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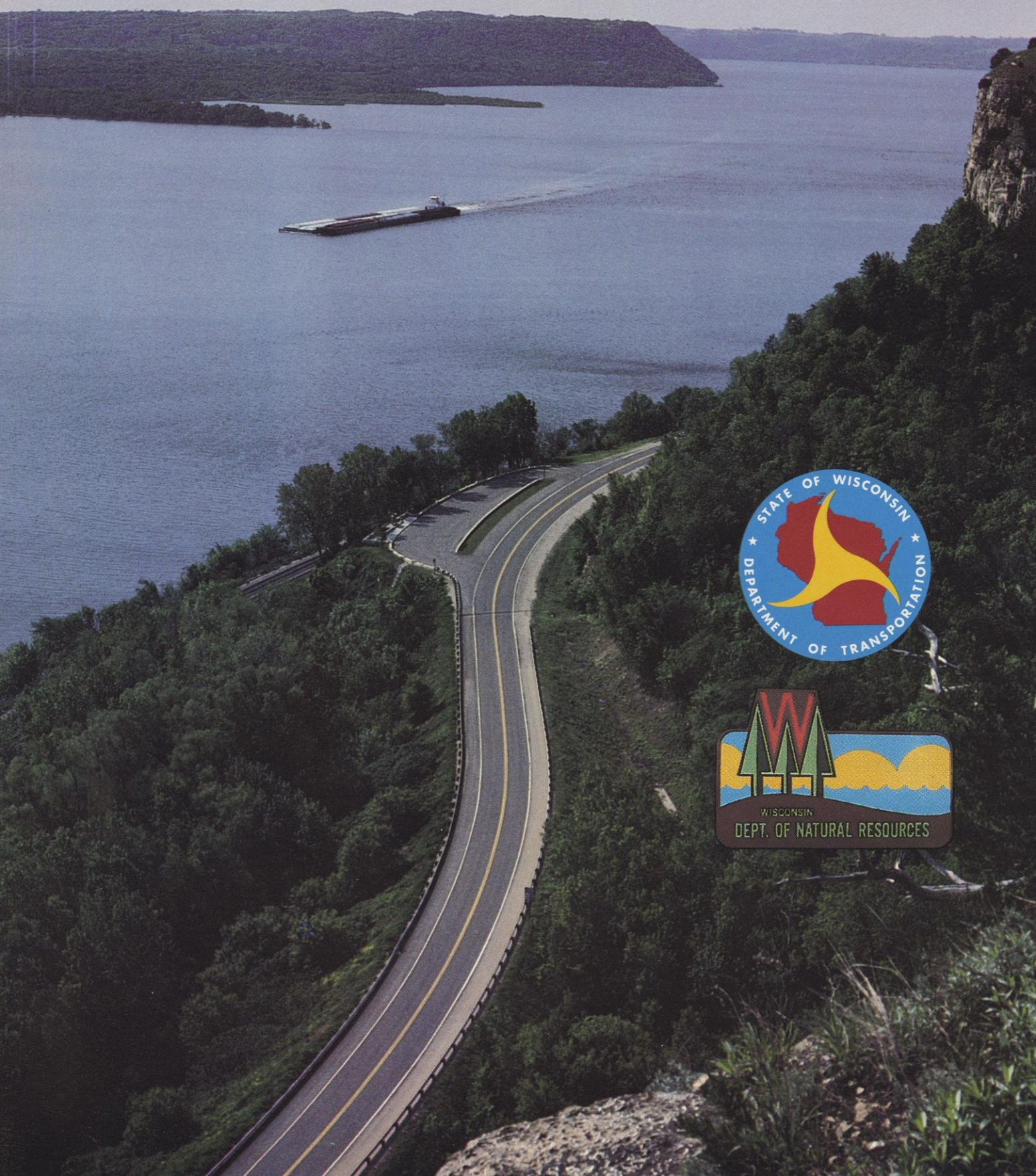
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# TRANSPORTATION AND THE ENVIRONMENT



# Walk softly across the land

Wisconsin is committed to an efficient transportation system and to making sure that system does no violence to natural things.

Our natural heritage in Wisconsin is the hallmark of our quality of life. Respect for wild things and resources runs deep in the tradition of John Muir, Aldo Leopold, and countless individuals who stalk the woods alone.

Among some, even a solitary footprint is sometimes viewed with alarm. In a mobile and technologically advanced world, our transportation system is society's footprint stamped large upon the landscape. How hard it treads is a serious responsibility.

Wisconsin has nearly five million residents. Our statewide transportation network includes nearly 600 airports, 4,500 miles of rails, more than 100 Great Lakes and river waterports and 108,000 toll-free miles of roads. Our food, mail and manufactured goods come and go via this network. More than 53 million visitors escaped to Wisconsin in one year recently studied.

Values such as speed, safety and convenience often seem to clash head-on with the voiceless world of nature. Wetlands, rich farmland, endangered plants and animals, scenic beauty, and non-polluted air, lakes and streams are becoming increasingly precious commodities.

There are those who would pave the last remaining bed of lady slipper orchids, and there are those who would chain themselves to trees or lay down before the blade of the earth-movers, but the State of Wisconsin takes a different approach. The difficult—often seemingly impossible—task of reconciling mass movement of people, produce and goods in harmony with our natural world is the responsibility of two major state agencies—the Department of Natural Resources and the Department of Transportation.

By law, each department has its separate mission. For years, employees in both felt the only way to succeed was to go head to head and prevail. Years of post-war enthusiastic roadbuilding and almost inexhaustible funds were followed by years of frustrated building projects, largely because of lack of money, declining need for new roads and a changing public attitude. Environmental awareness grew, bringing with it increasing concern for urban sprawl, endangered species, loss of habitat and especially wetlands—long considered worthless property by society in general.

Meanwhile, there was a succession of state and federal legislation, including the National Environmental Policy Act in 1969, that gave force of law to those changing attitudes toward air, water quality and resource protection. The balance of public decision-making was tipped in favor of the natural heritage. Avoiding destruction of a historic building, bypassing a wetland or a recreation area and affording public comment was now mandated by law and enforced by the courts.

That is not to say that DOT lacks historical precedent or concern for Wisconsin's natural and cultural resources. The Great River Road, other scenic easements, natural roadscapes, waysides, historical markers and individual engineering decisions in the field show a long record of environmental awareness.



**Taylor County rustic road—a light touch on the landscape.**

Photo by Dick Feeney

But until the 1970s when interstate highway construction began to wind down, the typical highway project was likely to involve a new road on new location that would meet all perceived demands for future use. Since that time, most highway projects have begun to fall into the reconstruction, reconditioning and resurfacing categories as emphasis shifted nationally to preservation of the existing highway system.

As they worked together, transportation engineers gradually developed a concern for protecting natural resources and natural resources specialists began to take a broader view of highways, bridges and airports. Nationally there was a discernible shift, as well, in the mainstream environmental view toward balancing needs and costs.

With the encouragement of top elected officials, leaders in both departments have moved toward resolving conflict and finding reasonable compromise rather than forcing solutions that languished in the shifting winds of political power.

Perhaps nowhere is the need for balancing transportation with natural resources more clear than from the perspective of Wisconsin's second largest industry—tourism. The state's economy relies upon tourism to generate \$6.4-billion a year. Some 53-million tourists, in turn, rely on the state's highways, runways and public transit to carry them to their Wisconsin "Escape."

We have learned that each square foot of pavement, each vehicle, each person has an undeniable impact upon the environment. Thoughtless, irresponsible and unchecked development of transportation and other tourist facilities could eventually destroy the magic that entices visitors.

Wisconsin is committed to maintaining and making reasonable improvements in its efficient transportation network, yet remains committed to living in harmony with the natural world. It makes little sense, and poor public policy, to diminish or destroy the very resources that attract so many.

As a state, we are determined to march toward a better quality of life for all. Yet we must become and remain equally determined to measure each step, taking care not to sacrifice that which we already enjoy and hold in trust for generations to come.

We can, and should, walk softly, and wisely, in harmony with our natural world. ●

**Front cover: Picture of the Great River Road dramatizes overlapping responsibilities of DNR and DOT.**

Photo by Dick Feeney

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A joint publication by:  
The Department of Transportation,  
Lowell B. Jackson, Secretary and  
The Department of Natural Resources,  
C. D. "Buzz" Besadny, Secretary

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## For more information about transportation issues in Wisconsin:

The nearest Transportation District Office is generally the best place to go if you should have a question about a specific project or problem:

### Madison -

District One,  
2101 Wright St., 53704  
608-246-3800

### Waukesha -

District Two,  
141 N.W. Barstow St., 53187  
414-548-5902

### Green Bay -

District Three,  
944 Vanderperren Way, 54304  
414-497-4242

### Wisconsin Rapids -

District Four,  
1681 2nd Ave S., 54494  
715-421-8300

### La Crosse -

District Five,  
3550 Mormon Coulee Rd., 54601  
608-785-9022

### Eau Claire -

District Six,  
718 W. Clairemont Ave., 54701  
715-836-2891

### Rhineland -

District Seven,  
Hanson Lake Rd., 54501  
715-362-3490

### Superior -

District Eight,  
1701 N. Fourth, 54880  
715-394-0551

The **Department of Transportation** is headquartered in the Hill Farm State Transportation Building, 4802 Sheboygan Ave., Madison 53707-7915.

### Division of Highways & Transportation Services,

Room 951, HFSTB,  
Madison 53707-7916  
608-267-7673

### Bureau of Environmental & Data Analysis,

Room 951, HFSTB,  
Madison 53707-7916  
608-266-9626

### Office of Transportation Information,

Room 103B, HFSTB,  
Madison 53707-7915  
608-266-3581

### Office of the Secretary,

Room 120B, HFSTB,  
Madison 53707-7910  
608-266-1113

# Do the job, but keep in touch

## Transportation, the environment and the liaison process

*Howard Druckenmiller, Director, DNR Bureau of Environmental Analysis & Review*  
*Cynthia Morehouse, Director, DOT Bureau of Environmental and Data Analysis*  
*Co-chairpersons of the Liaison Committee*

DOT and DNR have built up both formal and informal ways of making sure the right hand knows what the left is doing. This is important because construction of highways, bridges, harbors and airports often alters the environment.

The Department of Natural Resources (DNR) is charged with protecting and managing Wisconsin's natural resources. Among its many responsibilities is regulation of man's activities that directly impinge on the environment.

The mission of the Department of Transportation (DOT) is to provide a safe, economical and reliable system for moving people and products from one place to another. This means developing, constructing and maintaining a network of highways, airports, harbors and railroads which inevitably involve changes in the landscape. These changes frequently put DOT and DNR at odds.

Over the years, however, the two agencies have learned to recognize each other's legitimate responsibilities. From this has grown a successful process for resolving conflicts and achieving mutually acceptable solutions. The process was first formalized in 1955 in an agreement between two predecessor agencies, the old Wisconsin Highway Commission and the Wisconsin Conservation Department (WCD). The agreement named various WCD field personnel to review Highway Commission project proposals (mostly road construction) and comment on potential environmental impacts. These reports became the first formal mechanism to let road builders know what environmental problems existed. However, at first the reports by themselves often did nothing to help solve the problems.

After a while, though, solutions came too. Interaction between Highway Commission engineers and WCD biologists eventually led to consultation very early in the planning process. Discussion became increasingly extensive and meaningful. It finally evolved from simple problem identification into finding environmentally acceptable answers. The understanding and

respect that subsequently built up between biologists and design engineers is the cornerstone of what is now called the DOT/DNR Environmental Liaison Process.

