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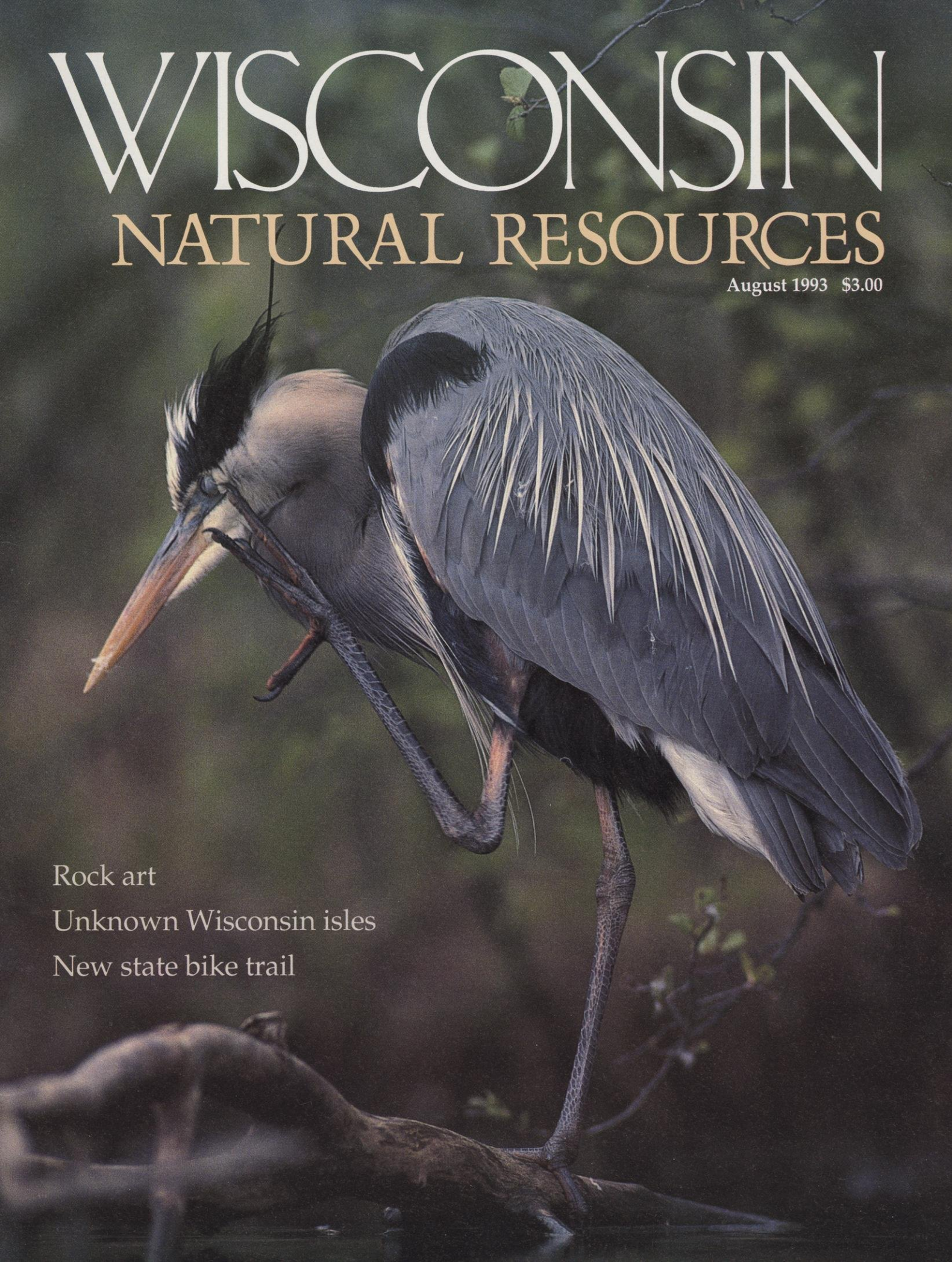

Rock art

Unknown Wisconsin isles

New state bike trail

Painted turtle. GREGORY K. SCOTT

Patience
IN THE POND

Anita Carpenter

The soothing warmth of a sunny summer afternoon envelops the oxbow pond. It beckons me to sit and rest, to watch and listen. Soon I place my binoculars and camera to the side, stretch out on the dock and gaze into the still water. In a few moments I become one with my surroundings, lost in the patience of the pond.

Pond water flows nowhere. Unlike gurgling streams rushing to large rivers, a pond moves at a slower pace; its inhabitants spend much time watching and waiting. Even darting dragonflies seem to zigzag at a reduced speed over ponds.

A green-backed heron (*Butorides striatus*) slowly strides in the shallow water along the shore staring into the water ahead of him, looking for a mid-afternoon meal. He supports his weight on one leg and pulls the other leg from the water. His oversized yellow foot closes like fingers withdrawn from a glove as it breaks the surface, barely creating a ripple. In slow motion, he spreads his foot and places it down in front. The new foothold seems unsteady, yet the heron never wavers; he never diverts his attention from the water and he doesn't make a sound.

Continued on page 31

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WISCONSIN NATURAL RESOURCES

August 1993 Volume 17, Number 4

FRONT COVER: Great blue heron (*Ardea herodias*) scratching.
SCOTT NIELSEN, SUPERIOR, WIS.

BACK COVER: Green frog (*Rana clamitans*).
TIMOTHY SWEET, CLINTONVILLE, WIS.

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Green-backed heron. STEPHEN J. LANG

Keeping a vital mix

"Biodiversity" is a new management buzzword, but the concept is as old as nature itself.

Betty L. Les and Kristin Visser

DNR PHOTO COLLECTION

Last summer, world attention focused on the topic of biodiversity when the first United Nations Conference on the Environment and Development was convened in Rio de Janeiro. People are increasingly interested in the topic, but many wonder what it means. Just what is biodiversity? How will it change how we manage Wisconsin's resources?

Biodiversity is short for biological diversity. Most scientists define it as the variety of life on Earth and the processes that support and sustain that life. It includes all critters, from microscopic organisms like bacteria and fungi to large organisms like white pines and bears.

There's more. Biodiversity includes all the interactions among these organisms — like when one species preys upon another, when plants produce oxygen that animals breathe, or when microbes break down leaf litter into soil and nutrients used by trees.

The term also includes interactions between organisms and nonliving things like sunlight, temperature, rain and atmospheric gases that have a tremendous influence on whether, and how well, organisms will thrive in a particular place.

The interactions that connect plants and animals with the nonliving environment aren't random events. They're all part of biological, physical and chemical cycles that have been occurring on Earth for millions of years. These cycles usually go unnoticed and, unfortunately, are not missed until the plants and animals that they support start to disappear. To complicate matters, there's often a lag between the time these processes break down and the moment species start disappearing. Typically, the tiny, inconspicuous organisms that are the backbone of life on Earth disappear first. According to famed ecologist E. O. Wilson, if insects and other small organisms were to disappear, humans would go extinct shortly thereafter because the ecosystem services the smaller species provide would stop.

Wilson's statement dramatizes why biodiversity is important to people: Humans are not only a part of nature, we also depend upon it. The air we breathe, the food we eat, the water we drink are all products of natural systems. These systems also provide essential services like cleansing our air and water, controlling floods and moderating climate. In addition, inconspicuous plants have yielded life-saving medicine. For instance, the rosy periwinkle (*Catharanthus roseus*), a little pink, five-petaled flower from Madagascar, provides alkaloids that cure many patients of two deadly cancers —Hodgkin's disease and acute lymphocytic leukemia. According to Wilson, the income from manufacturing and selling these two substances exceeds $180 million a year.

We are just beginning to understand the secrets of the Earth's biota. Only 1.4 million of the estimated 10 million plant

Nurturing a wide variety of plants and animals stretches our concept of the lands we manage. We need to stay mindful of the broad landscape and natural communities that converge in Wisconsin.

DNR PHOTO

Deer prefer stands of young trees and forest-field openings. Other species need a mix including older trees.

and animal species on the planet have been named and described; the life histories of even fewer are understood.

There are also intangible, but important benefits of biodiversity. Humans turn to the natural world for solace and recreation, experiencing it in a variety of ways. Why does the view from a hilltop take one's breath away or an approaching storm send a chill up our spine? Why do we mourn the loss of another species or fret when we trample an orchid? Why are stuffed toys that imitate baby bears, rabbits and other animals among the most prized possessions of our children? It could well be that our mental and spiritual health are as dependent on nature as our physical well-being. Certainly, the ties that bind us to nature run deep.

In spite of this dependence on nature, humans continue to harm species and ecosystems worldwide. Wilson believes that the Earth is in a unique episode of species extinction. Unlike earlier episodes that were caused by natural events such as volcanic activity, meteor strikes and climate change, this one is primarily due to habitat destruction by humans. For support, scientists point to today's rate of extinction, estimated at three species every hour — high enough to kill up to 20 percent of the Earth's biota by the year 2020.

Not everyone agrees with these estimates. Some think they are too high; others, too low. However, many on both sides agree that the absolute limit of the Earth to absorb human activity is unknown. Like occupants of a boat drifting toward a huge but silent waterfall, we don't know how close we may be to going over the edge.

Global strategies for conserving biodiversity are important, but it's also important to work close to home. Wisconsin is located where three of North America's great natural borders join. Here, East meets North and West — in this case, the eastern deciduous forest, the northern boreal forest and the temperate western grasslands. Wisconsin harbors 1,800 native vascular plants, 657 vertebrates and uncounted numbers of invertebrates and lower plants from these "biotic provinces."

The natural borders were more visible and obvious prior to European settlement. Settlers arriving in the 1830s and '40s found largely unbroken forest in the north and forest grading into extensive grasslands in the south. Vast, interconnected wetlands, lakes and streams were found throughout the area that is now Wisconsin.

How we lose natural biodiversity

Since the 1830s, all of our natural communities have been significantly altered in size and composition. The patchwork quilt of Wisconsin's landscape now includes farms, urban areas, roads, utility corridors and a lot more people. Fortunately and amazingly, in spite of the many changes, most plant and animal species present when settlement began are still here. Many survived by adapting to the newly formed

Wisconsin's natural communities

A look at each community helps you appreciate Wisconsin's natural richness. Fortunately, there is great potential for maintaining and even enhancing biological diversity in the region.

MENOMINEE FOREST HARDWOODS AND SCATTERED PINES STEVE HECKMAN

The **NORTHERN FORESTS** originally consisted of a mix of young, maturing trees, older conifers and hardwoods. Nineteenth and early 20th-century loggers cut over virtually the entire forest. The exposed, stumpy remains and brush piles favored hardwoods like oak, aspen and white birch that could survive in the new dry, bright conditions. Pines disappeared from many areas. While the Northwoods are now green and lush in areas, the trees in each stand tend to be the same age and fewer species are represented. The overall ecosystem is simplified compared to the original forest.

The solution lies in looking at the landscape as a whole, managing stands to produce a mosaic of young and older trees and a broader mix of species.

SOUTHERN FORESTS were also cut over, but they didn't bounce back the way the northern forests did because the land was kept clear for farming and urban development. Today the southern forest is severely fragmented, with only remnants on public lands and private woodlots. As a result, many of the large animals such as buffalo, elk, black bear, and cougar are gone, as are a number of birds (the passenger pigeon is perhaps the best known example). Providing large areas of forest will require working cooperatively with private landowners and managing public lands to restore forest tracts.

environments. For example, some grassland birds have adapted to pastures, parks and other open areas. Some adaptable species, such as white-tailed deer, thrived on change. Their populations are stronger now than they were in the 1830s. Other species could not adapt quickly enough. Some survive as small, remnant populations; others, like the buffalo and elk, are no longer found in Wisconsin.

Our most visible losses are at the community level. A community is an assemblage of species in a particular area, at a particular time, in specific habitats. At the time of European settlement, 21 larger plant and animal communities and another 13 smaller communities were present. For discussion purposes, the major communities are often grouped into seven categories: northern forests, southern forests, oak savannas, oak and pine barrens, grasslands (prairies), wetlands and aquatic systems.

