept them in check in their original range, some species flourish at the expense of natives. One such plant is garlic mustard. A summer walk-through by plant experts found garlic mustard growing in 60-70% of the forested tracts in the region. Even in the high-quality forests of the Sugar-Pecatonica watershed, garlic mustard often dominates to the point of excluding other species on the forest floor, which usually is the most species-rich layer of an Illinois woods. Another plant, dames’ rocket, was introduced as an ornamental plant because of its showy flower, and it has spread well beyond gardens and now grows along roads, in floodplain forests, and upland forests; some local populations spread over several acres.

Fire suppression Fires once periodically swept the prairies and savannas of Illinois. Streams and ravines acted as firebreaks, protecting many groves

of trees from the flames, but in open countryside the only trees to survive were fire-resistant species like oaks. The result was a land cover that had either no trees at all or, more commonly, a canopy of mature, widely spaced trees amidst a grassy understory.

Fires were eventually stopped by Euro-Americans anxious to protect their new fences and buildings. Just as fire shaped the plant communities of the watershed before settlement, the absence of fire has shaped them since. There is more sand forest in the region today than 100 years ago, for example, because sand savannas have become overgrown with new trees that would have been burned off previously.

Pollution Like most of Illinois, the land surface of the Sugar-Pecatonica watershed has many sites — old landfills (more than four dozen), storage ponds, and chemically contaminated former factory grounds — that continue to pose some local risk of soil and water pollution. Pollution control agencies do not sample air in the region, but readings from nearby monitoring stations suggest that air quality is improving. As has been the case across Illinois, ongoing shifts to cleaner energy sources, changes in industrial processes, and the gradual phase-in of tighter regulations should sustain those positive trends.

Grazing The sale of livestock (dairy cows and sheep as well as hogs and cattle) accounts for 70% of the region's total annual receipts from agriculture. This is unusually high for Illinois. (In 1994 Stephenson County led all Illinois counties in such receipts.) Some of the land in the Winnebago County forest preserve system had been badly overgrazed by sheep when it was purchased. Many animals still feed in farm woodlots, as do white-tailed deer, whose numbers have

swelled in northern Illinois in recent years. Such native flowering plants as blue cohosh are especially vulnerable to grazing and browsing animals. When such plants die out, their place on the forest floor is taken by other plants — some native, some introduced — that animals reject because of their spiny fruits or thorny stems. The latter thus thrive, and the species composition of the forest is changed.

Altered hydrology Surface waters have been little altered compared to many parts of Illinois, even though local flooding was no less frequent here than elsewhere in the state. Between 1854 and 1907 floods regularly knocked down the old Hay Bridge across the Sugar River; local farmers finally gave up rebuilding it. In the late 1930s a new county road built from Rt. 26 through McConnell had to be raised as much as 12 feet to protect it from the Pecatonica. Indirect evidence suggests, however, that the Sugar-Pecatonica watershed tends to flood less severely today than similar watersheds elsewhere in Illinois. Few streams have had to be “channelized” to speed movement of floodwaters through them.

The way land is managed affects how often and how badly land downstream is flooded. A relatively large part of the region's surface has year-around cover in the form of pasture, and much of the row-crop land on both sides of the Illinois-Wisconsin line is cultivated using conservation tillage that leaves a water-catching residue on the surface. The effects are especially evident in the upstream parts of the watershed in Wisconsin. In the 1930s, careless farming there caused massive gullying. Gullies have since been repaired and steep slopes planted in shrubs and trees that slow water movement over the surface. Hilly fields are