By 1970, an Environmental Liaison Committee of DOT and DNR managers was promoting interagency coordination and helping resolve problems that could not be settled in the field. To fulfill a federal mandate, the Liaison Committee also developed formal policies and procedures for environmental review of transportation projects.

A cooperative agreement in 1976 provided guidance for staff in the two agencies on how to implement liaison and conflict resolution procedures. The agreement was broadened in 1984 to include a wider range of environmental issues. Its underlying basis is that transportation projects are to be reviewed and problems worked out locally by DOT and DNR field offices. This approach has proven tremendously successful. The two agencies don't always agree, but they are both committed to resolving problems in the overall interest of Wisconsin citizens.

The legislature demonstrated its faith in the liaison process in 1976 when it passed a law allowing certain DOT construction activities without a DNR permit. Most involve projects that affect state waters, primarily bridge construction and replacement. The law lets DNR and DOT work out environmental problems with a minimum of formal requirements. The result has been a streamlined review process that ensures careful consideration of environmental concerns.

Another important area of cooperation involves state and federal requirements on environmental impact statements (EIS). An EIS must be prepared on every major project that will have a significant effect on the environment. To ensure complete and accurate analysis of what might happen in these cases, DOT receives extensive assistance from DNR.

The resulting EIS is important not only for the environmental data it contains, but also because it can be reviewed by those outside government before any final decision is made. The public sees the results of liaison and can offer comments or objection. The EIS ensures that agreements between the two agencies get public scrutiny.

How extensive is DNR-DOT cooperation?

Each year several thousand individual DOT projects are reviewed by DNR. Many involve only simple maintenance, but others can be potentially serious. Bridge painting, for example, can result in paint spray falling into the water unless precautions, sometimes extensive, are taken. Each year DOT paints anywhere from 100 to 120 bridges.

While new highway corridors are rarely proposed anymore, upgrading existing ones to improve safety and/or traffic capacity often requires that curves be straightened, bridges be relocated, and larger interchanges be constructed. All these have environmental implications that must be evaluated and in some cases mitigated. DNR is also involved when DOT has to extend airport runways, abandon railroad lines, develop harbors or carry out other responsibilities that impact the environment.

Despite the large number of important projects subject to the liaison process, less than 1% result in problems that cannot be resolved in the field.

Many people are unaware that included in the liaison agreement is a provision that DNR projects, too, that might affect future transportation development must be jointly reviewed to avoid potential conflict. When DNR buys land for a state park, wildlife area, or other purpose, federal funds are often used. Under federal law, use of these properties is restricted to recreation. The intent of federal restrictions is to protect lands dedicated to recreation and conservation from being converted to other purposes. However, some limited use of these lands for upgrading existing roads is often necessary. Early consultation to identify parcels needed for highway purposes can avoid conflict later. This is especially important where DNR wants to buy long corridors, such as the land abutting a wild or scenic river. By selecting environmentally acceptable future highway crossing sites before acquisition, both DNR and DOT can meet their responsibilities while avoiding extra costs and environmental concern. ●

# Getting to know you

*Gordon Slifer, DNR Environmental Impact Coordinator, Eau Claire*

Gordon Slifer has served in DNR's West Central District since the mid-1960s and has been Environmental Impact Coordinator since 1970.

For a long time we co-existed, each making a fair job of what we thought we were supposed to be doing. We also inflicted a lot of pain and anxiety on each other, that engineer and I. It was, after all, inevitable. He really was impossible! Mr. Leastcost, Straight Line! Mr. Engineering Mentality! I begged some unknown power for deliverance, but none came. So on we worked, more alongside each other than with each other. And only when we had to. The battle lines were drawn, the issues were clear.

We both had our constituency. His wanted good roads, mine demanded resource protection. Wisconsin, I argued, has some of the most comprehensive resource protection laws in the world. My goals and my mission are clear and absolute, I shouted. His reply fell on equally deaf ears.

The ensuing darkness lasted a long time.

But one day we talked to each other. I admitted that I occasionally used their highways. He confessed that he liked to hunt and fish. I suggested he'd not be doing that much longer if he continued filling our waterways with sediment and covering our wetlands with pavement.

For the first time, he seemed to understand.

But, he noted, I'd not have much of a road network to carry me where I wanted to go if he had to spend his entire budget on a relatively few projects to insure total and absolute resource protection.

Almost inaudibly I admitted he was probably right.

In a gesture not at all typical of those times, I said that I understood and respected his mission as being in the public interest. It's possible that I really meant it, but it's been so long ago I can't be sure now.

I even allowed that perhaps, as a state employee, fulfillment of his legislative mandate was also partly my responsibility.

I would have traded my paycheck for a snapshot of the look on his face.

After regaining his composure, he responded, admitting that for some time he had secretly suspected that all those resource protection laws weren't meant to apply just to the private sector.

We talked some more. Our conversations were quieter now and somewhat more relaxed. I showed films on ecology. He be-



**The author at a bridge construction site on Farwell Street in Eau Claire.**

Photo by Dave Weitz

gan to understand what I'd foolishly assumed he'd known all along. He taught me how he determines the need for a project, how he plans, how design affects costs.

I admitted that I'd known all along that you couldn't build a safe, economical, efficient road without some resource damage. He countered that perhaps there were some things he could do to help us cut our losses.

Later, we talked some more about that.

I even defended him once on a controversial project. I said, in a letter, that he was a reasonable and competent state employee. He saw a copy by accident.

Two weeks later, I got a letter of thanks from the Secretary of DOT.

Privately, he confessed that he no longer thought I was as weird as he had originally believed. I was too shocked to say something nice in return.

One day I gave a piece of the resource away. It was of no earth-shaking significance, but he needed it badly to fulfill his mission.

I did it without fanfare, but he noticed anyway. I noticed, too, when on his next project he incorporated design features and erosion control measures that went beyond his usual efforts to protect a resource important to me.

We tried it some more. I gave, and he gave, and yet, for all the giving up, the projects were somehow better.

We've grown a lot over the years, but we still can't look back and laugh about it all. Those were hard, bitter and unproductive times. There is just no humor there.

From the relative comfort of our newly found wisdom, we did look back, just once. We reflected on our discussion of constituencies: his wanting good roads; mine wanting resource protection.

In a flush of embarrassment at our earlier blindness, we realized that there was only one public we both had to serve. And that public, if we were willing to keep working at it, could have the best of what we both had to offer. ●

# Happy tailpipes make happy motorists

*Jeanne Sollen, DNR Public Information Officer, Milwaukee*

Mandatory auto emission tests in Southeast Wisconsin help clean the air and have public support too.

The somewhat surprising thing about the one-year-old automobile inspection program in southeastern Wisconsin is not that it's working—which it is—or that it's running smoothly—which it is. It's that—despite the hassle of messing around with people's cars—public support for the program has actually increased.

Before it began in April 1984, more than 63% of drivers surveyed thought tailpipe emission tests before license plates could be renewed would be a good idea. After the program had been in operation for nearly nine months, a comparable opinion sample revealed that driver support for testing had grown to more than 71%. Despite a few nasty letters and scattered complaints, program managers at DNR and DOT estimate that overall public acceptance is close to 85%.

Not only was an inspection program inherently controversial when proposed, it had potential unpopularity written all over it. Cars normally cause their owners enough grief and expense, but by early this summer, more than three-quarters of a million motorists had been asked to come in for the once-a-year checkup. All are located in the six southeast counties where air quality does not meet federal standards.

Aside from all the bother, it was likely that around one out of every five vehicles would fail the emissions test and cost the owner an average of about \$45 for repairs to pass the retest.

From the start, in the late 1970s when it was clear that the Clean Air Act would require emission reductions, testing had a solid base of public support. Still, it seemed to Robert Baker, now Deputy Secretary of DOT, and Wolf Klassen, then acting DNR Air Bureau Director, that in 1980 they were living at the state Capitol night and day to shepherd tailpipe inspection through the legislature.

One potentially troublesome element—a fee for testing—was dropped before final passage.

Then secretaries of both departments worked to secure funding for the program. Meanwhile, DOT moved to choose a contractor and design testing procedures while

**Emission tests are mandatory in Southeast Wisconsin to reduce ozone. DOT has 10 inspection sites. DNR sets the standards.**  
DNR photo



DNR staff began work on emission standards and an administrative rule.

A publicity plan to maintain support and educate the public was developed by Ron McCrea, now Gov. Anthony Earl's press secretary.

Both Earl, who was then DNR Secretary, and Lowell Jackson, DOT Secretary, made visits to the major press and television newsrooms in the six-county area.

Klassen, now DNR's Southeast District air program director, teamed up with David Kussow, DOT's inspection chief, for a series of talks and workshops to groups of auto mechanics.

Both Jackson, and Earl's successor at DNR, Carroll D. Besadny, also attended the grand opening of the program March 30, 1984 at the St. Paul Ave. inspection station in Milwaukee and had their own cars tested.

Judging from first-year emission data, the program is doing what it was designed to do—reducing tailpipe pollution and helping the region achieve compliance with federal ozone standards.

DNR has monitors at 10 locations in Milwaukee, Ozaukee, Washington, Waukesha, Racine and Kenosha counties. They started checking April 15th for ozone and will continue through October 15th.

Ozone can be harmful to human health, vegetation and sensitive materials such as certain fabrics. It is formed when nitrogen oxides and volatile organic compounds (VOCs) react together, triggered by ultraviolet light under certain warm weather conditions. Gasoline-powered automobile engines are an important, but not the only source of nitrogen oxides. VOCs, a reactive type of hydrocarbons, get into the air by evaporation from gasoline, nail polish, paint thinner, naphtha, turpentine and a variety of industrial chemicals.

Inspection is credited with reducing VOC emissions by 1,520 tons, or nearly 8%. Carbon monoxide emissions have been trimmed by more than 20,000 tons, or 8.7%. And as more and more polluting cars are cleaned up or retired from service, larger and larger emission reductions are expected. By 1987, according to Chris Bovee, a DNR data analyst in Madison, VOC emissions from autos are expected to drop by 29% and carbon dioxide emissions by more than 33%.

DNR's Southeast District air program, Klassen says, now investigates tampering and misfueling complaints, some of them forwarded from DOT. DNR tracks down owners of suspected polluting vehicles through use of a DOT computer terminal with access to registration files.

A special program to help consumers who unsuspectingly buy polluting vehicles from private owners started this summer. Funded by the Environmental Protection Agency and in cooperation with the American Association of Retired People, two part-time "clean-air counselors," were hired for a one-year period and trained to determine if tampering had been done.

The latest information on public acceptance of emission testing came last fall from nearly 5,000 questionnaires answered by drivers who had put their vehicles through the test. Not surprisingly, those who passed liked it better than those who failed. However, the degree of acceptance—better than 76% of those who passed and nearly 59% even among those who failed the first test—is one that the staff of both departments who have worked on the project find gratifying. ●



An Illinois man donated money for these flowers along I-90 in Rock County to atone for damage done by vandals.

Photo by Paul Werth

## Vandalism

*Dorothy Kapke, Deputy Director, DOT Office of Transportation Information, Madison*

Shame on vandals and litterers. They make our public places look bad and cost us all millions.

Amid the beauty of our roadsides and waysides lurks an ugly side ... the vandal, the despoiler. Consider:

- A bronze plaque was placed atop Old Settler's Overlook along the Great River Road near Genoa to commemorate the spirit of preservation. It bore an inscription written by R.C.(Tom) Leverich, a now-retired DOT employee who was instrumental in work on the Great River Road:

"Beauty is food for the soul. He who despoils beauty destroys his own soul."

The plaque was stolen within days of the dedication ceremony. Two replacement plaques have suffered the same fate, even though all three were embedded in a boulder.