Today, Wisconsin has 1/200th of its original grassland communities and less than 1/10,000 of its oak savannas, oak barrens, and pine barrens. Forest cover is roughly equal to that in place at settlement, but the abundance of certain trees and their ages are very different. Similarly, the number of lakes and their surface area have remained relatively constant, but the variety and populations of aquatic plants and animals in these waters have changed. We have lost about half of our wetlands and associated seasonal ponds.

These changes occurred through natural and human-induced disturbance. These forces are still at work today simplifying, fragmenting and polluting our remaining natural communities.

These concepts are worth understanding.

Ecological simplification describes what happens when a natural community or ecosystem loses some of its parts. Like losing a small cog in a watch, it's too late to learn that it won't keep time once the part is gone. By putting land to new uses, by introducing exotic species and by polluting natural systems, people disrupt food chains, destroy habitat or outcompete native species for food and cover. This simplification continues today.

Fragmentation breaks up large, continuous natural communities into smaller parcels. Highways and power lines crisscrossing a forest may help you to visualize fragmentation, but there are many other more subtle examples. Creating a sandy beach fragments habitat for amphibians, fish, and aquatic invertebrates that move or feed along a weedy shoreline; controlling wildfires in fire-dependent communities such as grasslands lets woody vegetation creep in; damming a stream can create a barrier for migratory fish species, cutting them off from spawning grounds.

Often there is a cascading effect, as the consequences of fragmentation ripple through the community. For example, dams frequently isolate mollusks from the fish that host their larval stages, so these species eventually die out. For these populations, fragmentation can bring another threat — genetic weakness. Small isolated populations of plants or animals that don't breed from a diverse gene pool can lose the ability to adapt to changing environments. That's not to say that all species are disadvantaged by change. Birds like

TRACEY TEODECKI

BLUE SPRING OAK OPENING, JEFFERSON COUNTY RON KUROWSKI (INSET) TONY GEIGER

(*inset*) Selective use of controlled burning effectively maintains savannas and some grasslands like this parcel at Mead Wildlife Area.

(*below*) To appreciate diversity, we need to understand the connections among plants, animals and soil. The actions of people and natural forces can simplify and fragment nature's communities and food chains.

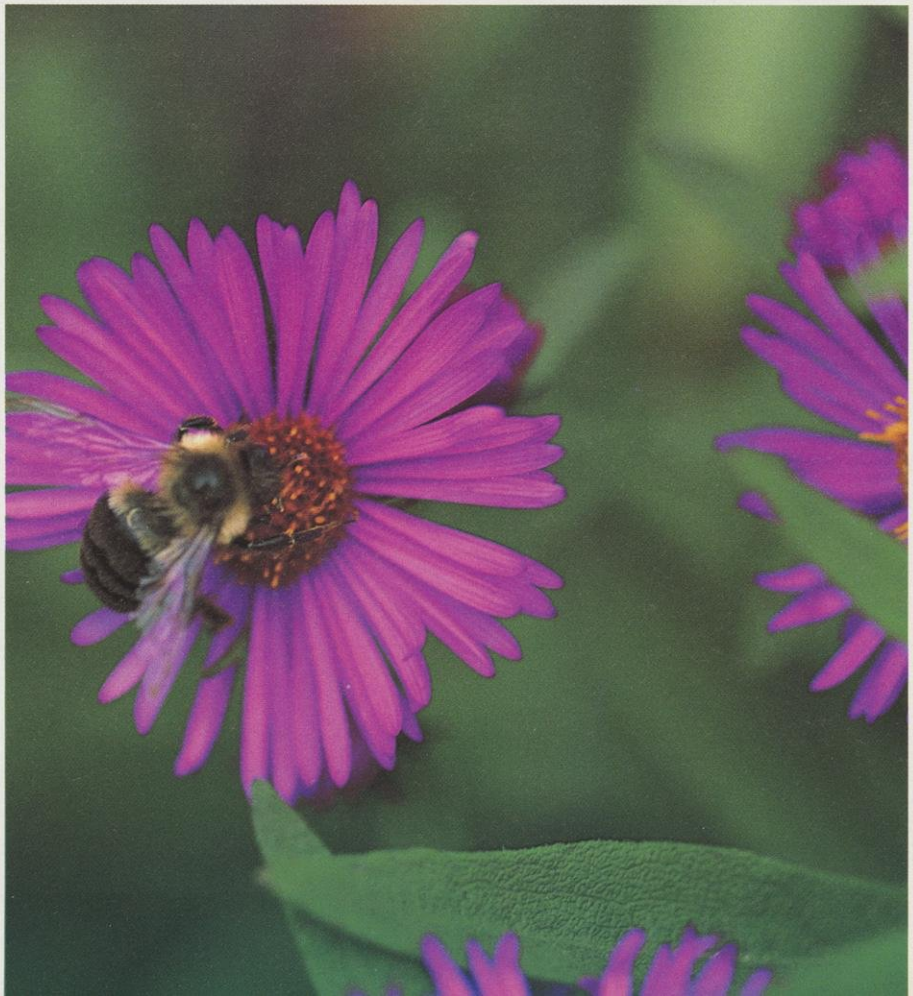
ROBERT QUEEN

OAK SAVANNAS in the south, and the **OAK AND PINE BARRENS** in the central and northern part of the state, are similar in many ways. Both are grasslands interspersed with trees, and both were naturally perpetuated by fire, which burned back brush and most competing species of trees. While oak savannas are found in areas with richer soils, barrens communities only thrive in areas with poor-quality, sandy, dry soils. Since settlement, savannas and barrens have been destroyed, simplified and fragmented by farming practices, urban development and fire control. Fortunately, many animal species associated with these communities have found surrogate habitat in pastures, hay fields and parks. Today, isolated remnants of these communities could be restored through the use of fire, light grazing and some timber production.

IRVIN YOUNG PRAIRIE, WALWORTH COUNTY RON KUROWSKI

Biodiversity means saving the pieces we may not fully understand. Who knows if asters or bees hold the key that unlocks a medical or natural mystery?

Wisconsin's great southern **GRASSLANDS** were plowed and paved for agriculture and urban development. As fires were controlled, those areas that were not destroyed by human activity grew up into trees and shrubs. Today, only a few small prairie remnants remain. Prairie restoration is possible, using plantings followed by regular controlled burns, light grazing and even some crop production.



ROBERT QUEEN

starlings or English sparrows and plants like dandelions do very well in these altered landscapes.

Environmental pollution can be toxic to natural communities or may change the habitat in which plants and animals live. For example, chronic exposure to certain levels of air pollution can shorten the life span and vigor of many plant species. Poorly managed construction sites and bare fields allow soil to wash off the land into streams, smothering fish eggs laid in gravel riffles. And industrial and municipal discharges containing harmful chemicals can cause disease and produce genetic defects in young fish and birds.

Expanded vision

Managing Wisconsin's natural resources to conserve biological diversity

Wisconsin has lost nearly half its original WETLANDS through filling and draining for farming and urban development. Fortunately, current federal, state and local laws have greatly slowed wetland loss, and restoration is taking place in many areas.

RED CEDAR LAKE WETLAND COMPLEX, JEFFERSON COUNTY RICHARD VOGT

Wisconsin's **AQUATIC COMMUNITIES** are prone to the same problems that simplification, fragmentation and pollution bring to land. Lost habitat, fewer spawning areas, industrial wastes and urban effluent challenge the survival of water plants and animals. Fortunately, most fish species that were present in the 1830s are still here, though many species are less abundant.

Efforts for more than 20 years to make all waters clean enough for fishing and swimming have restored health to many aquatic communities. That gives us the freedom to concentrate on smaller hot spots like harbors, where pollutants and commerce threaten natural diversity, and on individual lakes that are home to unique habitats and species.

implores us to look at whole ecosystems rather than concentrating as much on one or a few species. It's not a totally new idea. We've known, for instance, that restoring wetlands is the best way to provide food and shelter for ducks while also helping to restore a community of muskrats, songbirds, cattails and other wetland plants and animals. Biodiversity calls for managers to take the long view of their actions and assess how well the whole system is functioning. It also calls for managers to take a panoramic view of their work — beyond the immediate project site, beyond the surrounding watershed to the larger landscape.

We want to conserve biological diversity at all levels — genetic, species, community, and ecosystem — by blending human needs with nature's needs. To do that, we need to reflect how traditional programs, such as deer management or stocking trout, might affect biological diversity. We won't quit managing for our important fish and game species, but we may do some of that management work differently.

Restoration will be guided by what we know about Wisconsin's vegetation prior to the 1830s. That will help us understand the landscape's natural potential and how human activities have affected it.

But biological diversity will not be the sole criteria for making management decisions; it is not our only goal. And ecological simplification and fragmentation are not always bad. Consumers expect to use resources while they sustain them. Enhancing populations of game species, providing forest and agricultural products, and accommodating other human needs are important and necessary.

To conserve diversity, we have to stay mindful of the original landscape as we view the state we have been shaping for more than 160 years. Managing for biodiversity will take an even broader vision of the land and resources we "crop" for deer, timber, fish and recreation. Our "success" will be measured in part by our ability to sustain a diverse gene pool, a wide variety of nongame species, and a natural plant community.

There is no one "right way" to think about biodiversity; we envision it through the filters of our experiences, our traditions and our values. The important thing is to recognize that our proposed actions have wider consequences and trade-offs for more species *and* the landscape itself. We need to stay mindful of that wider, natural community and clarify where, when and why certain actions are desirable. □

TOFT POINT ON THE LAKE MICHIGAN SHORE, DOOR COUNTY

Betty L. Les coordinates biodiversity-related issues for DNR's Division of Resource Management. Kristin Visser is a special assistant to the director of DNR's Division of Resource Management.

Building biodiversity into DNR management plans

Comments from James T. Addis, Administrator, Resource Management Division

Why has biological diversity become an issue for DNR?

As scientific knowledge advances, we more clearly understand the linkages among more pieces of the natural world. There is more scientific, legal and public demand to include biodiversity principles in our practices and decisions. We need to analyze and consider those changes through open public discussion.

Does "biodiversity" mean DNR will lock up large tracts of land and allow no management and no harvesting?

No. In places where we decide to restore the natural landscape, it usually won't recover naturally. In some cases restoring and maintaining biodiversity will require very labor-intensive work: planting and burning prairies, reintroducing species, and controlling non-native species. The landscape has changed so much that the idea of "no management" is rarely an option.

Also, "no management" will not meet the needs of Wisconsin's citizens. We want to *blend* human needs and values with our desire to maintain the whole landscape.

In the northern forests, for example, preserving stands of very old trees or wilderness areas will be a part of a mosaic of land uses, but so will many other things — including areas where the forest will be harvested. A key issue in the northern forests is the age of trees present. The forest is now dominated by sapling and pole-size trees, with few stands of mature trees. We want to provide trees of all ages to sustain natural communities.

What about preservation? Does it have a role?

Yes, but it's important to remember that natural systems are always changing, though the change may be slow and not noticeable in a single human lifetime. So preserving an area won't guarantee that it will stay forever as it is now. Some time in the future, these "preserves" will need management, too.

Sometime we will want to preserve areas that contain unique or endangered plants or animals. We may want to preserve other areas to let nature take its course, that is, to preserve ecological processes. Those areas will be especially useful as outdoor research laboratories and as teaching centers where people can learn ecological concepts. We have a lot to learn about how ecosystems function. Preserving some areas will be one of many strategies for conserving biological diversity.

DNR PHOTO

Biodiversity calls for managers to take a panoramic view, says Jim Addis. They must assess the surrounding watershed and landscape as well as a particular project site.

Does "managing for biodiversity" mean that DNR wants to put the landscape back the way it was in the early 1800s?

No. We recognize that the landscape is irrevocably altered. However, we will use what we know about what was here in the early 19th century as a benchmark to guide restoration work.

If biodiversity doesn't mean locking up lands and letting nature take its course, what does it mean?

It means that in managing property we try even harder to take into account the variety of species and habitats present, to view each parcel as part of a regional landscape and to consider the long-term implications of our decisions. Our overall goal is to sustain a landscape that has a healthy mix of all four levels of diversity — genetic, species, community and ecosystem. We want to look at habitat, not individual species. And we want the public involved before decisions are made because, frankly, we want to avoid the kind of confrontations that have occurred elsewhere.