The Area at a Glance

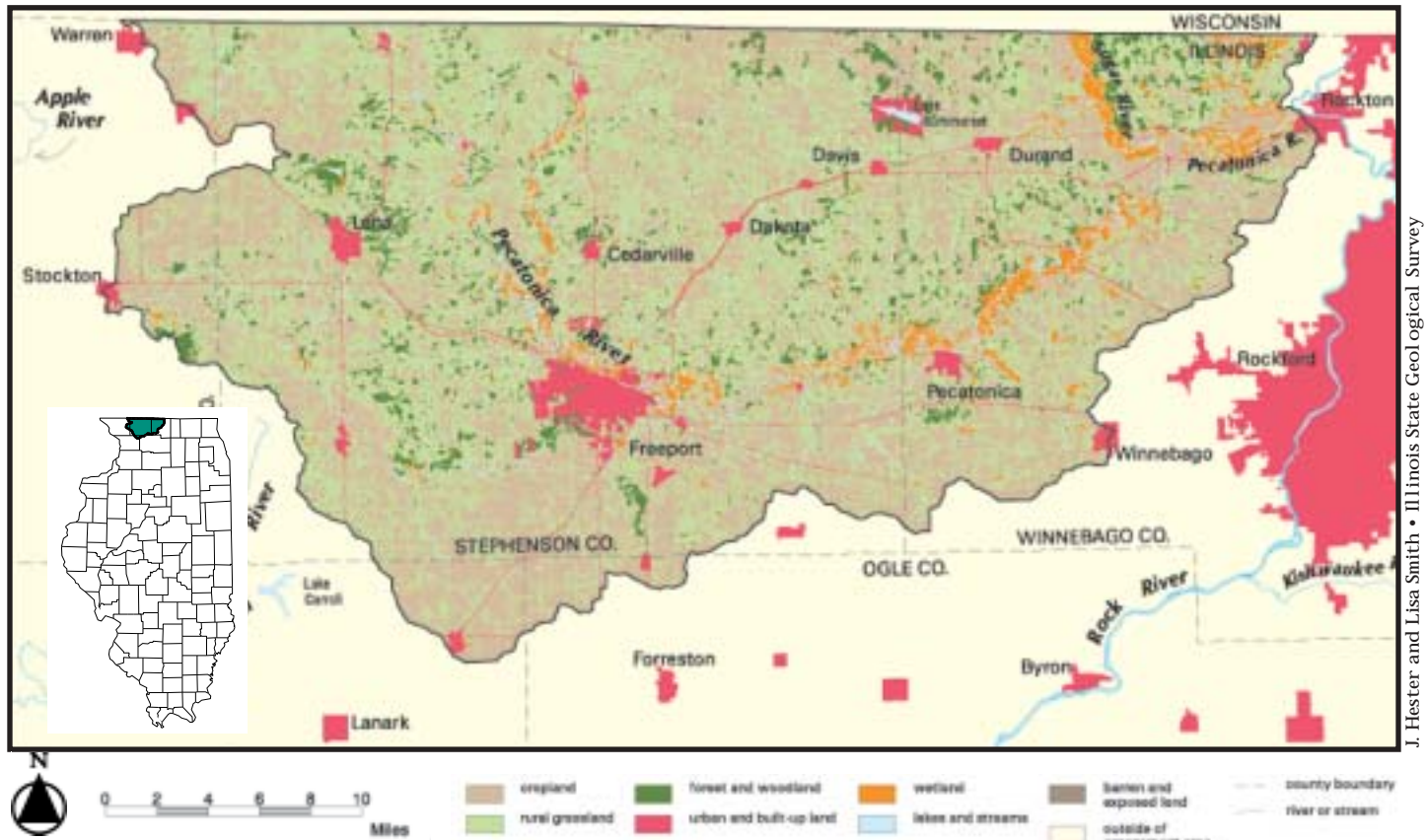
Outdoor recreation remains central to the experience of life in the Sugar-Pecatonica watershed. Lake Le-Aqua-Na State Park is the region's most popular spot, drawing nearly 270,000 visitors each year.

Urbanization is changing the region. After growing only 57% from 1870 to 1990 (a period in which the number of Illinoisans swelled 350%) and declining in the 1980s, Stephenson County population is expected to grow 4% by 2020.

Of the region's plant species, about 16% were introduced from other places and became naturalized. Plant experts found garlic mustard growing in 60-70% of the forested tracts in the region.

There is more sand forest in the region today than 100 years ago because the cessation of prairie fires has allowed sand savannas to become overgrown with new trees.

Sugar-Pecatonica Land Cover



J. Hester and Lisa Smith • Illinois State Geological Survey

farmed using conservation tillage, and the steepest fields are no longer farmed at all. Water soaks into the soil rather than running off it, with the result that floods have decreased in severity in the past 50 years. More water also seems to be flowing in area streams during dry weather periods, perhaps because more water is being captured and held where it falls, infiltrating subsoils that drain eventually into the streams that cut through them.