- On US 16 near Wisconsin Dells, DOT purchased land to preserve a cluster of ancient Indian burial mounds adjacent to an existing wayside. Although this spot has provided thousands of travelers a rare opportunity to see effigies in unusual animal shapes, hundreds of visitors have thoughtlessly walked to the crest of the higher con-

cal mounds, presumably to get a better view. The resulting erosion has taken only a decade to mutilate mounds that until now had survived for centuries.

- Thoughtless tourists have also taken their toll on Spirit Rock, a deeply significant part of Menominee Indian culture located along historic Old Military Road (WIS 55) in Menominee County. The road was designed to bypass the rock which was protected by a low white fence. A historical marker was also erected. According to the legend of Spirit Rock, a young Menominee, along with seven companions, was invited to visit a god called Manabush, a grandson of the





**Wayside in Iron County misused as a garbage dump.**  
Photo by Warren Schmitz.



**According to Menominee legend, the God Manabush, a grandson of Earth, made Spirit Rock—but vandals do not even respect the works of Gods.**  
Photo by Warren Schmitz

Earth. The friends asked to become successful hunters, and their wish was granted. But one of the band angered the god by asking for eternal life. Manabush seized the warrior, thrust him into the ground and said, "You shall be a stone, thus you will be everlasting."

The tribe believed that the disintegration of the rock foretold the extinction of the tribe, that when the rock disappeared the Menominee would be no more. Natural forces, of course, have eroded it, but nature has been assisted by tourists chipping away souvenirs. The rock, once a large boulder, has been reduced to a fraction of its former size.

Vandals do their damage everywhere.

The brown and gold Rustic Road markers are another target. One northern county, tired of replacing them, has actually withdrawn from the program while some others have simply stopped replacing the missing signs.

Even along busy routes, vandals dig up shrubs, trees and vines that have been planted with tax dollars for the enjoyment of all.

And along the shoulders, all-terrain vehicles introduce another type of vandalism — particularly in northern counties where ATV operators drive up and down ditches and shoulders illegally. After the vegetation is damaged and dies, erosion sets in, and unsightly ruts and gullies replace wildflowers and native grasses.

Bags of litter overflowing wayside trash containers—cans, bottles and plastic bags tossed from cars—all pose a perennial problem for highway maintenance crews. Litter pickup and disposal alone cost Wisconsin taxpayers more than \$1.4-million last year, and the cost is rising yearly. No one has estimated the additional costs of outright vandalism.

Wisconsin has invested millions in providing and preserving roadside beauty and recreational facilities only to have the actions of a few threaten to spoil it for everybody.

It's an old story and a sad commentary. Although it often seems nearly futile, the only solution seems to be continuing efforts to educate people, enforce the laws and remain vigilant. ●

# Rust and rot down the line

Robert Pfefferkorn, DOT Public Information Officer

Abandoned railroad lines are eyesores and dangerous. DNR and DOT want the old right-of-ways cleaned up.

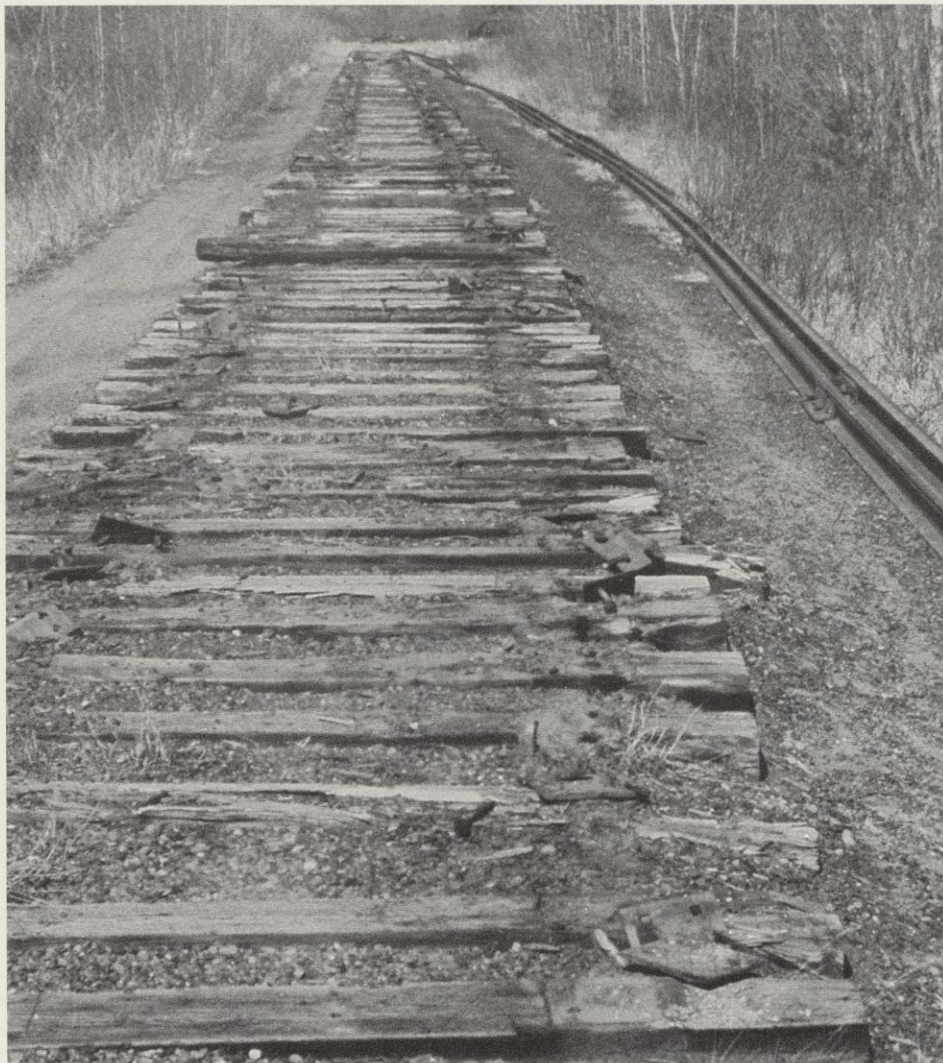
During the past decade the once proud and profitable railroads have left a trail of more than 2,000 miles of abandoned rail lines in Wisconsin—in many cases littered with concrete, steel and creosote-coated timber debris.

In some cases, there is a great deal of potential for recreational trails and other uses. Sometimes a bridge may make a scenic or historic feature, the fallen ties or other materials may accidentally create a beneficial habitat, or a bridge may offer a handy spot to fish from. But in far too many cases—many in remote areas of the state's near-wilderness that defy documentation, discovery and enforcement—tracks, ties, culverts and bridges are left to rust, rot and crumble. In most cases, nature will eventually heal itself, but DNR is concerned about pollutants, navigational hazards for recreational boaters and erosion on untended embankments.

"It's a nightmare because the railroads duck out of the state and leave their problems behind," said Marie Stewart, who was part of DNR's environmental analysis section. "We don't think we're over-dramatizing this," added James Smith, DOT's chief of regulatory intervention. "We've caught some salvage contractors burying, burning and hiding their leftovers. Many don't even bother; they leave the stuff to become an eyesore."

DOT is also concerned about both grade and grade-separated rail and roadway intersections. Who should pay for removing tracks and restoring a crossing, or removing a concrete overpass that poses a traffic safety hazard or when it comes time to widen a road? What happens should a young angler or a backpacker be injured on a neglected bridge? Who is responsible for maintaining these abandoned structures? Should the public have to pay for accidents that happen on these unwanted, attractive-but-neglected safety hazards?

There are state and local laws governing most, if not all, of the problems caused by abandonment. But to the railroads, abandonment involves contracting with someone to remove and sell the salvaged materials, and to the contractor any materials not worth the salvage effort are going to stay.



Scars of RR abandonment.  
DNR photo.

Although DNR has the power to issue citations for violations of environmental laws, staff time is costly. The legal process is time consuming and it may or may not persuade the railroad to spend the money to fix the problem.

Together DNR and DOT came up with a proposal that the railroads be required to file a restoration plan as part of their request for authorization to abandon a particular line. Transportation Secretary Lowell Jackson and Natural Resources Secretary Carroll Besadny asked the Interstate Commerce Commission (ICC) to issue a blanket order to the railroads to that effect.

ICC, which has the power to authorize abandonment, has not made a blanket order. But ICC is sympathetic and agreed to consider the state's request for such restoration plans on a case-by-case basis.

Smith said DOT is satisfied that the railroads now realize Wisconsin is serious

about the need for restoration plans. The Soo Line and the Burlington-Northern have agreed to commit in writing to perform satisfactory clean-up. The Chicago and Northwestern has hired a special representative to return to areas where environmental problems remain and see that proper clean-up and restoration are done.

Meanwhile, DOT is committed to trying to get the ICC to include a "protective condition" in all orders that would require railroads to produce a restoration plan and schedule consistent with state law. "We're not asking the railroads to do anything that they're not already obliged to do," Smith said. "When this kind of debris is left to rot, clog streams, fall apart and cause hazards, we would be required to spend public money to deal with the problems, and our position is that we shouldn't have to." ●

# Road salt

*DOT Public Information Staff*

Each time it snows, highway officials across Wisconsin are called upon to balance safety and environmental care.

Salt is cheap, plentiful and gets the job of melting snow and ice done as well or better than any other method we know. When it's applied to highways, travelers on both personal and commercial business can resume customary and safe speed usually within hours after a storm.

Road salt spread in Wisconsin amounts to an estimated 500,000 tons annually. This is equivalent to 200 pounds a year for each person. Application amounts, however, are not uniform, but are dependent on miles of roads, lanes, traffic and weather conditions. About 15% of the road salt total is used in Milwaukee County.

But oversalting can cause problems.

Certain tree species, such as sugar maple, red pine and white pine, are especially susceptible to damage from abnormally high concentrations of chloride, which they can get through root systems or from road spray.

These problems are particularly noticeable in urban areas, although browning of leaf or needle tips due to abnormal chloride levels has been observed as far as 100 feet and downslope from rural highways also.

The most obvious, and most costly, harmful effect of road salt is the damage done to cars and trucks. Wisconsin vehicle owners know all too well where the term "Rust Belt" comes from. Oversalting clearly causes substantial corrosion to cars and trucks.

But one of the most serious concerns is the possibility of contaminating groundwater.

Chloride concentrations in Wisconsin's lakes, streams and groundwater have increased substantially since the early 1960s. Some streams have become unfit for irrigation. Major changes have been mainly in the southeast part of the state, with generally negligible change in the north and west.

Wisconsin previously had a problem with runoff and leaching of salt from open, unprotected storage sites. However, for a number of years now, most state-owned road salt has been stockpiled in permanent, covered, county-owned storage enclosures with appropriate groundwater protection.

Wisconsin's new comprehensive groundwater legislation, enacted in May, 1984, required DOT to adopt rules gov-

erning the storage of highway salt. The rules assure that storage facilities comply with new groundwater quality standards and don't lead to contamination of either surface or groundwater.

The US Environmental Protection Agency has established a secondary drinking water standard for chloride of 250 milligrams per liter (mg/l) in supplies used for public consumption.

Certain industrial uses restrict chloride levels to less than 50 mg/l; a level of up to 100 is considered acceptable for irrigation and up to 1,500 is a value cited for stock and wildlife water supplies.

Critical levels for freshwater fish vary from 400 mg/l for trout to an 8,000 to 10,000 mg/l for small bluegills.

Uncertainty exists in the scientific community on the high-level, long-term effects of chloride on other forms of aquatic life.