How might DNR policies and procedures change as biodiversity is considered in management activities?

It will affect our land plans and our priorities for buying property. It could change our programs to stock fish and game birds. It will change the type of advice we give to private landowners, the kind of habitat changes we make to encourage game species, the size and shape of timber sales on DNR forests, and how and when we do prescribed burning.

One of our goals is to review present DNR activities and procedures to determine if they help conserve biodiversity. If some are not helpful, we will want to talk about how we need to change those activities. And we recognize that people in this agency don't have all the answers. We want to talk to everyone — researchers, hunters, anglers, environmentalists, farmers, local government officials, timber producers — who wants to talk to us about this issue. We will be asking for help in deciding how DNR should change the way we do things now.

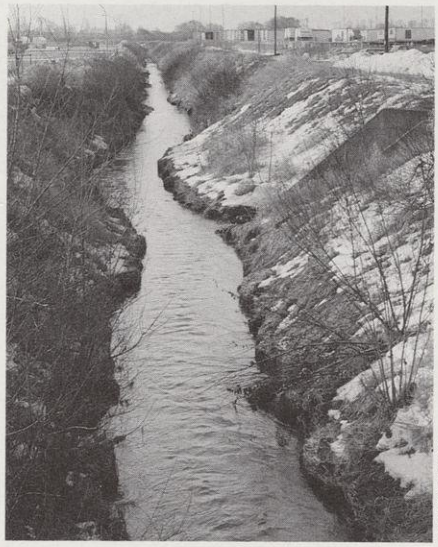
The Pike has been used as an agricultural drainage channel so long that it's easy to forget a river runs through it.

Can urban rivers work & play?

Jeff Schimpff

It seemed as likely a place as any to make good in this land of opportunity. Racine and Kenosha were developing as industrial centers. Water and land routes provided easy access to the supplies and markets of Milwaukee and Chicago.

The European immigrants who settled farms along the Pike River in the state's southeast corner found fertile soils all along the watershed from the upper river at Sturtevant (called Corliss in its early days) and Mount Pleasant, to Somers and Truesdell along Pike Creek to the south. During the early settlement period when tillable farmland was cheap and plentiful, clusters of wetlands collected unabsorbed rainwater from the rich, moist prairie soils that gently cradled the Pike, and kept the water clean.



JEFF SCHIMPFF

Beginning in the early 1900s, farmers in the watershed began to dredge and straighten the channels of the upper Pike River, Pike Creek, and several of their tributaries to help dry out crop fields faster for spring planting. They also tiled their fields to further improve drainage.

Dredging the stream channels removed riverbank vegetation, eliminated silt-catching meanders, and stripped away much of the stream bottom habitat. Although these extensive

drainage activities expanded the tillable acreage, they eventually dried up most of the necklace of wetlands that circled the stream channels. The changes greatly reduced habitat for fish and wetland wildlife, and sent forceful flows of erosive water downstream.

Streamside land drained for agriculture also seemed suitable for residential, commercial and industrial development, which in turn further reduced the natural vegetation. Without shady banks, water temperatures rose more rapidly on hot, sunny summer days. Eroded soil, industrial wastes, agricultural chemicals, lawn fertilizers and street runoff were now flushed into the Pike without filtering through wetlands or wide buffers of shoreland grasses. The river water became more silty and turbid. Dissolved oxygen levels dropped. In general, life became difficult or impossible for all but the most pollution-tolerant aquatic species.

We now recognize how disruptive such stream channelization projects can become. Since 1987, DNR guidelines have viewed river channel alterations as a last resort for communities that can find "no other reasonable alternatives to solving a recognized flooding problem."

To judge how channel manipulation altered life in the Pike, one needs only to examine the marked changes in fish populations. Fishery surveys in 1906 and 1924 identified several kinds of finny residents that thrive only in clean water. These included the northern hog sucker, and small fish like the redfin shiner, least darter, largescale stoneroller, horneyhead chub and southern redbelly dace.

During seven surveys in the 1960s, '70s and '80s, only the redbelly dace survived from this original mix of colorfully named fish. The vast majority of fish now making a home in the warm, turbid waters of the upper Pike River and Pike Creek are species more tolerant of polluted water.

Watershed planning forecasts tremendous growth

By the mid-1970s, it was clear that the capacity of the channelized streams could no longer keep pace with increased stormwater runoff resulting from land development in the Pike River watershed. Homeowners who built too near the river or in low spots had wet basements in spring. Farmers were unhappy that fields created in floodplain soils and other poorly drained areas were sometimes still not dry enough for early planting. Other fields ponded up during severe summer storms. Local officials and businesses were also concerned because future development plans would create even more stormwater runoff. Some believed a solution was needed to permit the Pike River channel to carry more water more rapidly to Lake Michigan.

To gain a broader view that could guide future actions, communities in the watershed formed the Pike River Watershed Committee and enlisted the assistance of the Southeastern Wisconsin Regional Planning Commission (SEWRPC). In 1983, SEWRPC published a comprehensive plan projecting regional needs through the year 2000. The plan recommended allocating more land for residential, commercial and industrial development; designating more parks, natural areas and other open space; and implementing solutions to control flood damages while managing existing and anticipated stormwater problems.

The plan emphasized stormwater management measures because job growth, and industrial, commercial and residential land development were predicted to increase significantly. Regional planners estimated that community expansion would pave or develop another 15 of the 37 square miles that remained in agricultural and open lands. This, of course, means even more water would be heading for the Pike River channel, filling it faster and spilling more widely over adjacent farmlands, golf courses and lawns.

After weighing several alternative solutions, the plan proposed to further widen and deepen approximately 14 miles of existing stream channel to accommodate future development. A channel of the size proposed could contain even the "100-year flood."

DNR staff expressed concerns that erosion might intensify along the prettiest, most natural stretches of the Pike, from just upstream of the confluence of Pike Creek with the upper Pike River, and downstream toward Lake Michigan. DNR staff also needed to complete stream surveys to document water quality, aquatic life, habitat diversity and estimate the potential to restore the river.

Consequently, approval of proposed channel alterations has been withheld until local communities modify the plan

JEFF SCHIMPFF

(*left*) Trailers, businesses and paved lots abut the ditched portions along the upper Pike east of Sturtevant.

(*above*) Even strong fences won't stop runoff. Snow melt carries nutrients and soil directly from thawing farm fields. Without grassy or brushy buffer strips, stormwater carries city, road and country pollutants directly into the Pike River.

by adding measures to maintain or improve water quality and habitat for aquatic life.

Between 1983-88, local governments installed pollution controls on sewage treatment plants and other point sources. In 1988, the Mount Pleasant Stormwater Drainage District started the process of applying to DNR for a channelization permit. Other communities soon expressed their intent to carry out all the channelization measures proposed in the 1983 plan.

Concern over the potential environmental consequences of such a large project led the Department of Natural Resources to require the completion of an Environmental Impact Statement (EIS). DNR staff hope the EIS will promote an understanding of the consequences of the SEWRPC channel plan and will serve as an opportunity for local citizens to examine alternatives to the proposed plan.

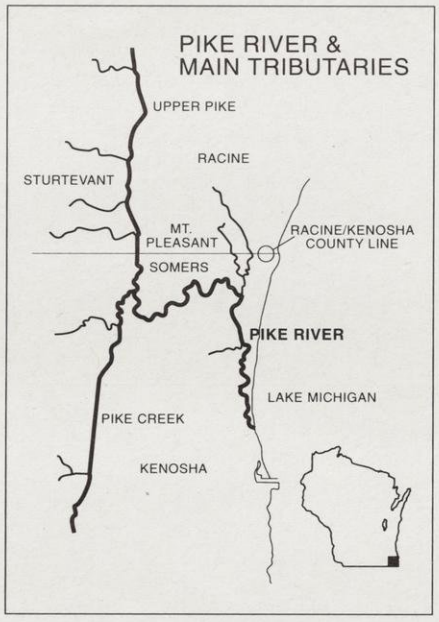
Even though SEWRPC considered a number of alternatives, some local residents feel that over the ensuing 10 years, attitudes and priorities may have shifted enough to warrant reconsideration of some other options. Others see developing the EIS as an opportunity to more closely examine the land use impacts of eliminating the floodplain in an urbanizing area.

Viewing urban rivers as community assets instead of stormwater drainageways

Across the country, stream corridors, no matter how humble, have received renewed attention. As farmland and other open space is converted to subdivisions and commercial areas, local residents have turned to long-neglected streamsides for recreation and a renewed sense of connection with the rest of the natural world. Often, these are the only open spaces left.

Communities with foresight have restored fish and wildlife habitat while at the same controlling stormwater and flooding. Community cleanup and rehabilitation projects along waterways have removed decades of debris, improved water quality, and have often added recreation trails, parks and other amenities. Most of these communities have found that their watery corridors, once regarded as nuisances and eyesores, could become the focal point in prized neighborhoods. (In Wisconsin, a project on the Rock River at Beloit is currently underway.)

Many people are interested in a number of options for the Pike's future. While no one envisions returning the rapidly urbanizing Pike River to its original condition, many residents want it restored to a more natural state. That was made clear at a public open house held in July 1992 to begin the process of developing the EIS.



The Pike River's major branches drain a mix of farmlands, businesses and homes.

There is a strong local interest in restoring the fishery. One of the most popular activities on the Pike River is angling for large steelhead (rainbow trout) that return to the river from Lake Michigan. The Pike is not fed by springs that would maintain the cold, oxygen-rich waters trout and salmon need to spawn. The Kenosha Sport Fishing and Conservation Association maintains an artificial fish rearing station so smolts (juvenile steelhead and salmon) will return to the Pike as adults.

A 1990 fishery survey showed that brown and brook trout also enter the river from Lake Michigan. Several species of shiners and other small fish provide a food supply for the steelhead that winter in the Pike's lower reaches.

People want other protection for the fishery, too — an end to the illegal shooting of fish in the river, and remedies for chemical spills, oxygen depletion, agricultural chemical runoff and other pollution that threatens aquatic life and has caused massive fish kills.

Some residents would like the watershed communities collectively to reconsider alternatives for controlling stormwater in a manner that would be more compatible with other stream values. For example, a combination of detention basins, wetland protection and wetland restoration would minimize the need to increase channel capacity.

A few streambank property owners are concerned that widening the channel upstream would flood their downstream property. Some local residents want wrecked automobiles and other debris removed from the channel so the river would be safer for canoeing and more aesthetically pleasing.

Some citizens felt proposed jetties at the river mouth were unnecessary and could erode a popular beach in Kenosha by blocking the normal flow of wave-driven sand. Others felt jetties would improve water quality and reduce flooding by keeping the river mouth open during sandbar-building storms.

Still other people were concerned about who would pay for any project, regardless of what was done.

Weighing options and opportunities for the Pike River

DNR staff would like to use the EIS process to help communities weigh options that restore and preserve the river's natural qualities and values. The 1990 inventory of the river's fishery resources offers encouragement. Environmental analyst Steve Mace of DNR's Southeast District believes the survey demonstrates that the Pike River "is a system that appears to be reestablishing itself," no matter how gradually. He noted that a greater variety of fish species were found in 1990 than had been documented in the past 15 years. Other tests indicated that water quality has slowly improved in the Pike dur-

ing the past three decades as municipal and industrial wastewater treatment has improved.

The cost of inaction — One option communities can always consider is the "do nothing" alternative. In the case of the Pike, doing nothing to either increase the capacity of the river channel or to provide on-site storage of stormwater would still be costly. If more of the watershed is developed and stormwater runoff increases beyond the current rate, the channel will overflow more frequently. Communities and farmers will have to bear the costs of flood damage; some properties in the floodplain may have to be relocated; and ponded stormwater will likely cover additional lands.

Consider how channel design affects riverside development — Owners of riverine and floodplain property are weighing where their best interests lie. Some believe building the channel deep enough to contain all flood waters would allow them to develop their property right up to the riverbanks. Use of their property might no longer be constrained by floodplain zoning rules. Others know that a more normal floodplain would reduce their buildable land area, but remaining land would be more valuable if it adjoins a more natural stream with cleaner water and better recreation.