Erosion Water that can't soak readily into soils tends to run off

them, and to carry with it soil particles from the surface. This is especially true on sloping surfaces whose soil parent material is powdery loess. Moving water cuts into loess soils like a knife, creating rills and gullies and eventually ravines. (Geologists speak of the resulting surface as a “dissected” landscape.) While farming does not usually cause the worst soil losses per acre — construction often disturbs land more severely — farming inevitably accounts for most of the soil that is eroded, because so much

land in the Sugar-Pecatonica watershed is farmed.

Eroded soil ends up in the same low spots as the water that carries it. Measuring sediments piled up in lake bottoms is one way to gauge topsoil movement over time, but no lake study has been done in the region, nor do stream gauges measure the actual amount of soil suspended in the water of the area's streams and rivers. Because many of the area's fields are on sloping ground, relatively more of the region's farmland is losing soil

faster than it is being replaced by natural soil-building processes (78% compared to the statewide average of 69%) — in spite of the fact that about half the local cropland is cultivated using soil-saving conservation tillage methods.

Fragmentation Building roads, fields, power-line cuts, and house lots divides a landscape into habitat “islands.” Such fragments often cannot supply the resources needed by species with extensive home ranges. Many animals nest, feed, and hibernate in different habitats; fragmentation severs the natural corridors through which animals move between them. The entire population of some plant and animal species in some tracts may consist of only a few individuals; the smaller such local populations are, the more vulnerable they usually are to disease and in-breeding.

The Sugar-Pecatonica watershed is highly fragmented. Its nearly 7,900 acres of forested wetlands are split into 467 separate tracts. Only five of these tracts (all along the Pecatonica and Sugar rivers) are larger than 233 acres. The same is true of emergent wetlands, which are wetlands shallow enough that plants rooted in the water are able to emerge above its surface. The roughly 5,500 acres of emergent wetlands in the region are split into nearly a thousand tracts, the smallest being 0.1 acre in size — smaller than a basketball court.

Apart from the state-owned Sugar River Natural Area, the most significant of the local holdings of public land are county-owned, in particular the series of 12 forest preserves maintained by the Winnebago County Forest Preserve District (mainly along the Sugar and Pecatonica rivers). Amounting to 3,200 acres, the preserves are crucial habitats.

Some, like the Sugar River (524 acres) and Pecatonica River (466 acres) preserves, are among the very few blocks of forest large enough to shelter nesting forest songbirds from the predators and brood parasites that inhabit forest edges. Wards Grove Nature Preserve in Jo Daviess County is another important nesting place for forest birds. So is Lake Le-Aqua-Na State Park and several areas in Winnebago County, including Hartley Memorial Woods Nature Preserve, Laona Heights Nature Preserve, and the Sugar River and Alder forest preserves. Most privately-held tracts of land, however, are considerably smaller than 500 acres. As a result, most local woods are population “sinks” whose bird populations are not reproducing themselves; such woods are populated by birds reared outside the region that migrate into it as adults.

While house lots do not consume much land — in Stephenson County, urban uses of all kinds take up only 3% of its space, half the statewide average — urbanization is a major cause of landscape fragmentation. Rural land is affected out of proportion to local population gains. Fewer people per household and more square feet per building lot meant that between 1982 and 1992 the amount of land in urban uses rose almost 12% in Winnebago and Stephenson counties, even though population increased only 5%.

THE PROMISE OF RESTORATION

Not every human manipulation of the landscape has unhappy ecological effects. Among the region’s “cultural habitats” are several habitat reconstructions and restorations. The region’s former prairies have received particular attention. Reconstructions — essentially a matter of planting new prairie plants on old prairie soil

The Area at a Glance

Air quality is improving, but the region’s land surface has many old landfills, storage ponds, and chemically contaminated former factory grounds that pose some local risk of soil and water pollution.

Because of sloping ground, relatively more of the region’s farmland is losing soil faster than it is being replaced (78% compared to the statewide average of 69%). This is in spite of the fact that about half the local cropland is cultivated using soil-saving tillage methods.

Between 1982 and 1992 the amount of land in urban uses rose almost 12% in Winnebago and Stephenson counties, even though population increased only 5%.