Both DOT and DNR are very concerned about limiting the amount of salt used on roads.

County highway departments, which perform the actual winter maintenance of state highways, have all taken action in the past year to conduct workshops to review policy, to train personnel, and properly calibrate their salt-spreading equipment so that they can carry out their salting, sanding and plowing operations in an environmentally responsible manner.

A number of Wisconsin municipalities have tried to use careful management techniques to reduce the amount of salt used. Results have been uneven.

One municipality that tried to totally prohibit use of salt had to revise its ordinance after the first winter storm. Three cities in Massachusetts tried to ban the use of salt but had to subsequently back off and permit controlled use.

What about alternatives to common road salt? A variety of non-chloride chemical deicing agents have been tested, with generally mixed results. Many non-chloride "alternatives" have their own negative environmental consequences.

Minnesota has experimented with a nitrogen-based agricultural chemical called urea. But urea in combination with water forms ammonia, which kills fish. Ammonia in turn can be oxidized to nitrates.

Phosphate, nitrate and ammonium compounds sometimes used for deicing have high fertilizer value. They may be great for lawns and cropland, but these potent nutrients can result in prolific growths of algae.

Calcium magnesium acetate (CMA) is the leading non-chloride alternative. However, CMA may have negative environmental impacts as well. The organic acetate as it decomposes could deplete dissolved oxygen in streams and lakes, which could create undesirable anaerobic conditions.

Besides, you have to use much more calcium magnesium acetate to get the same deicing effect as sodium chloride, and CMA is not currently available in commercial quantities at a reasonable price.

So, it appears at least for now that common salt (sodium chloride) is still the optimum deicing agent if a deicing agent of any kind is to be used.

There are substantial costs involved with use of salt on roadways: vehicle corrosion, highway bridge deck corrosion, damage to trees and vegetation and damage to water supplies.

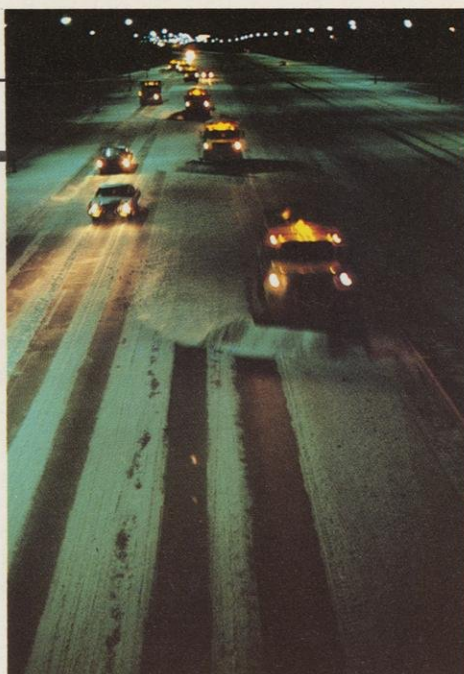
However, there are also substantial benefits: fewer traffic accidents, lives saved because of quicker response time in medical emergencies, reduced wage loss because of less absenteeism and lateness, and reduced production losses.

We need to quantify the costs and benefits of using moderate amounts of salt, to see if — on the whole — salt use is worth it.

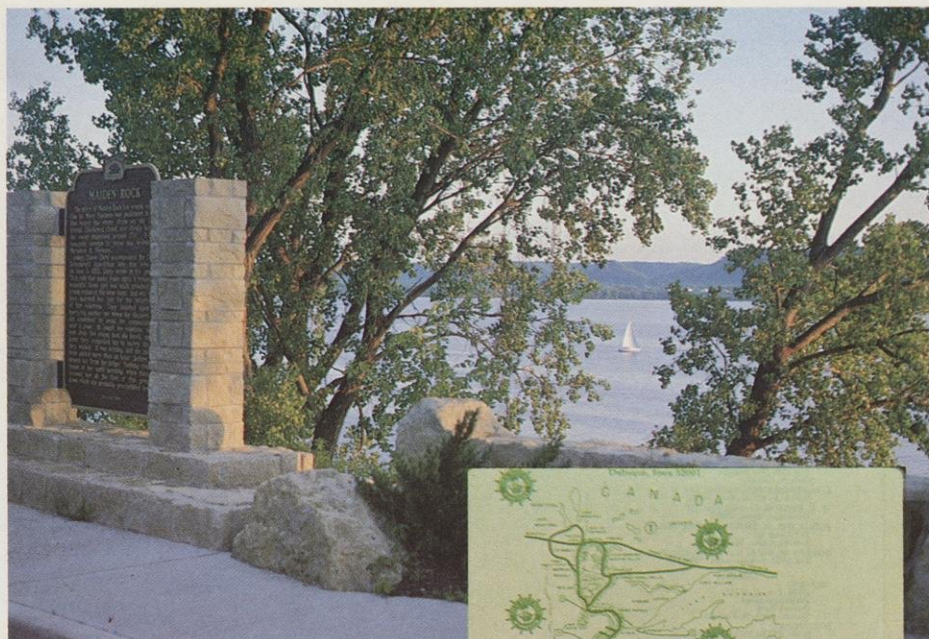
DOT says moderate use of salt on roadways is justified. At the same time, DOT believes that reductions in the use of salt are achievable. Reductions can best be achieved, says DOT, through flexible response by the state together with county and municipal highway crews.

In part because of efforts by highway crews, use of salt on state roads last winter dropped about 18% from 1983-84. Highway officials, however, are quick to point out that some of the decline can also be attributed to the less severe weather last winter.

Nevertheless, with everyone looking for ways to avoid excessive use, officials are hopeful the trend can be continued in the winter ahead. ●

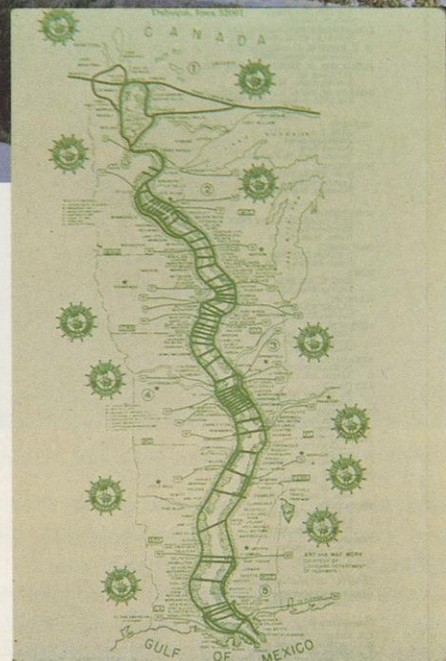


Environmentally responsible salting, sanding and plowing keeps traffic moving.  
Photo by Harvey Shebesta.



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Maiden Rock historical marker tells one of the many Great River Road stories.  
Photo by Dick Feeney

The Great River Road parallels the Mississippi.  
DOT graphic



## Main Street, USA—3,000 miles long

*Trymby Stickels, DOT Publications Editor, Madison*  
*Marlin L. Beekman, DOT Chief Planning Engineer, Eau Claire*

Plans are in the works to broaden the Great River Road idea to include the whole Mississippi River corridor.

The Mississippi River Parkway Commission wants Congress to designate the Mississippi River and about 34 miles on either side of it as a National Heritage Corridor. At its center, the Great River Road would stretch for 3,000 miles like a national main street from the Canadian Border to the Gulf of Mexico. The designation would help preserve the rich history of the river and at the same time promote economic opportunities.

The Mississippi River Parkway Commission includes representatives from all 10 states that border the river and from two Canadian provinces. Members are now

busy with public meetings to incorporate local concerns into the new designation.

The commission was formed almost 50 years ago to work for creation of a scenic highway paralleling the channel of the nation's greatest river. As early as 1908, M.W. Torkelson, who was head of the Wisconsin Park and Planning Board and a pioneer in highway and bridge engineering, envisioned the unique assets of a great river road. In 1938, another proponent, Albert Greensfelder of St. Louis, Missouri, organized the 10-state Mississippi River Parkway Commission and got Congress to appropriate the initial \$250,000 for a study of the idea. Two

years later eight river states had passed parkway resolutions. The idea simmered during World War II, but afterwards the idea for a scenic highway took hold prompted by results of a congressional survey of the route. In 1952 the Mississippi River Parkway Commission approved the concept and by 1954 federal funding was authorized to begin planning. The State Highway Commission, DOT's forerunner, then began working with federal and local governments to create the Great River Road.

Wisconsin has worked hard at it. In 1961, the DNR-administered Outdoor Recreation Act funded a scenic easement program to





Wisconsin Highway 35 between Alma and Nelson along the Great River Road. Photo by Dick Feeney

control adverse development along the route. Scenic highway improvements—waysides, overlooks and historical markers—were financed by the state's regular highway construction funds. Finally in 1973, the Federal Aids Highway Act allocated \$90-million for Great River Road development in the 10 states bordering the Mississippi. Today motorists can follow the green and white helmsman's wheel markers of the Great River Road along Wisconsin Highway 35 from the Illinois border to Hager City and then on County Trunk E-Q to Prescott.

Subsequently, Congress added allocations of \$56.25-million in 1976 and \$100-million in 1978—a total of \$246.25-million for the Great River Road. Wisconsin's share was \$20.7-million—to be used only on the federally designated portion of the route from DeSoto to Prescott. This runs back and forth across the river. However, Wisconsin has designated an alternate route from DeSoto to Illinois entirely within our borders. The state has spent \$20-million for improvements on this 92-mile stretch.

While Great River Road funding has enabled Wisconsin to improve and enhance portions of the route, no money has been appropriated for the work still undone. Remaining projects will have to compete for priority with all other needed highway im-

provements statewide. DOT planners estimate that finishing the Great River Road in Wisconsin will cost about twice as much as has already been spent here. This would bring highways up to standard and develop overlooks, waysides, boat landings and other amenities. The Mississippi River Parkway Commission is asking Congress to include appropriations for some of these improvements in the new Federal Highway Act.

DOT's Six Year Plan currently calls for \$28.4-million in improvements on the federal portion and \$18.3-million on the state portion of the route. To complete it before the end of the century would cost an additional \$37-million—\$23-million on the federal portion and \$14-million on the state route.

Meanwhile, the aforementioned National Heritage Corridor designation, conceived by the National Park Service, is expected to move ahead separately. Its purpose is to compile under a federally-funded commission a complete inventory of historical and natural areas, wildlife refuges, significant industrial sites and other locations considered part of our national heritage.

Unlike a national park, a national corridor does not involve purchase of land and imposes no regulatory burdens. Primary

purpose is to "increase international awareness and recognition of the corridor's vast resources."

The only other national heritage corridor in the country is the 100-mile Illinois and Michigan Industrial Canal, extending from Chicago to the Illinois River.

Certain members of the Mississippi River Parkway Commission have expressed concern that the national heritage designation might diminish the Great River Road concept. But supporters of the corridor idea claim it could mean additional tourism and development in bordering areas. A unified concept could help generate federal funds to aid in completion of the scenic highway, interpretive centers and other features. Proponents say National Heritage Corridor status will not necessarily restrict or prevent future commercial and industrial development either. Rather, they say, it would give additional significance to protection of existing historic, natural and scenic areas while opening adjacent, less sensitive sites to balanced development in the spirit of public-private partnership. The idea of a 3,000-mile-long national Main Street has appeal far beyond the states that border the Great River. ●



Re-establishing natural roadsides. Photos courtesy of Fox Valley Federation of Garden Clubs.

## Operation wildflower

*Robert Pfefferkorn, DOT Public Information Officer, Madison*

That spray of color along the highway didn't get there by accident.