DNR resource managers have taken a fish's-eye look at this latter vision. Fisheries managers suggest modifying the proposed straight, deep, steep-sided channel wherever there is enough room. By providing a wider, shallower, more graceful floodplain channel with meanders, fish habitat and plant life could be restored and the river would support a wider range of fish, birds and other animals. Within this wide channel a smaller, winding "low-flow" channel could provide habitat that both looks and functions more like a natural stream than the present channel.

Cooperative management agreements with property owners could establish grassy strips and restore wetlands along the river and its major tributaries. These buffers would filter pollutants from runoff, greatly enhance a proposed environmental corridor in the Town of Somers, and complement a narrow recreation trail proposed in the Town of Mount Pleasant. Other alternatives, some studied but dismissed as more costly by SEWRPC, are also possible.

Continue investing in water quality and fishing to spawn further recreational opportunities — Given public demand, DNR fish managers have made a considerable investment to improve and sustain fishing in the Pike. Last year DNR fishery crews stocked more than 290,000 brown, brook and rainbow trout, coho salmon and chinook salmon into the river. By placing more emphasis on stemming runoff, re-establishing river meanders, removing fish barriers, restoring shoreline vegetation and providing public access, the river could attract even more anglers, other compatible recreation, and related new business opportunities.

River restoration is an opportunity to create quality open spaces — An inventory of wildlife habitat along a 200-foot-wide swath of the river shows that the potential for protecting quality open space is still great. Thirty percent of the corridor has already been converted to residential, commercial or industrial use. But nearly 43 percent of this narrow river corridor (363 acres) is undeveloped and covered with grasses or woods. The remaining 27 percent is agricultural land. Job forecasts predict fewer farmers in the watershed's future as farmland is converted to other uses. So developers and

Restoring the riverbanks brings beauty and value to shoreland property. The coneflowers and Queen Anne's Lace add a burst of color to this prairie planting along the upper Pike River.

JEFF SCHIMPFF

local government can decide either to cooperate or to compete for riverside property. The opportunity to provide public recreation and open space will rapidly diminish unless county, town, or other local governments are poised to acquire land or negotiate easements along the river.

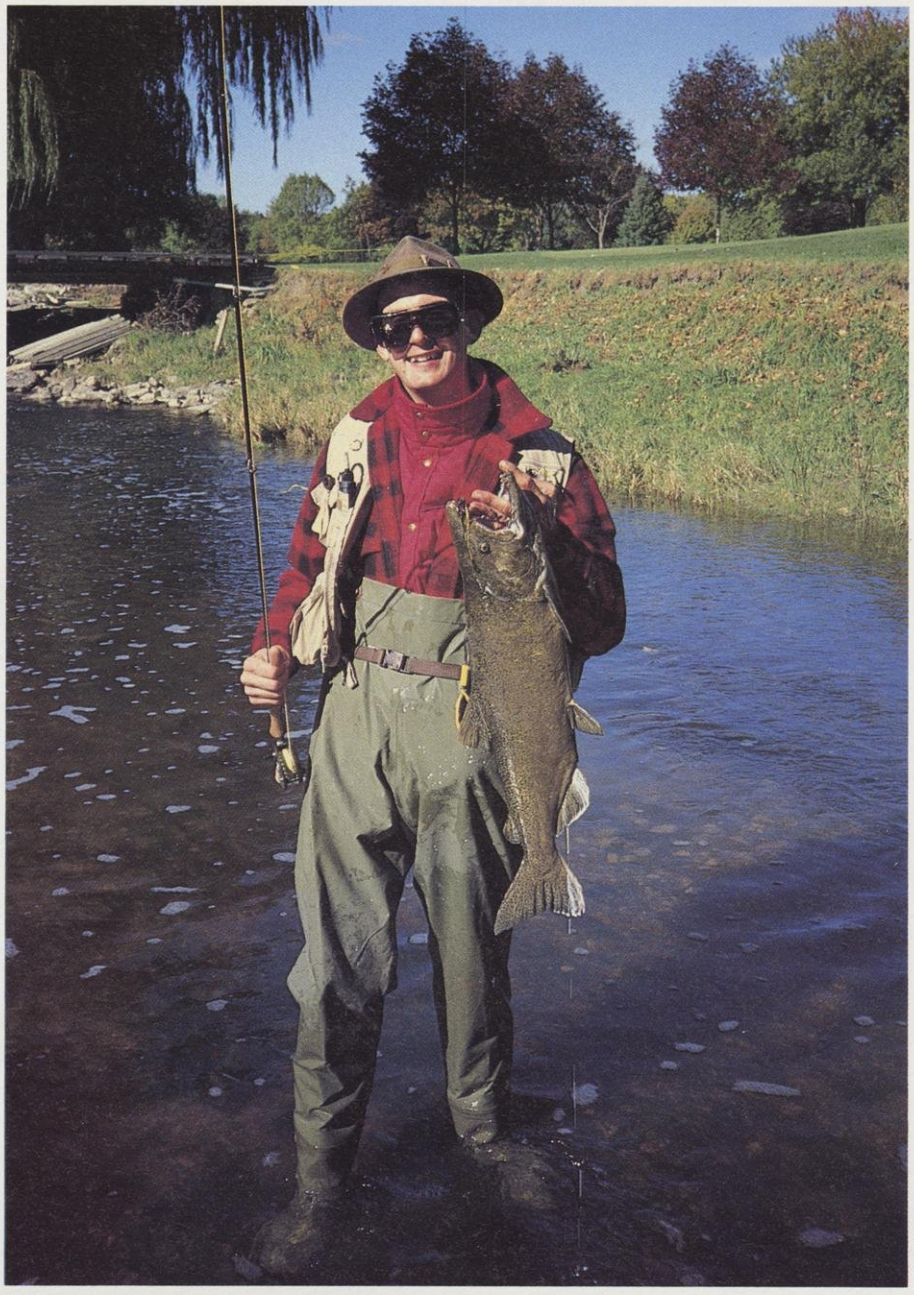
Sharing the costs, sharing the opportunities

If the Pike is to be restored to a more natural condition , rather than enlarged primarily to accommodate stormwater flows from urban expansion, interest groups with divergent agendas in several communities will need to reach a consensus. All parties seem to agree that, at a minimum, present wildlife and fish habitat values should be maintained. A preliminary channel design from Mount Pleasant does propose some fish habitat improvement. The watershed committee believes it is possible to further refine the SEWRPC proposal and produce a consensus plan.

Yet, it's uncertain if restoration will go further. No one has rushed forward with the cash necessary to fund acquisition of a recreational corridor or sites for wetland restoration. Recently, a Town of Mount Pleasant official stated that budgetary woes may severely hamper implementation of their recreation corridor plan.

The experience and expertise of outside parties like the National Park Service (through its Rivers, Trails and Conservation Assistance Program) or the UW-Extension System could help watershed communities form a collective vision, and steer local governments toward additional funding sources. For instance, if final plans call for extensive habitat restoration and public recreation along the river, project proponents could apply for grants from both the state Stewardship Fund and federal habitat restoration programs. Several foundations also award money for such uses.

Another way to reduce costs is to enlist volunteers to do much of the physical work like cleaning streams, stabilizing streambanks, installing in-stream fish habitat and planting shoreland vegetation. Anglers, wildlife watchers, boaters, bicyclists, hikers and neighbors might take part if in return they could enjoy the benefits of restored habitat. This approach also instills in residents a greater sense of stream stewardship. The Southeast Gateway Chapter of the Sierra Club has already offered to host meetings and work projects.



BOB BLUMREICH

Anglers from Kenosha and Racine who raise and fish salmon on the lower Pike are strong partners in the river's recovery.

Important issues concerning the future of the Pike River remain to be resolved by local residents and officials working together to develop a common vision. The current Department of Natural Resources effort to develop alternatives to examine as part of the EIS can provide a useful framework for this process.

Like the vision that first drew settlers to this area, deciding the future of the Pike River presents some interesting new opportunities. □

Jeff Schimpff, a former Kenosha County resident, is a DNR environmental analyst based in Madison, Wis.

On the path of the ol' 400

The 400 Trail is the newest recreation destination along the scenic route of a classy train that sped through southwestern Wisconsin.

Allison Beach

Somewhere in the deep recesses of our memories a large, shiny, locomotive sits at the station — sleek and ready to roll with a full head of steam. Whether real or imagined, it carries us through nighttime readings of *The Little Engine That Could,* old western movies, old train sets, grainy black-and-white films of soldiers departing during war times or immigrants' stories of their journeys to a new land. Perhaps that memory is stirred by a flattened penny in the very back of a dresser drawer.

Today, we are less dependent on trains, but their long, straight rails still influence our lives.

The railroad system aimed to reach and connect every corner of the nation. Wood ties and steel rails were laid in gentle grades through some of Wisconsin's most scenic areas. Though the great and powerful locomotives no longer run many of the rails, their routes still mark the path to adventure. Currently, 14 public trails statewide are becoming our finest recreation corridors.

The newcomer pulling into the station for your recreational pleasure is The 400 Trail. It runs a 22-mile stretch between Reedsburg and Elroy. The trail will be a crowd pleaser because it's beautiful, it offers a wide range of recreation and it links with several other trails.

ROBERT QUEEN

(TRAIN) COURTESY OF THE STATE HISTORICAL SOCIETY OF WISCONSIN

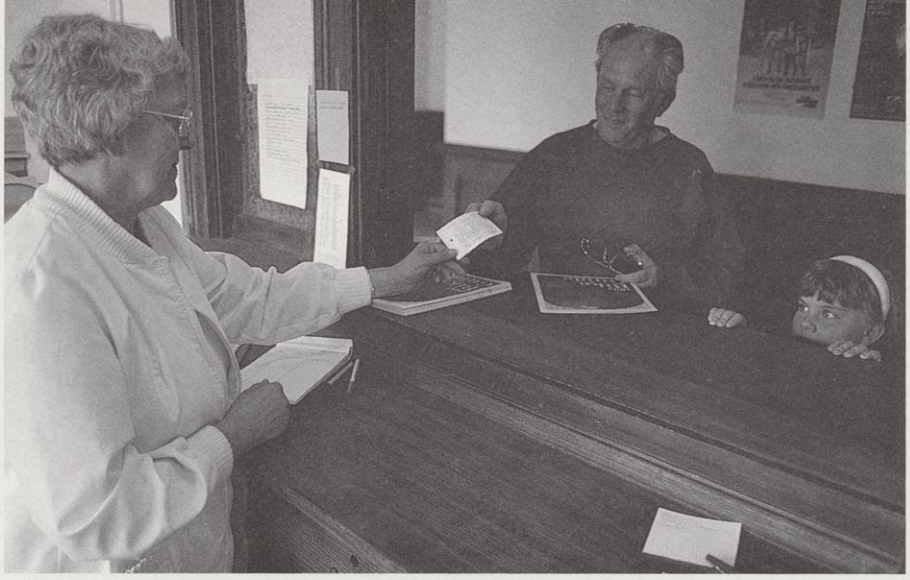
(above) A Chicago and Northwestern engine of the type and vintage of the famous 400.

(below) Author and trail manager Allison Beach travels the trail that weaves along the Baraboo River, bluffs, river bottoms and small-town charm of southwestern Wisconsin.

The trail has a colorful history. The Chicago & Northwestern railway began operating this line on January 2, 1935. The route continued to provide passenger service between Chicago and the Twin Cities until 1963.