Ancient Land



This quarry southeast of Durand in Winnebago County exposes fossiliferous limestone that was deposited in a warm, shallow tropical sea approximately 450 million years ago. These rocks are a primary source of crushed rock for the stone industry in northern Illinois.

Dig away the glacial debris at the surface of most of the Sugar-Pecatonica watershed and there will be revealed a second landscape, topographically more vivid than the familiar one on today's surface. The conspicuous feature of this invisible landscape is the 400-foot deep Pecatonica Bedrock Valley, which had been carved out of old rock long before the glaciers began creeping in from the north and east, and along whose course the modern Pecatonica still flows, some 400 feet above.

Here and there that ancient land intrudes into the present. In many spots in both Winnebago and Stephenson counties, the Pecatonica and some of its tributaries have sliced through the soft glacial till at the surface into the sandstone and dolomite that forms the bedrock here. Dolomite, for example, is exposed at the Dakota Prairie. A geologic cousin to limestone, dolomite formed from the remains of marine creatures that piled up by the billions on the floor of the warm sea that once covered this part of the continent. The exposed bedrock at the Durand Southeast Geological Area is thick with fossils of fauna that lived in those shallow, sunlit waters. Later these

deposits, fused by the pressure of their own weight, turned into rock.

The local bedrock has been mined for stone at enough places to make an important local business. In 1997, 23 quarries scattered across the region produced crushed stone, most of which was sold to the construction industry. (The Pecatonica Bottoms in Winnebago County is an old rock quarry.) Removing rock from the earth, however, is a noisy and dusty process and when urbanization encroaches on once-isolated beds of commercially viable stone, mining becomes limited.

The power of the ice to reshape the land is dramatically visible at the Freeport Southeast Geological Area. The advancing ice occasionally sheared off large blocks of protruding bedrock and pushed them, still intact, some distance from the parent rock. These chunks of rock were later covered by the same fine-grained glacial debris that covered the rest of the landscape, and appear today as small, isolated hills. Many of the dolomite prairies in the region took root on such "ice-shoved hills." One such is the Wirth Prairie in Stephenson County, considered the region's best remaining dry dolomite prairie, in part

because of its exceptionally rich array of prairie wildflowers.

“Colored Sands” is the local name for St. Peter Sandstone, a formation of marine rock laid down as an extensive sandy beach between 440 and 490 million years ago, when this part of Illinois was the shore of a vast inland sea. It lies invisible beneath most of Illinois, but is exposed in the upland areas of southern Winnebago County, among other places, including at the Colored Sands Bluff Nature Preserve. The stone contains naturally occurring iron oxides that, turning red when exposed to weather at the surface, darken the stone — hence its name.

More recent sands — in this case chewed-up bedrock laid down by glaciers only a few thousand years ago — were washed from the ice as it melted. Winds pushed them into dunes and ridges that, stabilized by plants, became indistinguishable from other hills.

If the glaciers in the form of ice acted as a bulldozer on the land, glaciers in the form of meltwater acted as a plow. The valley of the Pecatonica is about a mile wide downstream from Freeport; the Sugar River’s valley at its widest is some three miles wide. Today’s rivers did not cut such impressive gashes into the earth. Rather, they were carved by the torrents of meltwater that flowed from the receding glaciers as the climate warmed.

Often the rubble carried by meltwater piled up high enough to form dams that blocked the further flow of water from the ice fronts. Backed-up water at one point filled up the Pecatonica River valley upstream toward its headwaters in Wisconsin, up the valley of the Sugar, and west into the Yellow Creek valley. Known now as Lake Silveria, this gigantic puddle stood long enough that 15 feet of sediments accumulated in the river valleys-turned-lake-bottom. These sediments became the new river bottomland when Lake Silveria drained away. Lake sediments form the flattest terrain known, and the modern Pecatonica does not run across this land, it ambles.

Once valuable as a source of materials to build with, the rolling terrain and its associated plant cover is now coveted as a place to build on. “The rolling and wooded landscape of the Freeport area,” reports the Freeport Area Chamber of Commerce, “has provided builders with the perfect canvas on which to convey their art.”

The Area at a Glance

The region’s landscape is highly fragmented. The roughly 5,500 acres of emergent wetlands are split into nearly a thousand tracts, the smallest being smaller than a basketball court.