Ten years after the late Fran Graebner and the Fox Valley Federation of Garden Clubs scattered the first seeds, a lush array of wild prairie flowers, forbs and grasses greets travelers along the Little Lake Butte des Morts interchange on US 41 near Neenah.

Operation Wildflower started with some 47 different species of flowers, five different prairie grasses native to Wisconsin and about six acres of state-owned land in the loops of the cloverleaf and along the freeway.

It was Mrs. Graebner's hope that "maybe in years to come there will be a prairie in this area similar to those that grew two hundred years ago. This will be my bicentennial effort."

Inspired by landscape design lectures given by Prof. Phil Lewis at the environmental awareness center at the UW-Madison, Mrs. Graebner contacted H.O. Ellison, then highway maintenance engineer with the DOT's district office in Green Bay.

Ellison and Warren Schmitz, waysides and landscaping supervisor for DOT in Madison, encouraged the Garden Club to use indigenous plants.

Established in 1973 to promote highway beautification, Operation Wildflower was federally funded. Six projects in Wisconsin received \$20,000 to help pay for site preparation and planting. An estimated 15 acres of roadsides were restored to more native appearances with seeds and plants provided by local members of the Wisconsin Garden Club Federation.

Funding was discontinued in 1977, but DOT and county highway departments, continue to work with other garden clubs, schools and civic organizations around the state to establish similar natural roadsides.

Except for relatively narrow strips nearest the shoulder that must be mowed, natural plantings provide an effective means of maintaining roadsides. Many of the species used are based on DNR research which developed maintenance-free plantings which also provide wildlife cover. Aside from erosion control and esthetics, natural areas help control noxious weeds as well as reduce maintenance costs.

Plants and seeds for the Butte Des Morts interchange were provided by the garden club members. Some seeds were gathered along railroad tracks, others from the Arbo-



Nodding wild onion.



Blazing stars and coneflowers.

retum at the UW-Madison. A large number of plants came from the Prairie Nursery of rural Westfield, operated by J. Robert Smith, a retired DNR employee.

Among them were the purple coneflower, daisies, golden rod, Queen Anne's Lace, turks cap lillies, milkweed, yarrow, purple and white asters, blazing star, spiderwort, and prairie smoke.

The Winnebago County Highway Department used spot spraying of an herbicide to control thistles in 1978-79. Additional plantings and re-seedings have continued. A major planting was completed this spring coordinated by Mrs. Carlton Schneider of Appleton.

District Conservationist William Evans of the Soil Conservation Service said that by 1980 "Operation Wildflower" had become an active and viable prairie establishment with pheasants, rabbits and songbirds enjoying the cover nearly as much as the travelers. ●



**Wayside refreshment.**  
Photo by Paul Werth



**Many have cookout grills.**  
Photo by Dorothy Kapke

## Waysides

*Dorothy Kapke, Deputy Director, DOT Office of Transportation Information, Madison*

Other states have highway rest stops — only Wisconsin has waysides.

Even the name evokes images of a picnic table under the cool spread of an oak tree, while nearby an old-fashioned iron pump promises a cold drink with a nearly-forgotten hint of minerals from deep underground streams.

These waysides, and the more sophisticated Interstate safety rest areas, comprise just under 2,000 acres. Yet they accommodated 24.3 million visitors in 1984.

There is an amazing variety of things to see and do in these mini-parks tucked into scenic glens or perched atop an occasional ridge every 20 or 30 miles along the highway. There are bluffs to explore, an island where eagles nest, Indian effigy mounds, an old limestone quarry, boat and canoe landings, hiking trails and enough historic sites and markers to keep history buffs busy for months.

Beginning in 1967, DOT and DNR began a program to provide multiple use waysides

throughout the state utilizing LAWCON matching funds. LAWCON, the Land and Water Conservation fund, is a federal program that provides 50% grants to state and local governments to acquire or develop outdoor recreational facilities. In all, two dozen waysides were developed with more than \$450,000 from LAWCON.

In addition to providing the travelling public with a pleasant rest stop, many of these waysides were designed to incorporate scenic overlooks or a boat access site to enhance recreation opportunities.

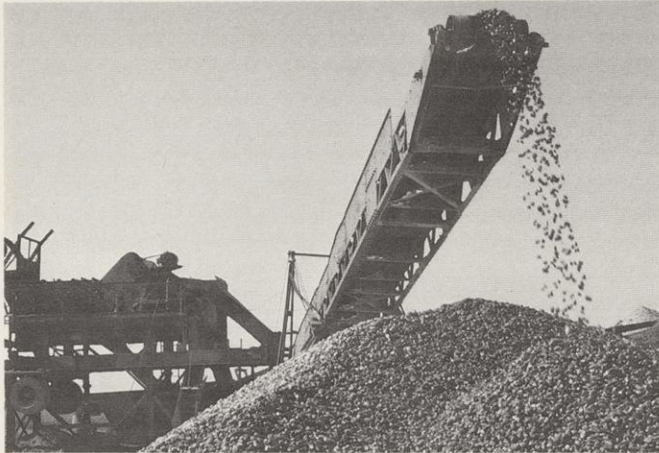
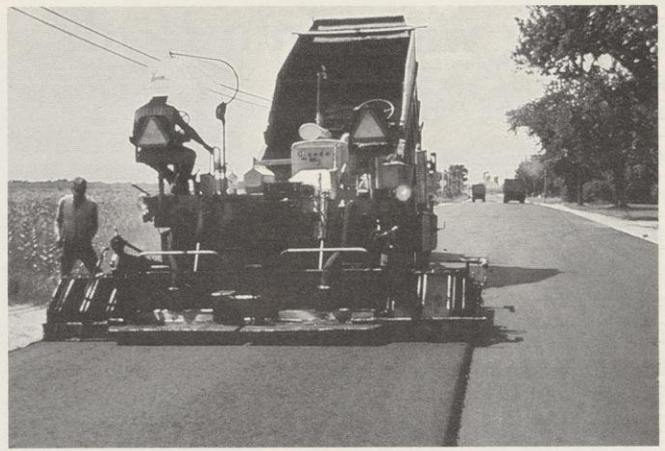
Wisconsin was one of the first states to recognize the value of a natural appearance of roadsides. Where once the goal was to regularly administer crew cuts to the medians and shoulders, Wisconsin has spent two-and-a-half decades encouraging natural vegetation.

Under a related DNR-DOT program, some of the state's most spectacular scen-

ery has been protected by scenic easements, purchased in the 1960s and 1970s with federal and state recreation dollars. These easements are publicly-owned viewing rights negotiated with the landowner to preserve the vista for future generations.

Another program involves rustic roads. Since 1973 more than 30 of them have been marked with the official brown and yellow Rustic Road sign. Under the designation stretches with outstanding natural features such as native vegetation, rugged or scenic terrain or panoramic views of water, woods or farmlands are preserved. Many incorporate biking or hiking paths and automobile speeds are limited to 45 miles an hour or less.

Together, the waysides and related enhancements to the state's highway system provide an enjoyable and enticing transition to Wisconsin's wealth of scenic and recreational opportunity. ●



## Recycling old highways

*Frank S. Huitt, DOT Public Information Officer, Madison*

Asphalt and aggregate join the never-ending circle. Taxpayers and the environment benefit.

What goes up must come down — except when it comes to road building. There, what goes down must eventually come back up.

Resurfacing and repair can greatly extend the useful life of road surfaces, but the time comes when any pavement must be removed and replaced. What do we do with the old pavement? Where do we get the raw materials? What is the least costly way—in terms of dollars and environmental impacts—to renew our road system?

The Wisconsin Department of Transportation has earned a national reputation as a leader in recycling old concrete and bituminous pavements into new roadways.

The result is:

Saved money, energy and natural resources.

Pavement as good as or better than the original.

A substantial reduction in the environmentally sensitive problem of pavement disposal.

In the summer of 1984, DOT recycled concrete from 28 miles of four-lane Inter-

state while constructing additional lanes between Madison and Portage. It amounted to 300 acre-feet of broken concrete and was reused as large aggregate in the new concrete—the largest such use in history.

Had it been removed and disposed of in a single pile, it would have covered a one acre field to the height of a 14 story building — enough to bury the State Capitol. Recycling reduced the problem of disposal by at least 80%. While it doesn't yet show any appreciable dollar savings over the use of new aggregate, neither did recycling bituminous pavement at first.

Wisconsin began recycling hot mix blacktop in 1979. But it was not until the price of oil had shocked the world with a 10-fold increase that savings became considerable. Bituminous pavement is a mix of petroleum-based asphalt cement and aggregate. While it becomes brittle and cracks over time, most of the constituent elements remain virtually unchanged, and therefore, it can be reheated and mixed with new asphalt cement and aggregate to produce a pavement equal in quality to that produced

entirely from new material. Because of design improvements, pavement produced in this manner is usually superior to the original.

Modern equipment makes it possible to use recycled pavement for as much as 70% of the new mix. Usual savings are from 50% to 60% of the asphalt and aggregate used in a completely virgin mix. Cost is about a third less than new. From 1979 through 1984, savings amounted to nearly \$41-million in Wisconsin.

Both bituminous and concrete recycling processes use less aggregate, an important natural resource. Through 1984, it's estimated that recycling reduced the need for new aggregate by 5-million tons.

All in all, recycling asphalt is popular and increasingly widespread throughout the state while reusing concrete is still relatively new. In time, recycled concrete should also save money, energy, natural resources and landfill space. ●

**Upper left: Removing old concrete highway.** DOT photo

**Lower left: Recycled concrete pavement is used as aggregate in highway construction.** Photo by Don Hartman

**Upper right: Laying down asphalt pavement.** DOT photo

**Lower right: Recycled asphalt pavement is usually superior to the original.** Photo by Paul Leu





# Changing waste into roads

*Maynard A. Schneider, Director, DOT Office of Transportation Information*

Foundry sand may be too slick to stay put, but you're probably driving around on fly ash.

Not all attempts at innovation succeed on the first try, as Thomas Edison and scores of other inventors often found. It's no different for DOT engineers who are continually challenged to develop new, cost-saving and socially responsible ways to build roads. One thing they've tried is recycled industrial waste such as fly ash and foundry sand.

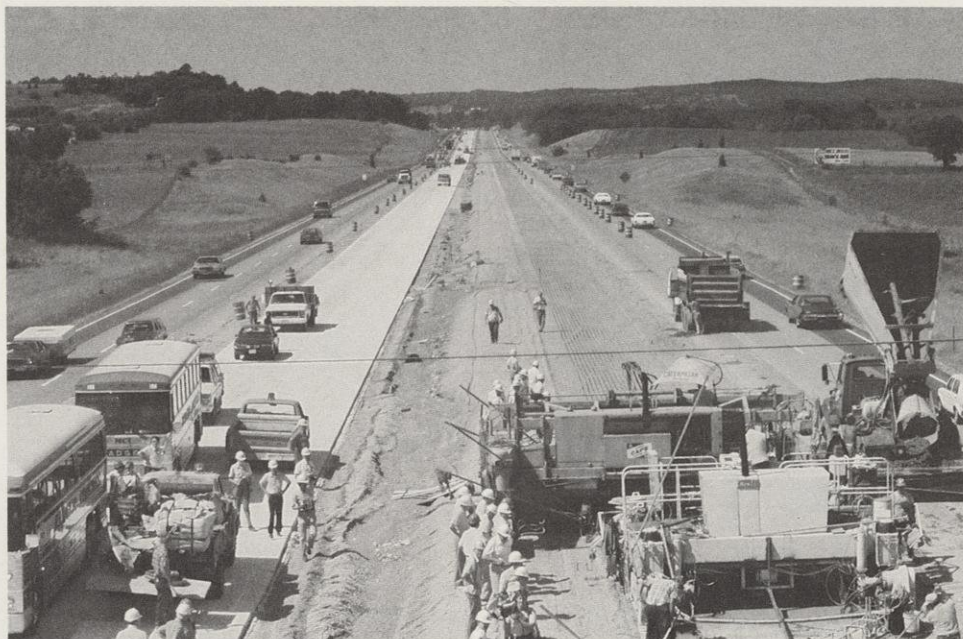
At the urging of the Federal Highway Administration, DOT has permitted contractors to substitute fly ash, an industrial by-product of coal-fired power plants, for some of the cement in concrete pavements. Collected electrostatically in tall chimneys as part of emission control systems, fly ash has cementing properties of its own when combined with lime and water. Since 1975, more than 13,000 tons or a thousand truck loads have been used on state roads. That, plus fly ash used in other construction materials, is enough of a market to allow power plants to charge for a material that is otherwise a costly disposal problem.