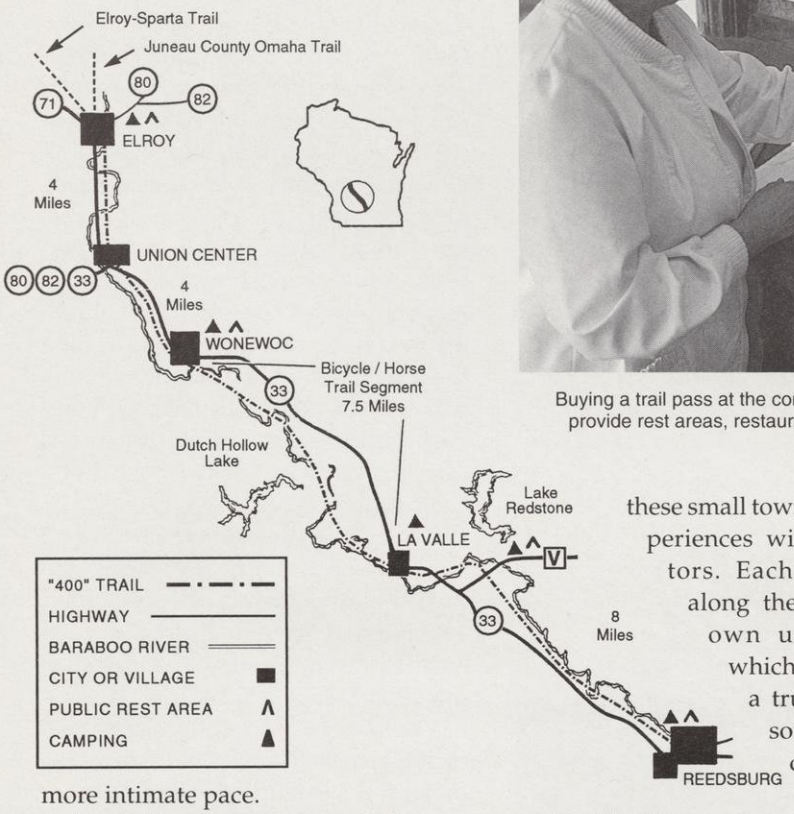
The sleek train was called the "400" to suggest class and associate it with a prominent social register of the same name. More importantly, the 400 was fast, averaging 63 mph. It traveled the 400 miles between the upper Midwest's two great metropolises in 400 minutes and that, according to local press hype, made it "the fastest train on the American continent." Not only was the locomotive superior, but the coaches had reclining seats and the lounge car was sumptuously appointed with the latest in comfort and fashion, the quintessence of luxury travel.

People who rode the 400 saw an area of geographic diversity very different from the lands they had come from. Through the train windows they witnessed wetlands, sandstone bluffs, prairies, river bottoms, rolling croplands and pastures. Bicyclists, hikers, horseback riders and snowmobilers enjoy the same sights and experiences today as they explore The 400 Trail at a slower,



ROBERT QUEEN

Buying a trail pass at the converted railroad station in Reedsburg. Communities along the route provide rest areas, restaurants, services and amusements that welcome trail users.



more intimate pace.

The hills of southwestern Wisconsin, untouched by the last glacier, are home to many plants and animals that will delight those who travel the trail. By bike, foot, horse or snowmobile, you may catch a glimpse of red-tailed hawks, sandhill cranes, wild turkeys, kestrels, great horned owls, indigo buntings, northern orioles, wood ducks, great blue herons or sora rails. A little closer to the ground, travelers may see bobwhite quail, white-tailed deer, mink, beaver, red and gray foxes, badgers or raccoons.

Botanists, both novice and expert, will enjoy identifying prairie natives like little bluestem and coneflower as well as forest flowers like trillium.

The 400 train carried much more than goods, livestock and people. It brought an enriched history and a future to the hills, river bottoms, farmlands and small towns it whistled through: Reedsburg, La Valle, Wonewoc, Union Center and Elroy. In a new way, the old rail line will again provide opportunities for residents of these small towns to share experiences with their visitors. Each community along the trail has its own unique traits which give visitors a true feeling for southwest Wisconsin.

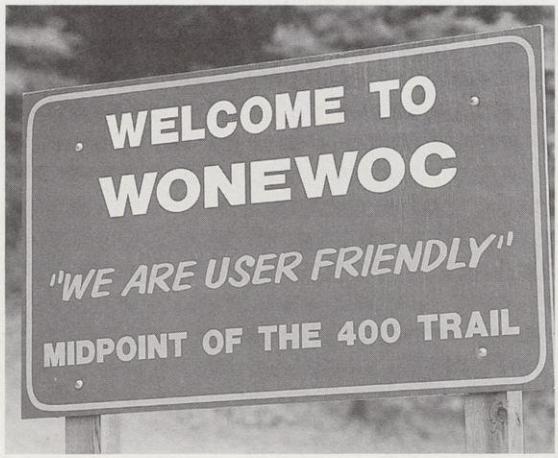
Reedsburg, a city of 5,000 people, is located on the south end of The 400 Trail. The Department of Natural Resources' goal is to complete the trail through town and restore the old train depot as a trail head by the summer of 1995. For now, explore town and when you're ready to hit the trail, start your journey at the temporary trail head on the west side of town north of Highway 33 at the intersection of North Preston and La Valle streets.

Reedsburg lies directly on the 90th meridian, making it the only city in the state where time measured on a watch or a sundial are precisely in sync. Pioneer Village and the Museum of Norman Rockwell Art are popular stops for visitors. The downtown area has preserved many fine buildings and homes that are listed on the National Register of Historic Places.

The city also offers a fine public park system. Large and small parks scattered throughout town provide a municipal swimming area, many picnic shelters, several ball diamonds and some campsites at South Park. Visitors will also find a large selection of restaurants and lodging. In Reedsburg bicyclists can connect with the Wisconsin Bikeway, a 300-mile route leading from La Crosse to Kenosha, which was the first statewide bicycle route in the nation.

Travel eight miles northwest on the trail and you'll find the village of La Valle hidden in a valley of the Baraboo River. This small town (pop. 412) nestled between Dutch Hollow and Lake Redstone, bills itself as "The Crossroads to the Lakes." The two manmade lakes offer excellent water sports and fishing. Two parks neighbor La Valle: Hemlock County Park features beautiful sandstone bluffs that beckon to be explored. The park has a children's park, a shelter, picnic areas and grills. Lake Redstone offers a beach, children's park and picnic area. La Valle is also at the southern end of the horse trail which parallels the bike trail

Wonewoc extends rural hospitality that has greeted visitors by rail, horseback or trail.



ROBERT QUEEN

ROBERT QUEEN

(opposite)Pastoral beauty along The 400 Trail — spiderwort just east of Wonewoc and a farm along the Baraboo River north of Reedsburg.

for the 7.5 mile journey to Wonewoc.

At the midpoint of The 400 Trail and the northern terminus of the horse trail, Wonewoc contains the only interpretive nature trail on The 400. Trail users who want to switch recreational gears will be pleased to discover that in Wonewoc (pop. 830) they can hike, bike, canoe, horseback ride and snowmobile. Bike repairs and canoe and bike rentals are available in the village. Baker Field, located directly off The 400 Trail, has a covered shelter, lighted tennis courts and a ball field. The American Legion Park, which is surrounded by wildflowers and tall pine, oak and maple trees, offers a large swimming pool and the only public campground between Reedsburg and Elroy.

The quiet village of Union Center (pop. 206) and the surrounding area harbor unique habitat and a variety of services, including a golf course. Just north of town along the trail you'll see beaver dams and wetlands.

Elroy (pop. 1,600) is gaining fame as the hub for bike trails, now hosting access points to The 400 and Elroy-Sparta state trails as well as Juneau County's Omaha Trail. In addition, the Elroy-Sparta Bike Trail connects with the La Crosse River State Trail, which links to the Great River State Trail. This network of trails now provides more than 100 miles of continuous bicycling from Reedsburg to north of Trempealeau.

The Commons in Elroy is an easy place to access all these trails. This downtown park provides parking, restrooms, lockers, showers, area information, picnic facilities, a Tot Lot and driver-only shuttle service. Elroy is on the west fork of the Baraboo River, which offers fine trout fishing. A city park on the south edge of town has camping facilities, a picnic area and a swimming pool.

Bikers and campers enjoy a refreshing stop at the Commons in Elroy where they can rest, picnic or take a relaxing shower. Three recreational trails meet here.

ROBERT QUEEN

The inviting atmosphere all the small towns along the trail provide is embodied in The Friends of The 400, Inc. This support group has already made great strides to promote the trail even though it just opened. The friends group has developed an informational brochure, designed a 400 Trail patch, and organized the trail's grand opening last June 5th. This nonprofit organization provides an invaluable service to help maintain The 400 Trail and lay down the welcome mat for visitors and communities along the route. For more information on The Friends of The 400, Inc. please write to P.O. Box 400, Wonewoc, WI 53968.

As you explore The 400 Trail, take the time to savor the scenic serenity and enjoy the small-town friendliness that surrounds the route. And as you take a relaxing pedal along the mild grade, reflect on the great engine, the vast railroad empire, and Wisconsin's commitment to recreation that made the trail possible. You may hear even hear faint, lone whistle of the "400" carrying its city slicker customers through the countryside. □

Allison Beach, trail manager for The 400 Trail, is stationed at DNR's Southern District Headquarters in Fitchburg, Wis. (608) 275-3214. Trail information is also available from Wildcat Mountain State Park, Box 99, Ontario, WI 54651 (608) 337-4775.

Town festivals along the trail

Reedsburg

FALL

first Saturday in Oct. – Harvest Festival, City Park – Craft Show. Contact Reedsburg Chamber of Commerce (608) 524-2850

Oct. 31, Sunday – Halloween Parade
Contact Reedsburg Chamber of Commerce (608) 524-2850

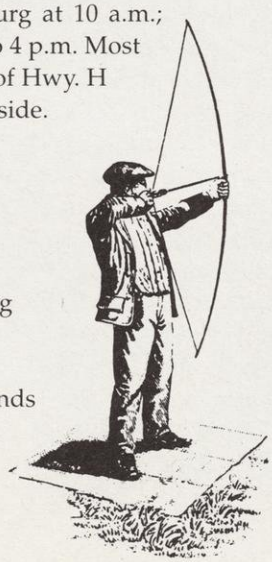
last Saturday in Nov. – Breakfast with Santa, Voyageur Inn – (608)524-6431

SUMMER

last Sunday in May – Reedsburg Area Historical Society Annual Chicken Barbecue and Open House on historical property grounds east of Reedsburg on Highway 33 – Contact Lavern Kruse, Pres. – (608) 727-2922

first Sunday in June – Fly-In/Drive-In Breakfast sponsored by Reedsburg Optimist Club. 7 a.m. to 12 noon – Contact Bruce Brenner – (608) 524-2842

third week in June – Annual Reedsburg Butter Festival
Fun for all – 10K run, parade, tractor pull, horse pull, Little League exhibition games, demolition derby, carnival, arts and crafts fair, live music, food stands. Tues.: Crowning of Miss Reedsburg; Weds.:Family Night, Crowning of Butter Festival King and Queen; Sat.: Parade in downtown Reedsburg at 10 a.m.; Sun.: Arts and Crafts Fair, 10 a.m. to 4 p.m. Most events held at Nishan Park, corner of Hwy. H and 8th Street, on Reedsburg's east side. Contact Bette Wheeler, Chairman – (608) 524-2103



third weekend in July – Little Britches Rodeo
sponsored by La Valle Team Penning

July 3-4 – Bow Down Show Down
at Reedsburg Outdoor Club grounds on weekend nearest 4th of July

July 4, Sun. – Fireworks
at dusk – at Webb Park

last Friday in July – Reedikulus Day
Annual Street Sales sponsored by the Reedsburg Area Chamber of Commerce. 8 a.m. to 8 p.m. in Reedsburg. Contact Reedsburg Chamber of Commerce (608) 524-2850

La Valle

FALL

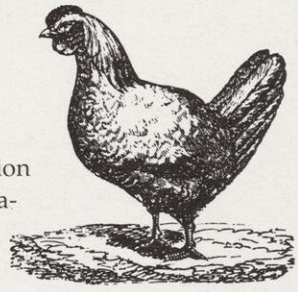
third Sunday in August – Annual La Valle Celebration
at La Valle Community Park. Events of the day include a parade, horse show, Fun Run, variety show, chicken barbecue and assorted children's games

Wonewoc

FALL – WINTER

August – Woney – Wacky Days,
Street side sales and activities Contact Wonewoc Area Betterment Club (608) 464-3220

first Saturday in Feb. – Wonewoc Winter Fest
Old Fashion Games, broom hockey, ice sculpting, candlelight walk, dance, hay ride – contact Wonewoc Betterment Club (608) 464-3220.