The region’s nearly 7,900 acres of forested wetlands are split into 467 separate tracts. Fragmented local woods are population “sinks” whose bird populations are not reproducing themselves, but are populated by birds reared outside the region that migrate into them as adults.

The 12 forest preserves maintained by the Winnebago County Forest Preserve District, amounting to 3,200 acres, are crucial habitats for forest birds.

Prairies and savannas are being restored or reconstructed at several sites in the region, including the 184-acre Sugar River Alder Forest Preserve.

— are being attempted at Highland Community College and Freeport Park District and at the Pecatonica River Forest Preserve. While reconstructed prairies usually are species-poor for years (being dominated at first by a few warm-season grasses) they nonetheless offer valuable habitat. Compared to a corn field or parking lot, even a species-poor prairie is a haven for grassland birds such as

Henslows’ sparrow, bobolink, and dickcissel.

The goal of a prairie restoration is to nurture back to ecological health a prairie that still exists, but has been damaged. This is done not by replacing nature but by helping it, usually through controlled burns that mimic the wildfires that helped create the tallgrass ecosystem. At the 184-acre Sugar River Alder Forest Preserve, the

Above, a farm at sunset just north of Pecatonica

Below, the Pecatonica River

Joel Dexter



Winnebago County Forest Preserve District is restoring dry mesic sand prairie and savanna that had been farmed and abandoned and were reverting to brush.

Ecological reconstruction and restoration for the moment remain more a craft than science. However, nature is capable of remarkably rapid regeneration. Many visitors probably mistake the Sugar River and Colored Sands forest preserves as virgin wild land, but both tracts had been cleared of their original trees and were derelict land when the county bought them in the 1930s. Even small changes can have large benefits for damaged ecosystems. Simply planting trees along the sides of denuded streams and rivers eventually helps cool the water, stabilizes banks against erosion, calms the violence of floods (by slowing the movement of water into the stream), and filters pollutants (including excess nutrients) that wash into streams from adjacent land.

Restoring small tracts of land that connect still-viable habitats offers similarly high returns. For example, encouraging the regrowth of oak trees in forest openings does more than add nest sites for birds, it also eliminates the edge habitat preferred by predators and parasites. Closing these gaps in the woods makes existing nest sites safer, and thus benefits breeding songbirds out of proportion to the acreage involved.

Since the early 1800s, the people of northern Illinois have held divergent ideas about the best ways to use land. “Diversity” is a goal that can be measured by the number of uses a landscape can accommodate as well as the number of species. Where settlers in the Sugar-Pecatonica watershed once coveted trees, for example, they now



seek forest — a complex bundle of goods that includes scenery, wildflowers, huntable game, quiet, or opportunities for study. Crowding many uses and many creatures into small spaces requires sophisticated and ongoing management. It is a chance to revive some of the wisdom that the region’s thrifty farmers once practiced so well. 🌿

(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 between 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 Sugar-Pecatonica Rivers Basin: An Inventory of the Region's Resources is based on one of these assessments, the *Sugar-Pecatonica Area Assessment*. The assessment was compiled by staff of IDNR's Division of Energy and Environmental Assessment, Office of Realty and Environmental Planning; and 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 *Sugar-Pecatonica Area Assessment* and all other CTAP and Ecosystems Program documents are available from the IDNR Clearinghouse at (217)782-7498 or TDD (217)782-9175. Documents also are available on the World Wide Web at:

<http://dnr.state.il.us/orep/inrin/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.

The Illinois Department of Natural Resources does not discriminate based upon race, color, national origin, age, sex, religion or disability in its programs, services, activities and facilities. If you believe that you have been discriminated against or if you wish additional information, please contact the Department at (217) 785-0067 or the U.S. Department of the Interior Office of Equal Employment, Washington, D.C. 20240.

Department of Natural Resources information is available to the hearing impaired by calling DNR's Telecommunications Device for the Deaf: (217) 782-9175. The Ameritech Relay Number is (800) 526-0844.

EDITOR: KAREN MILLER

AUTHOR: JAMES KROHE JR.

PUBLICATION DESIGN: DUO DESIGN

COVER PHOTO: MICHAEL JEFFORDS