Fly ash was also used experimentally in 1976 as fill on a road embankment for a section of the airport spur from I-94 to Mitchell Field in Milwaukee. Concerned about groundwater contamination, DNR required the fly ash to be encapsulated with impermeable clay and observation wells to be installed for groundwater tests. To date, no adverse effects on groundwater have been detected and the material has proven to make an excellent embankment, holding up well with little shifting or settling. Approximately 100,000 cubic yards was used, enough to fill Camp Randall football field to a depth of almost 50 feet.

An experiment that failed, however, occurred the first time DOT tried to use foundry sand as fill for a different embankment. Foundries are Wisconsin's fourth largest industry and safe disposal of their spent sands is a serious and costly environmental problem. They turn out about 500,000 tons of the material each year. If it could be used in road construction — for fill or as an ingredient in pavement — it might save on landfill sites as well as on "tipping" or dumping fees. DOT and DNR staffs have conferred extensively in the search for an environmentally acceptable way to recycle the sand. DOT Secretary Lowell B. Jackson has encouraged his engineers to explore whether it could be used effectively, economically and safely.

## Waste foundry sand is hard to handle for road building projects.

Photo by Bob Serak



## The use of waste fly ash in concrete pavement is an option available to highway contractors.

Photo by Don Hartman

In an experiment last year, engineers decided to try sand already dumped in a landfill to build a railroad overpass embankment in southern Milwaukee County. The landfill operator agreed to provide 168,000 cubic yards, which was to be encapsulated with impervious clay to prevent leakage of any possibly hazardous materials. Arrangements were made for monitoring wells to keep an eye on groundwater and the clay liner. The sand was very wet, in part because of the presence of bentonite, which foundries use as a bonding agent.

"Bentonite tends to retain water and drying out the embankment proved impossible," said Dan Kastenholz, chief construction engineer at DOT's Waukesha district.

"The earth-moving equipment could hardly get through the sand," he added.

The sand also contained foreign materials such as slag, iron pieces, cores, wood, tires, iron drums, plastic, rubber hoses, reinforcing bars and peat. Workers complained of nausea, dizziness and headaches. Pungent odors were traced to rusted barrels containing unknown liquids.

After using about 60,000 cubic yards of the foundry sand, DOT decided to halt the experiment. Then it had to import other fill from another site to complete the embankment.

"While the Milwaukee pilot project did not prove to be satisfactory, we have learned from the experience," said Clint Solberg, DOT engineer charged with developing new methods.

His conclusions so far:

- No more sand from an existing landfill.
- Sand must be free of foreign materials.

Said Solberg, "We are willing to use the lesson as a building block, rule out what is impractical and continue our joint pursuit of what is practical."

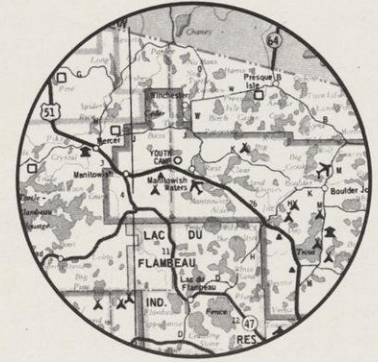
One possibility is using sand directly from the foundry, but, just as with fly ash, it must be relatively close to the highway project to keep down hauling costs and must be delivered as needed. Another possibility is using it in the mix for either bituminous or concrete on road surfaces.

DOT will continue research efforts with the foundry industry, DNR and the University of Wisconsin. All are optimistic that an environmentally sound and cost effective solution can be found. ●



Beaver lodge at McKinney Lake where trees were left uncut.

Photo by Greg Egtvedt



## The Manitowish Waters Airport

Greg Egtvedt, DNR Assistant Environmental Impact Coordinator, Rhinelander

Not only pilots and planes, but geese, deer, lakes and forests too figured in the design concept.

Flyers on vacation spend twice as much as the motoring public and are especially important to Wisconsin's tourist industry. One important destination for them is the Northwoods resort area around Manitowish Waters where air traffic has increased from around 3,000 in 1976 to more than 4,000 trips in 1984.

Until recently, the airport there near US highway 51 had been inadequate to handle such volume. The runway was short and unpaved. It could not be used in rainy or wintery weather nor by many popular large aircraft. New wood-using and electronics industries in the area made improvements economically important. Then a fatality spurred public concern about safety.

In 1976, the town of Manitowish Waters petitioned DOT's Bureau of Aeronautics for an airport development project. Their plan to make the facility safe year-round called for construction of a hard-surfaced runway, lighting, paved taxiways, surfaced parking areas for aircraft and an automobile parking lot.

Because airport construction can have significant environmental repercussions, DNR customarily reviews DOT-administered airport construction projects. In this

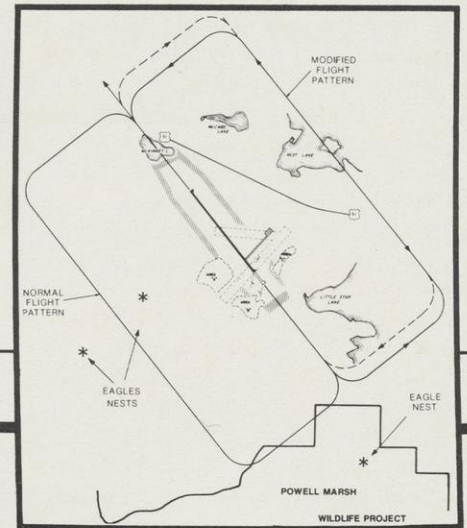
case, Manitowish Waters in Vilas County is prime recreational country characterized by numerous lakes, wetlands and forests. Adding to its sensitive environmental nature is the Powell Marsh State Wildlife Area located about a mile south.

Initial studies indicated a new 3,500-foot paved runway would be needed. DOT's consulting engineer, Becher-Hoppe, figured out an alignment that accommodated this need yet resulted in minimal adverse environmental consequences.

Once the runway alignment was determined, further measures were prescribed to mitigate unavoidable adverse environmental effects.

Powell Marsh was not only a major factor in placement of the runway, it also changed aircraft flight paths. Approaches were modified to minimize disturbance to eagles and migrating waterfowl using the wildlife area.

To provide an adequate construction site and meet clearances specified by the Federal Aviation Administration, approximately 200 acres of forest land had to be clearcut. These acres contained four environmentally sensitive areas that required special attention. One was a portion of McKinney Lake shoreline at the northwest end of the pro-



posed runway. The others were wetlands around which a 25-foot minimum buffer was specified and where only handcutting of trees was allowed. There was to be no grubbing or use of heavy equipment in the wetlands. And the shoreline at McKinney Lake was not clearcut. As an alternative, a 100-foot buffer between the lakeshore and cleared area was established in which only trees penetrating the glide slope (35 feet or taller) were removed.

In an effort to discourage white-tailed deer from grazing on the runway and reduce chances for deer-airplane collisions, a less palatable grass seed mixture was prescribed for use on cleared areas.

Construction began on the new runway late in 1984, and was expected to be completed this year.

It is not always easy to predict the success of mitigation efforts such as this. But the Bureau of Aeronautics and DNR are hopeful that when temporary construction disturbances have healed and the new runway is in service, the people of the Manitowish Waters area, and their visitors, will have a scenic, safe and environmentally compatible north country airport. ●

# Walleyes spawn at the Bridge

*Terry C. McKnight, DNR Environmental Impact Coordinator, Rhinelander*

DNR biologists and DOT highway engineers designed a walleye spawning area as part of a new bridge construction project.

In 1974, an old 570-foot bridge on Highway 86 at Tomahawk needed replacement. The bridge crossed the Mohawksin Flowage on the Wisconsin River.

DNR's field staff routinely reviewed DOT's plans for a new bridge and its approaches. Some environmental concerns arose regarding an earthen fill proposed in the flowage to improve roadway alignment.

As a mitigating measure, an experimental walleye spawning reef was designed as part of this fill.

The Mohawksin Flowage covers 1,910 acres and is 25 feet deep. It has slightly alkaline soft water, medium brown in color of moderate transparency. A dam controls water level fluctuations to less than one foot in a year. Much of the reservoir's bottom is sand with some areas of muck or gravel. Aquatic vegetation is scarce to moderate.

The lake contains rather typical and common fish species for northern Wisconsin. A moderate walleye population is present with some natural reproduction.

Past studies confirm walleyes usually prefer gravel lake or stream bottoms for spawning. Their eggs ordinarily hatch better on gravel. In some cases, adding gravel over other bottom types has attracted walleye spawning.

Since highway fills in water are generally soil and/or rock other than pure gravel, DNR and DOT designed a gravel reef conducive to walleye spawning.

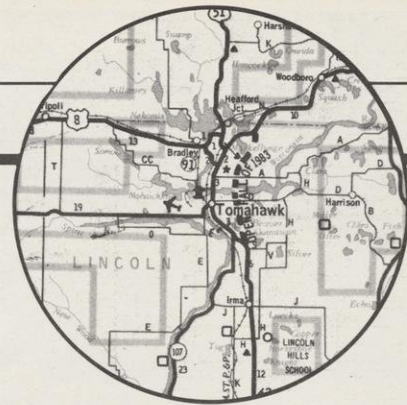
In the spring of 1975, samples were taken at the proposed reef area to determine whether any walleye spawning had occurred there before construction. No walleye eggs were found.

The spawning reef was constructed in the fall of 1975. A one-foot thick mantle of gravel was placed in water down to 3 1/2 feet atop large rock heavy riprap. Riprap protects earthen fills from wave action and erosion. The riprap extends from the lake bottom to three feet above the water level.

The total length of the reef is approximately 500 feet, and the average width of the various segments is 25 to 30 feet. The spawning gravel consists of clean, uncrushed rocks from one to eight inches in diameter.

Each spring from 1976 through 1980, abundant walleye eggs were found on the reef. No sampling was attempted in 1981, but eggs were present in 1982 and 1985 when tests were run again.

Most of the walleye eggs were found in water depths of four to 20 inches. Spawning started in late April or early May eight to 13



days after the ice was out of the flowage when water temperatures were between 48 and 55 degrees Fahrenheit.

In most years, many of the walleye eggs developed nicely through the advanced "eyed" stage—where the embryo's eyes are visibly developed. Egg mortality is usually highest before they reach this stage.

While walleye spawning use of this reef was apparently successful, survival of young hatched from the reef is unknown. Until the contributions to adult populations from such reefs are known, this kind of project should be regarded as experimental.

In December of 1984, a similar spawning reef was constructed in the Tomahawk River as part of a new bridge project on County CC in Lincoln County.