SUMMER

Fourth of July – Fourth of July Celebration
parade, softball and volleyball tournaments, chicken barbecue, fireworks at Baker's Field.

Elroy

SUMMER

last weekend in July – Elroy Fair

Unknown isles

The federal government is poised to transfer more than 670 islands in Wisconsin rivers and lakes to state ownership. Did you know we already manage 600 others?

Tina V. Bryson

As a new resident of Wisconsin, all I expected from the Badger State was badgers, snow, more snow, and more snow. As I trudged from December through March bundled up from head to toe, I wasn't comforted by well-wishers who assured me that last winter was a mild one.

My only solace was dreaming of a nice warm island somewhere much farther south. It never occurred to me that I now live in an island state and by virtue of residency, I owned more than 600 islands.

Actually, my island ownership is more like a cooperative. As a Wisconsinite you too are co-owner and we have the opportunity to acquire approximately 670 additional islands. So as my partner in this venture, I want to tell you what we own, our current opportunity, and our responsibilities.

Before the states were united and governed by the Constitution, the law of the land was the Articles of Confederation. While discussing how to deal with the vast acreage under public domain, Thomas Jefferson argued that random settlement where land was subsequently surveyed would lead to costly and drawn-out lawsuits to settle boundary disputes. Therefore, the Confederation enacted the Land Ordinance of 1785, which required all federal land to be surveyed before it could be transferred from public to private ownership.

In conducting the original land survey of Wisconsin in the mid-1800s, surveyors on foot perceived that small islands had little value compared to the effort it would take to survey them. Some islands were as small as .002 of an acre. Those islands that were not surveyed couldn't be sold to private interests and have remained under federal ownership as public domain.

ARTICLE PHOTOS BY ROB NURRE

However, not all islands in Wisconsin are public property. Surveyed islands could be sold by the federal government. Second, private parties who held title to all property around nonmeandered waterways were seen as legally holding title to the islands in those waterways as well.

Those islands kept as public lands were managed by the U.S. Department of Interior's Bureau of Land Management (BLM). In 1912, the State had the opportunity to acquire some 600 unsurveyed islands on inland lakes in the northern third of the state. These islands, transferred by a congressional grant, are currently managed by the Department of Natural Resources under the State Owned Islands Program.

Where feasible, all islands managed by the Department of Natural Resources are currently posted to identify legal public uses. Some of the islands are too small or too rocky to post a sign. The islands are inspected every three years to prevent land trespass, record the degree of public use, replace signs and schedule necessary maintenance.

Now, DNR managers have a rare opportunity to acquire additional islands totalling more than 2,500 acres. A BLM inventory of the proposed property includes approximately 590 river islands, 70 inland lake islands and 11 Great Lakes islands. The islands, which range in size from .10 to 200 acres, are located in 55 counties.

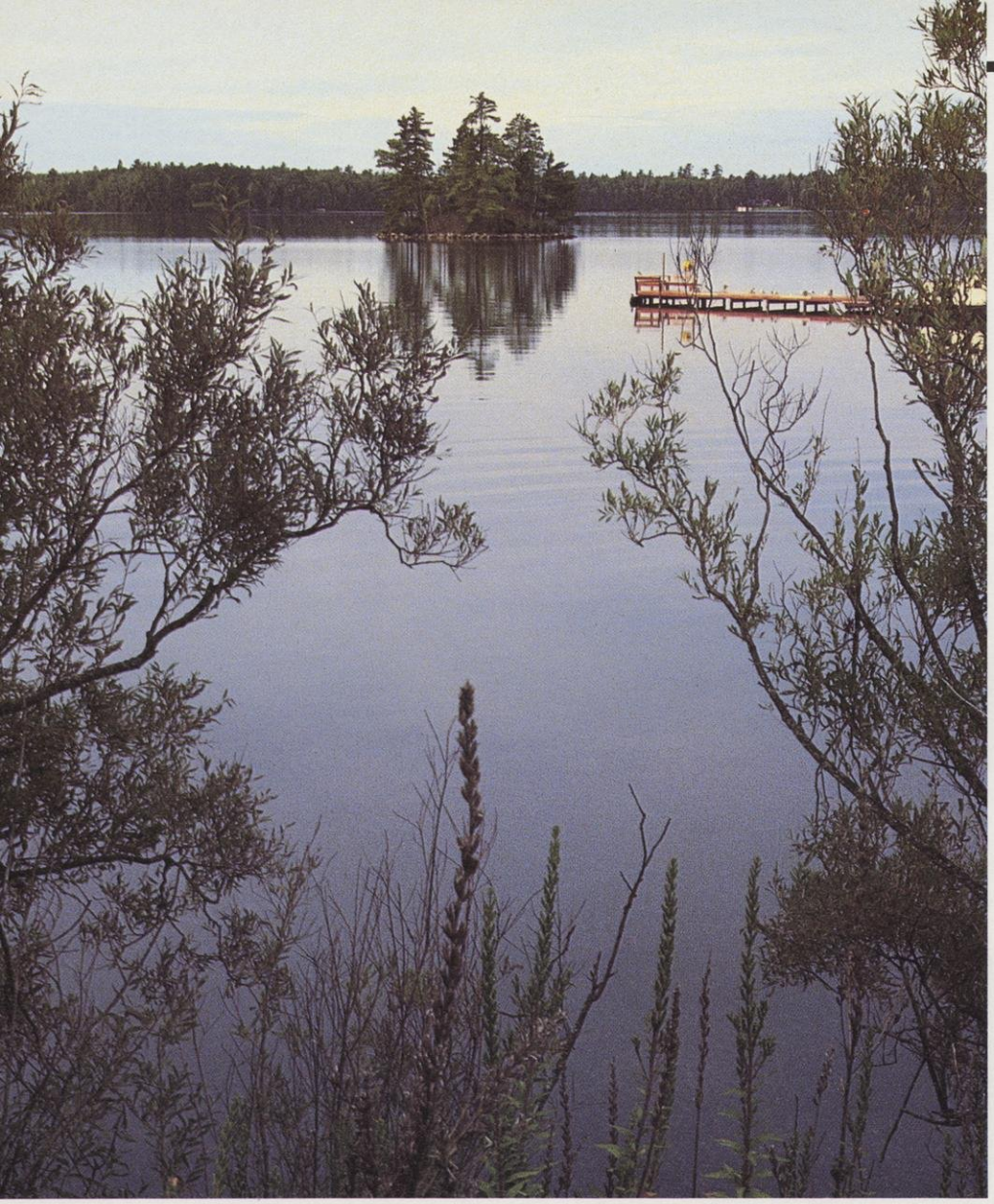
According to Rob Nurre, realty staff specialist with the DNR's Bureau of Property Management, the BLM has determined these properties are surplus and has offered them to the State of Wisconsin at no charge.

"Previously, the State applied to receive these islands under the provisions of the federal Recreation and Public Purposes Act. This process, however, proved costly and inefficient," he said. "Consequently, BLM discovered a more efficient way to transfer island ownership."

Transfers via congressional grant, as was done in 1912, recently proved effective for Michigan and Minnesota, Nurre said. The Wisconsin Department of Natural Resources is pursuing the same process to transfer all 670 islands at once rather than on a case-by-case

(*above*) Islands add a sense of refuge and relaxation to the landscape near homes, recreation spots and vacation lands.

(*opposite*) Who owns islands? If you own all the land surrounding a body of water, you can get title to any islands within that lake or stream. Many small islands in public waters, like this Wisconsin River isle near Biron, were never surveyed and remained in federal ownership.



Islands, like this one north of Minocqua, can preserve plant and animal communities that were squeezed out as shorelands developed. Preserving natural habitat on small islands may take precedence over recreation.

basis. Presently, the department, other state agencies and the state's congressional delegation are preparing to introduce such legislation in Washington D.C.

The majority of these islands are concentrated in the state's major rivers: the Wisconsin, the Chippewa, and the Black. Several others are located in smaller rivers and lakes throughout the state from Milwaukee to Green and Douglas counties. Others adjoin the coast of Door, Florence and Marinette counties. If these islands are acquired, they will be incorporated into existing properties that the Department of Natural Resources manages.

These unsurveyed islands, once considered insignificant by surveyors, are now worth about $1.5 million. However, in addition to their monetary value, our islands are significant in other ways.

Foremost, islands provide a habitat for plants and animals. Wild ginseng and nesting sites for bald eagles, loons and ospreys have been found on Wisconsin islands. Even islands that are mere chunks of rock or low sandbars can provide refuge for wildlife and preserve remnants of native vegetation as surrounding shorelines continue to develop.

Archaeologists have recovered artifacts and other evidence that the islands are culturally and historically rich. Regional archaeologists at the Nicolet National Forest Service in Rhinelander recently published a report on their findings investigating islands in the Manitowish Waters chain of lakes.

"There is evidence of cultures that lived 1,000 years ago," said Cynthia Stiles, project director and archaeologist. "The islands were probably used for fish processing and gathering of food from the lakes and rivers. Later, loggers dammed the waters between the islands and shoreline to make it easier to drive logs.

"All kinds of tool forms such as arrowheads and tools for processing fish and other animals for food [have been found on these islands]. We also found metal artifacts from the fur trade era and pottery."

Archaeologists believe that pits discovered on several islands were used as food caches. Other island areas were set aside as sacred sites for burials, Stiles said.

In light of archaeological evidence, she recommended that each island be examined to determine if it qualifies for the National Register of Historic Places before recreational activities might damage these sites.

Her Manitowish Shoreline Survey, for instance, recorded that on one larger isle, "much of the island has been disturbed by recreational activities and natural erosion. The site is naturally unstable due to its steep terrain and intensive recreational activity has increased the rate of erosion. No ground vegetation has had a chance to grow... Artifacts are presently eroding out of the bank at an alarming rate."

Back in 1912, the main objective in acquiring islands for the public was to preserve their fragile features and protect their natural resources.

Then-Congressman Elmer Morse led the 1912 campaign to include the 600 islands in the Wisconsin Forest Reserve, proposed in Vilas, Forest, Price and Oneida counties. Rep. Morse testified before the House Committee on the Public Lands that some islands had been bought, stripped of their pine or hemlock, and indiscriminately sold.

Islands were easily misused because they were isolated from consistent scrutiny or because they belonged to the federal government and escaped local jurisdiction. Rep. Morse also testified that private owners were "establishing saloons and houses of ill repute on the

islands, and in this way practically ruining our great forest reserve."

Morse's call to preserve the fragile resources on islands could refocus our attention and intentions today. For several years, the islands Wisconsin received from the federal government were leased to the public for cottages and campsites, but by the mid-1920s, long-term exclusive leases were phased out in favor of wider public access.

How might federal islands be used?

Proper uses are still in question today as DNR personnel consider whether islands should be managed to preserve habitat rather than be developed for recreation.

Islands are currently classified by their potential to provide recreation — ranging from unrestricted primitive camping to one-night use, day use or no public use.

Nurre is one island advocate who believes that leaving islands undisturbed is also active management. "Some small islands provide a haven for many species of wildlife and plants, others contain important cultural and historic sites, still others are scenic and often define the character of the waters in which they lie.

"Active management can include just keeping an eye on the islands for signs of overuse. If endangered species start using them, we can be aware of that and take more aggressive management steps," he said.

"We're proposing to leave many of these islands in the same pristine condition that they've always been in," Nurre said. "They're Wisconsin gems, and we will be actively protecting them to keep them that way. In some cases, public enjoyment of an island may mean simply appreciating it from the water rather than walking on a delicate shore."

In the past, visitors caused problems by cutting down trees or leaving trash on river islands. Since the islands under BLM management were not posted and were rarely inspected, abuses continued unchecked.