While further evaluation of these and other artificial reefs would be desirable, fish managers are optimistic this technique may hold promise for improving walleye reproduction in waters where suitable spawning areas are limited. ●

# Frye's Feeder—a winner!

*Robert Pfefferkorn, DOT Public Information Officer*

Move a creek out of harm's way and make it a better trout stream.

What does Starky Starkweather think of the work DOT's District 1 did where State Highway 92 crosses Frye's Feeder about a mile north of Mt. Vernon in Dane County? "That's one I'm proud of," he recalled. "When you get to be my age, you learn to win some, lose some. But that one's a winner!"

Starky, a well-known Madison-area outdoorsman, has been active in Trout Unlimited and Dane County Conservation League efforts to riprap, stock, fence and otherwise

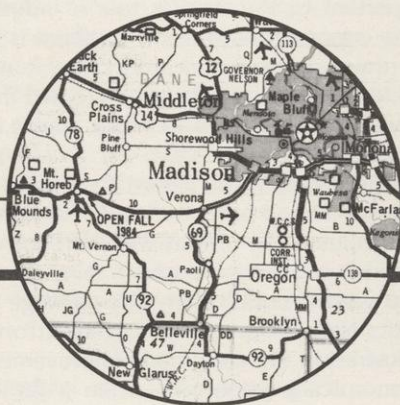
rehabilitate muddy creeks into some of the finest trout streams in the state. He had been trying to do something about Frye's Feeder for several years before he heard about DOT's plans to flatten a rather sharp 90-degree corner near the Woodburn farm.

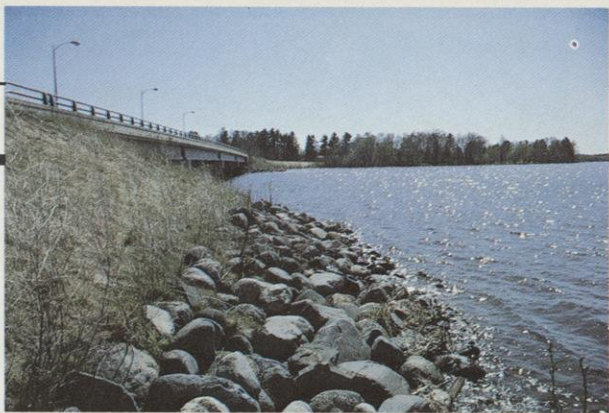
Starky thinks that one of the previous farmers had diverted a small creek into the farm's barnyard for the cows, others say the stream was fenced in to form the barnyard. Anyway, the barnyard slopes downhill about 100 yards toward the water, and what

with the cows tromping about, the stream that passed under the highway bore little resemblance to the cool, clear spring that bubbled forth just to the north and east of the farm.

What disturbed Starky is that Frye's Feeder is, or should have been, a prime spawning area for the trout downstream, where Deer Creek joins Frye's Feeder and together become Mt. Vernon Creek.

"Well, one day I dropped by District 1 and asked why they don't just move the

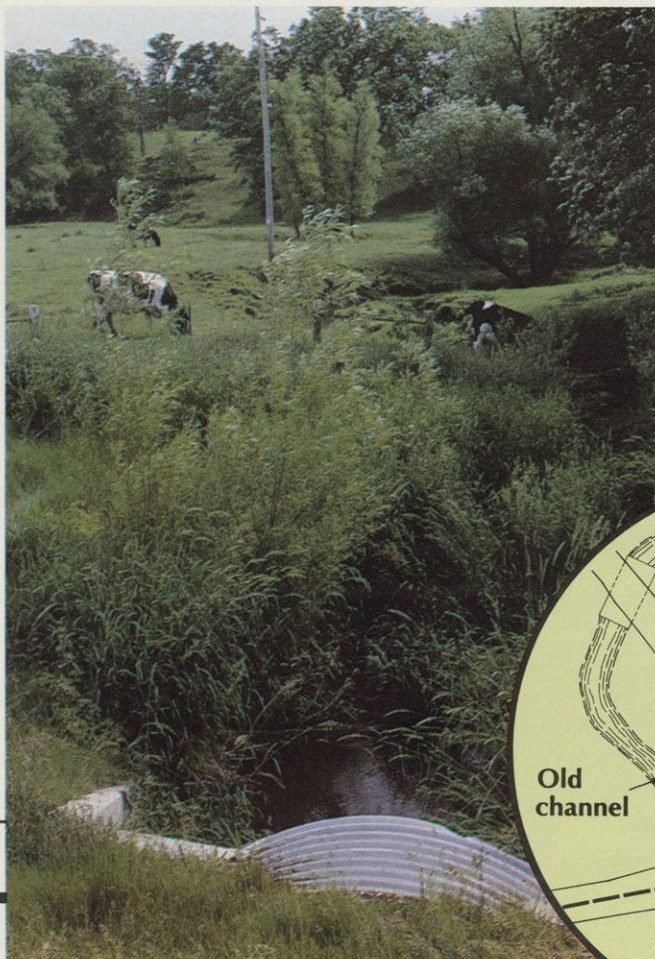




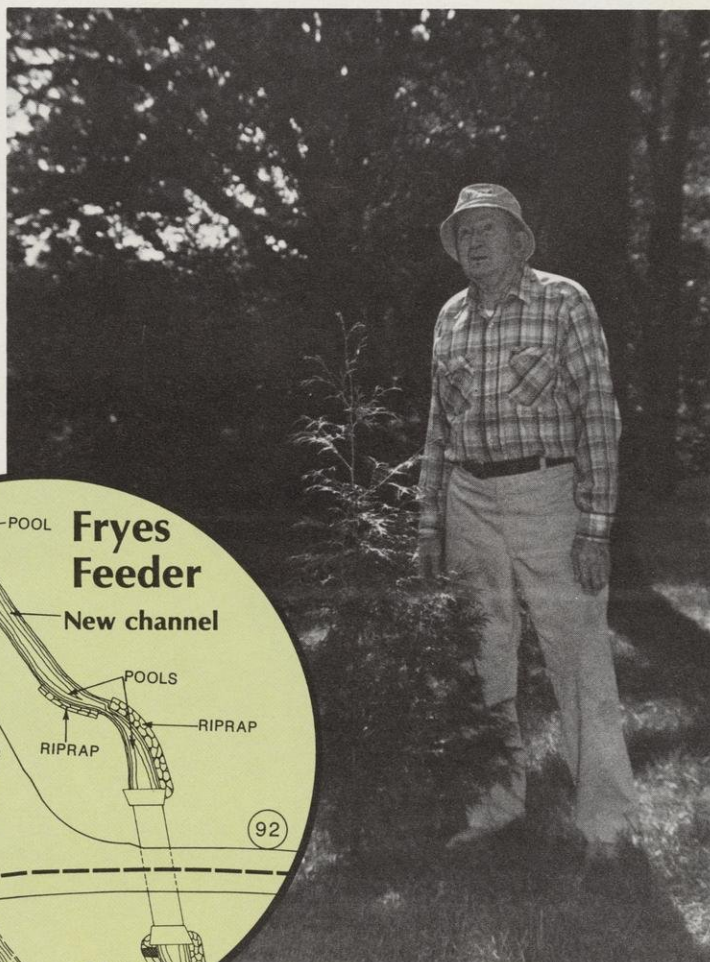
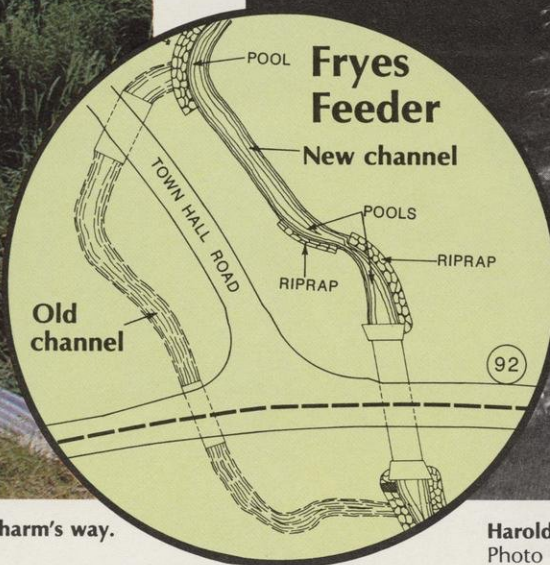
Walleye spawning reef was built into Mohawksin Flowage as part of bridge replacement project on Highway 86 at Tomahawk. Photo by Dave Kunelius



The reef has improved natural walleye reproduction. Photo by Doug Stamm



Frye's feeder in its new DOT-built channel, out of harm's way. Photo by Maynard A. Schneider



Harold Starkweather. "That's one I'm proud of!" Photo by Jean Meyer

stream to the east side of Town Road.

That, indeed, is what happened. With help and advice from Starky, Trout Unlimited, The Dane County Conservation League and DNR staff, DOT built a replacement bridge in a new location, then moved the stream.

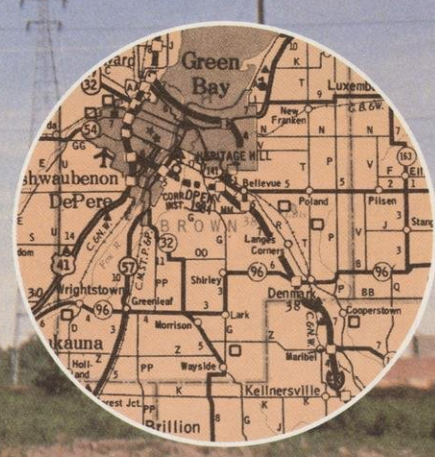
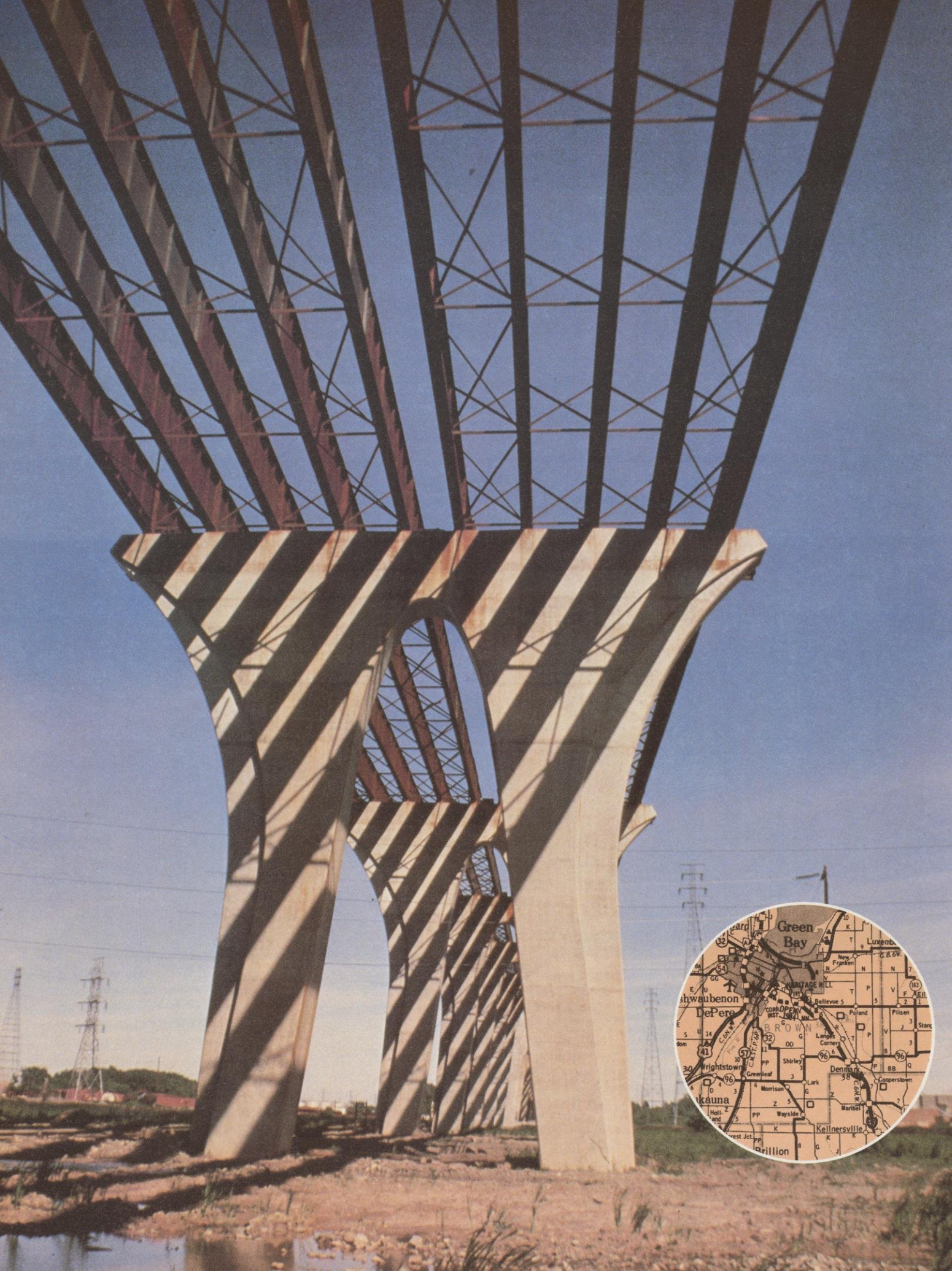
The new bridge has two metal pipe culverts, one eight feet and the other seven feet in diameter. To handle low flow, the larger pipe is placed a foot lower than the other. This also helps maintain water veloc-