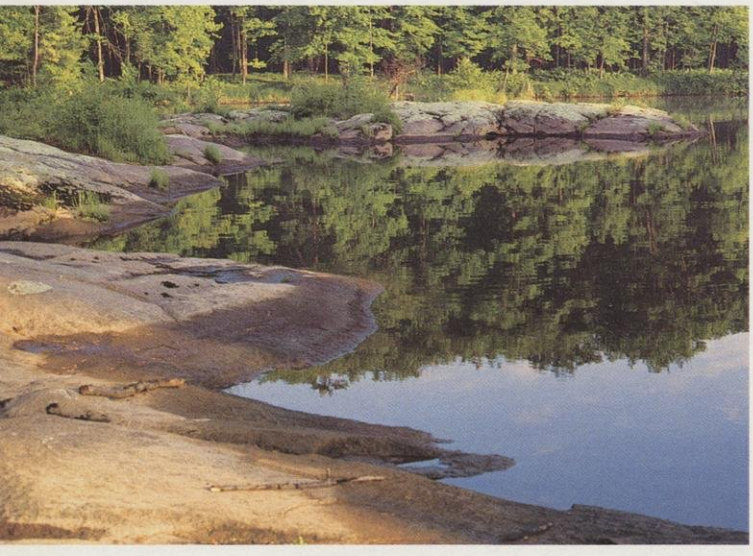
"BLM management of these islands has been purely custodial," said Larry Johnson, BLM realty specialist. "The islands were not really managed at all up to this point.

"That's the reason we're proposing to transfer these islands to the Department of Natural Resources. [These properties] are valuable for wildlife and recreational management, but we have only one office in Milwaukee with a few people to manage 30,000 acres in 21 states all over the Midwest. We couldn't do the job that needed to be done."

Simply put, the islands can be better managed by DNR people in the field than BLM people in an office, Johnson said.

According to the draft legislation, the department could not sell or transfer these properties out of public ownership, but municipalities that agree to meet state objectives could get authority to manage islands. The legislation also provides a way to resolve private ownership claims.

Tiny bedrock islands like the one below or the little gem to the right wouldn't attract development. Public debate will determine how and if some of the larger properties are used for recreation or left to nature.

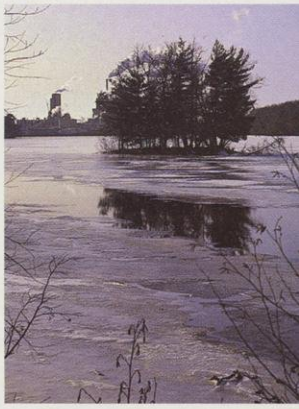


"Individuals who feel they have title to listed lands must submit a written claim to the BLM," Nurre said. "Claims will be resolved on a case-by-case basis within 10 years after the enactment of the legislation. The intent is to provide a process to identify and resolve good-faith claims of island ownership," he added.

Getting public help to manage islands

Since acquiring 670 islands would double the number of islands and triple the island acreage in public ownership, the current system of inspecting islands every three years is insufficient to protect them.

Two management alternatives are being tested. First, islands adjoining properties DNR currently owns would be administered by the same property manager. Second, a pilot program will evaluate if interested volunteers — groups or individuals — can carry out plans that protect and preserve our islands. Responsibilities could range from keeping records of wildlife on fragile islands to stemming erosion control and planting trees on islands open to recreation. Island stewards might be called upon to monitor firewood cutting, trash disposal, campsite maintenance or report attempts to build hunting blinds and cabins.



These diamonds in the rough can be true jewels in a wilderness setting. With your cooperation, public islands will be preserved by those who have enjoyed them for generations and those of us who have just arrived in Wisconsin — the Island State! □

Tina V. Bryson, a recent transplant from North Carolina, is a public information officer with DNR's Bureau of Information and Education in Madison.

Pictographs and petroglyphs

Graffiti, weather and pollution are defacing Wisconsin's rock art and carving away our ancient history.

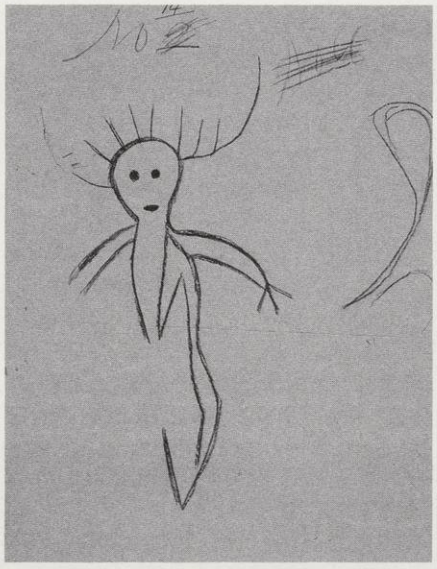
Cynthia M. Stiles

In 1878, a young boy and his friends were trapping raccoons in a small stream valley in La Crosse County. They set one trap along a rock wall and noticed a hole in the bluff face. They enlarged it, and crawled into a small cave. The walls were covered with carvings of animals and people.

This remarkable place, dubbed Samuels Cave, was considered a great find. Though archaeologists and others had found and studied ancient Indian sites in the state well before the 1870s, here was the first hard evidence of art, ceremony and communication from ancient cultures.

Unfortunately, news of this extraordinary find did not reach the State Historical Society of Wisconsin until a year later. The society asked Reverend Edward Brown, a prominent local geologist, to investigate. In the year between the discovery and Brown's visit, the cave had been visited by the curious and used for local gatherings. The walls now had initials and other carvings alongside and on top of the original figures. Black soot from numerous fires obscured some drawings.

With the boy's help, Brown identified and traced many of the original carvings, using charcoal and thin blue paper. His careful tracings are still housed in the historical society's Archives and Research Division in Madison.



COURTESY OF STATE HISTORICAL SOCIETY OF WISCONSIN

JIM TERMAN

(left) An ancient carving or petroglyph from Samuels Cave has been defaced and eroded through time.

(above) Rev. Edward Brown's 1879 tracing of the same petroglyph.

(below) The entrance to Samuels Cave in La Crosse County whose discovery started the study of Native American rock art by European settlers.

JIM TERMAN

Brown's documentation began the study of rock art in Wisconsin. Since 1879, almost one hundred more sites have been found, most of them since 1986.

Rock art of the sort found in Wisconsin is categorized as either petroglyphs (carved, outlined figures) or pictographs (black or colored drawings). Most sites are located in caves or rock shelters, or are high on rocky bluffs that are tucked back into small stream valleys of the southwestern portion of the state. Scattered sites have also been found on the tall rocky formations of Monroe, Adams and Juneau counties; on a large schist outcrop in Dodge County; and on the limestone cliffs facing Lake Michigan and Green Bay in Door County.

Archaeologists suspect many additional sites have not been discovered and many more are gone, lost to natural rock weathering, quarrying and recreational activities. What remains is a legacy from ancient people to future generations.

Rock art comes in many shapes, sizes and colors. The most recognizable figures are deer, bear, fish, moose, birds, fox and other animals as well as humans. Some panels of rock art depict recognizable activities such as hunting and canoeing. However, a considerable amount of the rock art found remains undecipherable to modern people. These panels contain patterns

of lines, circles and other geometric figures whose translation has been lost through the centuries.

Understanding the meaning in rock art is one of the most difficult challenges facing archaeologists. As early as 1886, U.S. Bureau of Ethnology scientists explored the pictographic writing of Indian people then living in North and South America. The scientists sought some standards which could be used to compare the ancient figures. Indian cultures used drawn and carved figures to communicate most aspects of their daily lives as well as to record special events and ceremonies. Myths, stories, battles, treaties, travels, ailments and their causes, accounting, warnings to other groups, tribal and clan designations, individual or group achievements, property markers, personal names, daily activities, even games were all recounted and recorded on these rocky tableaus for future reference. More recently Canadian researchers recording Indian oral histories and traditions have found that some rock art panels served as mnemonic devices to recall the proper order of ceremonies.

Determining the date when rock art was painted or carved has proven to be extremely difficult. In most sites the artists did not leave any other evidence of their activity — no carving tools or paints used to make the figures. Many caves and rock shelters were used by successive generations and different cultures over and over again. It's usually impossible to tell which group crafted the rock art figures. However, archaeological excavations in one unique site in Iowa County may have uncovered paint remains. This would be a breakthrough for dating some of the figures. Other artifacts found at this same level in this excavation are assumed to be the same age. By dating other remains, archaeologists can better estimate when these particular figures were painted.

The discovery of rock art is an especially rare find because the paintings and carvings are so fragile. Natural weathering has claimed many sites and pollution has accelerated this aging process. Since 1986, three of the figures in Samuel's Cave have fallen off the walls, disintegrating into piles of sand. Quarrying almost claimed a site in Dodge County but a group of concerned citizens and state employees negotiated to save the site. Techniques used in the

(right) A fading black pictograph marred by graffiti at Samuel's Cave.

(below) An eagle petroglyph from the Twin Bluffs site. Outlining the figure in chalk proved to be a mistake. Lichen and other plants can adhere to the chalky substrate and slowly erode the carving.

SUE HARRIS

past to document this artwork left residues that inadvertantly damaged the drawings and carvings. Archaeologists used to cast petroglyphs in plaster, but the casting process often removed bits of the sandstone carvings. Other figures used to be outlined in chalk before photographing. The chalk left a residue on which lichen subsequently grew. New findings are recorded using low-light photographs and measured drawings to minimize physical contact that has damaged these fragile figures.

The single human activity that has destroyed the most rock art is graffiti. Many of the original carvings and simple outline paintings look so much like modern doodles or children's art that people feel free to add their own creations. In many areas, petroglyphs were carved into such soft rock that any hard implement can be used to carve initials or scrawl messages over the ancient figures. Scientists in Kansas are now experimenting with chemical solutions that form a hard, weather-resistant coating that would preserve rock art in place.

Twelve Wisconsin rock art sites are listed in the National Register of Historic Places. The Register recognizes prehistoric and historic properties of national significance. Most of these rock art sites are located on private property and are not open to the public. Only a few are readily accessible, since rock art sites are usually situated on high ledges and rock faces. Roche a Cri State Park in Adams County contains one such site that is open for public viewing. This site contains both petroglyphs and pictographs. A new exhibit at the park explains the artwork and the colorful history of the pictured rocks.

As Doug Bohjanen can attest (see sidebar), seeing a panel of ancient paintings for the first time can be exciting. We can only imagine the thoughts of those young boys at Samuels Cave as their lantern light played on the figures carved into the walls. We must find a way to preserve these ancient art forms and sustain that sense of awe about our heritage. □

Cynthia M. Stiles is an archaeologist with the Nicolet National Forest, Rhinelander, Wis.

ROBERT A. BOHJANEN

Red pictographs of a canoe full of people and an eagle are barely visible. The combined forces of people, weather, sunlight, waves and vegetation are obscuring these artful relics.

The pictographs of Death's Door

Last year, my brother and I decided to look for panels of pictographs that were reported years ago on the Door County peninsula. Descriptions of the drawings gave scant information about the exact location, nor did they offer details or photographs of the paintings. Still, we felt that with a little luck, we could find them.

Early on the morning of July 25, we began our search. By mid-morning, it was readily apparent that our work was cut out for us. Perhaps the paintings had worn off years ago from the relentless wave action or natural weathering.

At midday, we decided to move elsewhere and look for another panel of paintings that had been reported on the peninsula. After considerable time hiking and searching this area, we came up empty. Our hopes of ever finding the ancient art were rapidly fading.

We decided to return to our original position and continue the search along a rocky stretch of beach. After a few minutes of searching, I noticed Bob, who was a little ahead of me, frantically waving his arms and pointing. I raced down the shore to where he was standing. There they were — the pictographs of Death's Door. I'll never forget that moment as we stared in awe and wonderment at the ancient paintings before us. It was like looking through a window in time.

Some of the paintings were in remarkably good condition, considering their age and exposure to nature. On one panel, we saw a large canoe loaded with six to eight men. At least two other canoes of equal size were covered with lichen and barely visible. To the right of the canoes was a large bird, possibly an example of the thunderbird described in Indian myth. Continuing down on the irregular rocky face were some badly worn paintings, one of a moose; the rest were too worn to clearly see.

We saw drawings of a dancing man who appears to be urinating, a cross-like object and a spiral with a side handle. Other paintings appeared worn and too badly faded to distinguish their shape.

As we stood looking, more questions than answers began to surface. Who painted these figures? Were the paintings related to any others in the Great Lakes? How did they survive centuries of wear? Did these panels record a specific event? We knew that Death's Door had been named for its propensity to lure vessels onto the rocks. Numerous ships have been lost in the area and Indian tales also related mishaps in this vicinity.

We may never know the meaning of these paintings at Death's Door. We can only try to save these archaeological resources from further destruction and deterioration so future generations can study and appreciate them. I consider it a privilege to have visited this special place. And I sincerely hope that actions can be taken to protect and preserve this fascinating aspect of our ancient history.

Douglas C. Bohjanen, Kalamazoo, Mich.

Readers Write

WHY THERE'S NEVER ENOUGH TIME TO FISH

The Outstanding Waters piece brought up a few math facts you might use to promote our waterways.

Wisconsin has 14,927 inland lakes. That means if a person had the opportunity to visit a different lake each and every day, it would take more than 40 years before you'd make a return visit to any water.

Lake Winnebago itself can keep someone entertained for quite a while. If a person fished for one minute in each square acre of that lake, that angler would have to fish 24 hours a day, seven days a week for more than three months.

If you spent a day at each Wisconsin trout stream, it would take more than seven years to visit all of them and another 13.7 years to spend a day at each of the 5,002 warmwater streams.

This adds up to more than 61 years of different fishing holes and we haven't even talked about the Great Lakes that border the state!

Dennis Lilly
Black Creek, Wis.

IS THE "E" FOR ENERGY OR ECONOMICS?

It is, I think, misleading to include crops and woodlands among the potential sources of "easily replenished" renewable energy as stated in your April 1993 story, "The second coming of renewable energy." Ultimately, the total amount of energy spent to plant, maintain, harvest, transport and refine these resources must be greater than the total amount of energy that can be derived from them. The unavoidable Second Law of Thermodynamics tells us that this is true.

The real lure of exploiting crops and forests for energy production was clearly stated in the article: they "would provide a shot in the arm to the state's industrial and agricultural base." It is the siren's call of the greed factor; the irresistible desire to increase the quantity of life. History shows us that it is most often the prospect of economic gain that motivates humankind to action rather than the long-term practicality and sustainability of a given endeavor. History shows us, too, that regarding our activities, Ma Nature *always* bats last. Unfortunately, this is the lesson that we often refuse to learn or accept.

Kurt Sroka
Somerset, Wis.

You are absolutely right that the energy we use must come from some source. The key to raising energy crops lies in capturing energy from a free source — the sun. As with any other crop, raising energy crops economically means one's production costs in time, equipment, fuel, etc. must be less than the value of energy derived from the finished product.

Several "energy crop" farmers are proving it can be done. In fact, a recent article "How Much Energy Does It Take to Make a Gallon of Ethanol?" by David Morris and Irstad Ahmed, Institute for Local Self-Reliance, December 1992, details the costs and energy balance for producing ethanol from corn and from cellulose. The authors included the costs of feed stocks, fertilizer, fuel, electricity as well as the costs to process the energy crop — steam, electricity and transportation costs. Their research concludes that the average corn producer could expect a 33 percent net energy gain and someone using state-of-the-art technology might experience as much as an 87 percent gain over the energy costs of production. Whether this excess energy can be sold profitably is another matter.

WILDCAT SIGHTING

In mid-March I was looking through my kitchen window glancing up the small hill to the south where we cut wood. I saw a cougar smelling the ground and looking over a few uncut pieces of wood. He/she was taking his/her sweet time dragging a long, heavy tail and keeping an eye on my three black sheep and pygmy goat. The livestock didn't seem to be concerned, but they occasionally eyed the "wild thing."

I quickly got my binoculars thinking the animal would bolt, but ol' wild thing was still there strolling slowly like it was waiting for the bus. I even got to go outside and stand on the back step observing the cat.

That day there were still patches of snow. I went up the hill, found the cat's tracks and covered the paw prints with a bucket. By the time I could show the prints to someone else, the snow had melted.

That's OK. I know what I saw and my life is richer for it.

Jacqueline Baleton
Almond, Wis.

We sure don't think you're crazy. In fact the Eastern Puma Research Network in Maryland received sighting reports of 46 adult pumas (cougars) and three cubs in Wisconsin during 1991, the most recent year for which records have been compiled. Of these sightings, 29 were of cats in the dark phase and most reports came from Waupaca County. Cougars also have a tan or tawny phase.

The Eastern Puma Research Network compiles eyewitness reports. Where many cats are sighted, a researcher interviews witnesses and completes a formal questionnaire. A quarterly report summarizes such sightings nationwide. You can contact the Eastern Puma Research Network in care of P.O. Box 3562, Baltimore, MD 21214.

WHY TRANSPLANT EXOTIC TREES?

Although the project described in "Ambassadors with roots" (April 1993) is designed with good intentions, I was surprised to find that a natural resources agency supports the introduction of plants which are not native to an area. There are hundreds of examples of how such actions resulted in the loss of native species through disease or as the result of competition. Our government alone spends millions of dollars on attempts to get rid of such foreign species. Was there a valid reason for not planting species which were already native to Latvia, Iceland and China?

Nancy Findholt
Union, Ore.

We don't disagree one bit about the caution that ought to be exhibited before exotic species are introduced to a new area. We intentionally spent time with Chinese, Latvian and Icelandic foresters discussing genomes, soil requirements and proposed habitats before seeds, seedlings and trees from Wisconsin nurseries were offered. We consciously tried to match species that were close to native stocks and were most likely to grow in the host countries.

Our aim was to determine if excess stock here could be put to fruitful use in these foreign countries. All three places have a greater need for reforestation stock than can be provided by native tree nurseries.

A better solution would have been to import native seed stocks from China, Latvia and Iceland, culture them for two-three years in native soil and return rooted stock to its homeland. However, that would raise other concerns — imported stock could introduce diseases, organisms and a host of new genes to our nurseries. Secondly, we don't believe the costs of such a program should be borne by Wisconsin taxpayers

without explicit consent.

You are absolutely right that importing stock has the potential to disrupt natural ecosystems. It's a chance most people also willing take each spring in raising flowers and vegetables originally raised in other countries and regions. We tend to ignore such concerns until the import "escapes" to the wild and causes a problem.

ICE AGE TRAIL FAN

I find *Wisconsin Natural Resources* to be one of the most informative, straightforward and entertaining magazines on the market. I especially like the absence of advertising, your layout and photographic style and the range of subjects you address.

What prompts me to write is a valuable state and national resource, The Ice Age Trail, which I feel you have been woefully inadequate in addressing. As one of the three managing agencies, I'm at a loss to understand why the DNR's publication ignores one of only eight National Scenic Trails in the United States.

I speak of the trail from close experience as in 1991, I became the third person to hike the 1,000 mile trail/corridor end to end.

Tim Malzhan
San Francisco, Calif.

Four articles have highlighted aspects of the trail since 1986. We are currently crafting an article for use later this year which will describe portions of the trail that are complete or are likely to open soon.

Thanks to all our readers who took the time to write and share their thoughts with other readers.

Continued from page 2

A stick rises from the pond at a 50° angle. The heron places one foot, then the other on the stick. His feet seem too big and awkward to grasp the tiny stick yet he steps with no difficulty and assumes a crouched fishing stance, poised for action. He waits. His center of gravity seems so high that the tiniest wisp of wind would surely topple him, yet he remains motionless.

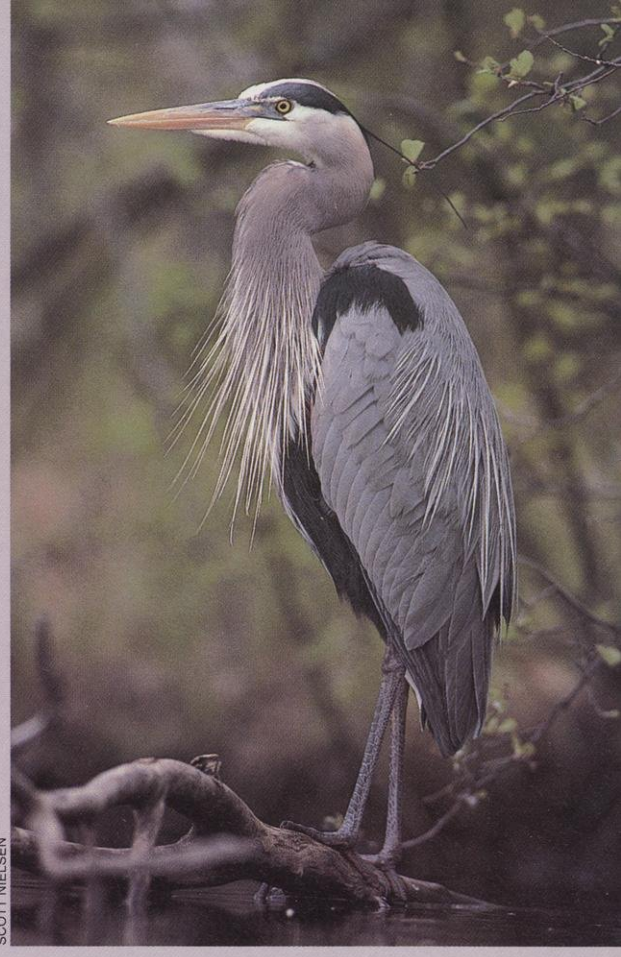
He spots something! His head moves forward. He looks. Minutes slip by. He does not move. His legs do not shake from standing in an off-balanced position for so long. Then, with a lightning fast movement, the heron lunges forward like a sprinter exploding from the starting blocks, although his feet never leave the stick. His neck stretches out. His beak enters the water. He snatches an unsuspecting inch-long minnow. With a quick flip, the heron tosses the fish, swallows it head first, then resumes his fishing stance.

Not far away, a great blue heron (*Ardea herodias*) stands like a carved statue in foot-deep water. He focuses on any movement under the pond's surface. He cocks his head, stretches his long neck for a better look and waits. Several minutes pass. The heron takes a few deliberate steps so slowly that his position only changes relative to the background. It's hard to distinguish when he stops to begin another long, motionless vigil.

A belted kingfisher (*Ceryle alcyon*) perches 20 feet up on a dead branch overhanging the pond gazing into the water below. Like the herons, he is fishing. Something piques his interest. He takes flight, hovers over the pond, drops five feet for a closer look and hovers again. On this tranquil day, I can hear the soft sound of his wings beating against the air. Suddenly he folds his wings and plunges beak first into the shallow water. His splash is the first noise on this quiet afternoon, yet nothing seems to notice except, perhaps, the fish below. The kingfisher surfaces without a fish, returns to his perch, shakes his feathers and resumes watching and waiting.

A lime-green blanket of duckweed covers the edge of the pond. Nothing moves, or so it seems. Then I realize that several pairs of dark, pea-sized eyes are lurking in the duckweed, barely visible above the surface. Perfectly camouflaged in the green soup, green frogs are waiting. They do not move. They do not call. They rarely blink. They seem mesmerized in the warmth.

A 30-inch western fox snake (*Elaphe vulpina vulpina*) swims across the water surface. His quick-moving tongue constantly tests the space in front of him. He's in no hurry. The snake passes within six inches of a green frog, apparently unaware that a delicious meal is so near. With stoic patience, the frog does not flinch or dive at the predator's approach. The snake moves on, barely rippling the pond's tranquillity.



SCOTT NIELSEN

A great blue heron patiently waits for a meal to swim by.

I'm not alone basking in the sun. Partially submerged logs and flat rocks provide ideal basking sites for painted turtles (*Chrysemys picta*). Stacked up like picnic tables at a winter wayside, the turtles patiently tolerate the closeness of fellow turtles. They bask for hours. Any disturbance would make them instantly disappear into the safety of their watery world, but nothing happens.

My few moments of rest and solitude slip into three hours. I'm reluctant to leave the pond to rejoin a frenzied world of crowded highways, noisy lawn mowers and impatient people. I retrieve my camera and binoculars and slowly retreat. The great blue heron is still fishing. The painted turtles continue to bask. The green frogs are waiting. Patience in the pond is forever. □

Anita Carpenter basks at a pond or two near her Oshkosh, Wis. home.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