ity. The pipe bottoms are filled with layers of clean native gravel and the relocated meander features deepened pools tucked into the outsides of curves as suggested by DNR's fishery experts. Large rocks along the banks control erosion. DOT engineers built a cattle pass under the highway, installed a stock tank to water the cows and put up fencing to keep the cows away from the new creek bed.

Now Frye's Feeder—in its cleaner form—is an integral part of the Mt. Vernon Creek

system, providing spawning ground and relatively clear, moving water for trout.

"It's a vast improvement," Starky said. "It accomplishes exactly what we wanted. It's a good piece of business, and it keeps the cows out of the stream. Today, it's self-supporting—DNR doesn't have to stock it anymore. It's not only the best in Dane County, I think it's one of the best trout streams in the whole state!" ●



# The I-43 Bridge at Green Bay

**Jack Robb, DOT Planning Supervisor,  
Green Bay**

Rare Forster's terns, yellow-headed blackbirds, cormorants and crowds of waterfowl would be affected by construction. Careful work minimized damage and created new habitats.

In the early 1970s DOT began planning a new highway crossing of the Fox River through the area known as Atkinson's Marsh on the northwest side of Green Bay. The crossing was for a new interstate highway and it followed a corridor parallel to a local road called Tower Drive. The interstate was part of a beltline project around Green Bay and would connect to existing Highway 41 on the west side of the city.

As plans developed and actual highway locations were chosen, it became evident that a considerable area of wetland would be affected. Therefore, DNR and the US Fish and Wildlife Service found it prudent to take an in-depth look.

Studies revealed that for a long time, wetlands west of the Fox River have been very important for waterfowl production. In 1975, these wetlands had one of the highest brood densities in Wisconsin. To illustrate their exceptional productivity: it was found that 109 blue-winged teal, 77 gadwall, 40 redhead ducks, 21 ruddy ducks, 14 mallards, seven green-winged teal, and 11 Canada geese were produced there in 1975. In addition, there were scores of coots, hundreds of blackbirds including the uncommon yellow-headed phase and several rails. Muskrats were numerous. It was determined that the 108 bank dens and 57 nesting houses had a potential yield of 825 animals.

The wetlands were also very important for resting, feeding and pairing of migrating waterfowl. For example, whistling swans stopped there routinely on their annual flights. At least 115 species of other birds had been observed in the area during a year's time. Included were the peregrine falcon, osprey, bald eagle, and double-crested cormorant, all of which were on Wisconsin's endangered species list. The peregrine falcon was on the federal list. Twenty-five pairs of Forster's terns nested in the marsh near the oil tank farms along old Tower Drive. This colony represented the largest of only



**Now completed, about 23,000 vehicles per day use the bridge. Before it was built, DNR studies found that waterfowl here had the highest brood densities in Wisconsin. During construction DOT took care not to degrade water quality.**

Photo by Carl Burkart

three known breeding colonies in the entire state.

So with all this information, how could a four-lane divided freeway be constructed through the wetland without totally disrupting or destroying its value as habitat for so many species?

The fact was that it could be if careful attention were paid to construction so as to minimize environmental impacts. Not only that, new habitats could even be created and others enhanced.

During construction, excavated materials were removed in a way that would not degrade water quality and thereby damage aquatic life elsewhere on the marsh. This material was isolated in embankments and cannot return to the watercourse.

To eliminate future problems, electrical transmission towers that had to be relocated were placed on concrete footings supported by wood pilings so that the steel would not be subject to periodic inundation.

Approximately 62 acres of wetlands lay within the new highway right-of-way, of which 35 acres were actually destroyed in construction of the embankment, piers, and other work. However, since most of the marsh was choked with cattails, open water areas were needed for better habitat and were, therefore, created to offset the lost wetlands.

Ditches were built with gradual back-slopes to allow for varying depths of water.

Culvert pipes were set at elevations that would make sure water levels were maintained. A dike that serves as a frontage road protected open water areas from wave action on the bay. Flap gates were constructed to control flooding.

To create nesting sites for waterfowl within the loop of the Bayport Drive interchange, DOT built small islands and dredged open water areas to varied depths.

A ditch was dug along the south side of the bridge with fingers that extend underneath between the piers to create even more open water.

Altogether, 22 acres of new open water and wetlands were created. Another 20 acres were held within the highway right-of-way, but no longer designated as wetlands. To offset this, the city of Green Bay rezoned approximately 100 acres of municipal land adjacent to the project as a conservancy district. The property had formerly been planned for future industry.

The new bridge and roadway are now completed and provide a much needed traffic service. They are used by approximately 23,000 vehicles per day, which alleviates congestion within the city.

There are some car kills, but most species have adjusted and continue to use the area.

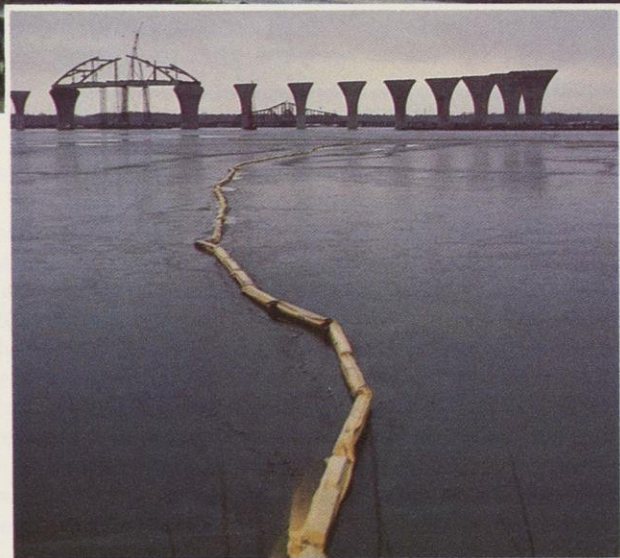
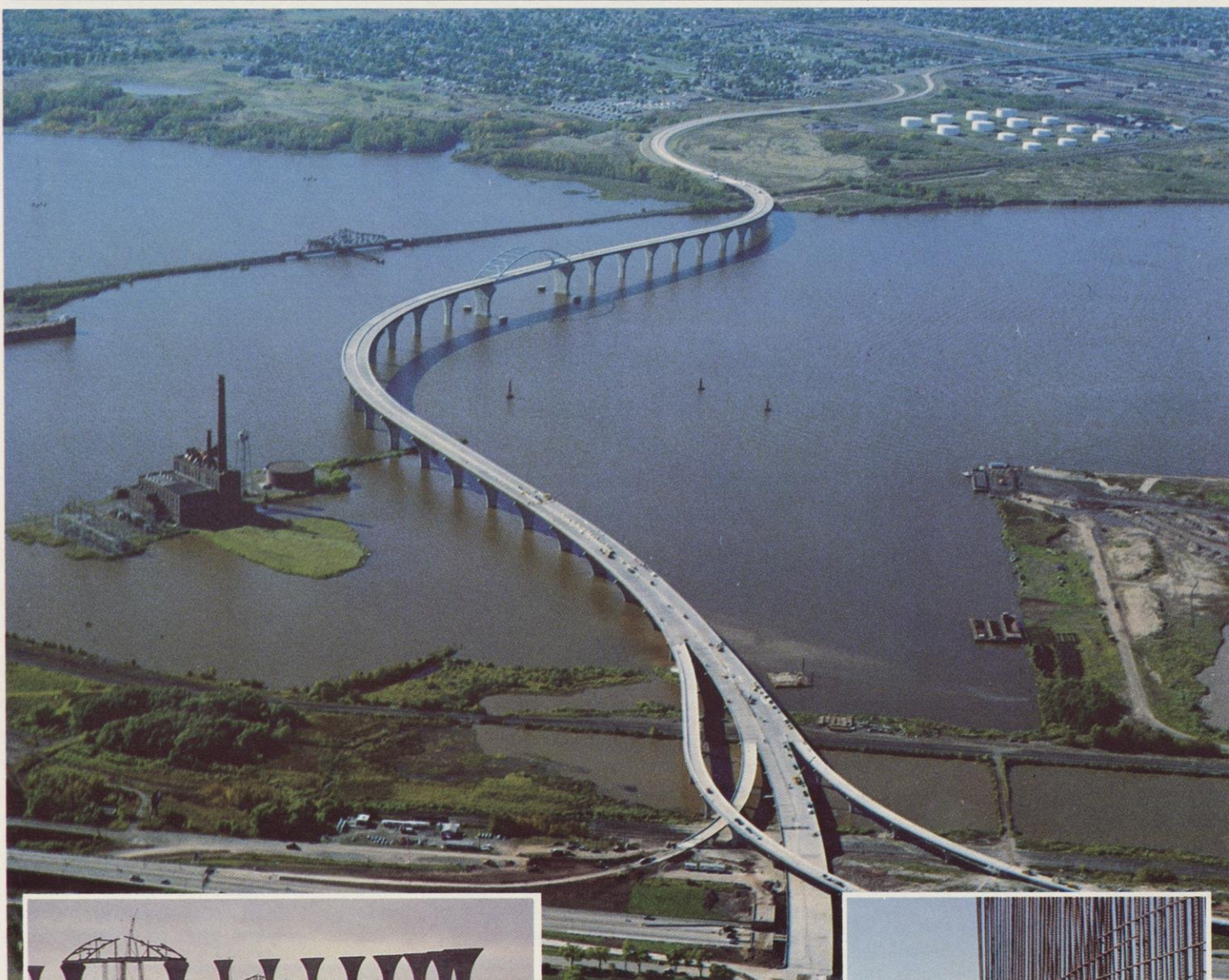
As a side benefit, many people have witnessed Canada geese raising their young on a manmade pond within the loop at the Bayport Drive interchange. ●

◀ **I-43 under construction across Atkinson's Marsh. The highly productive wetland should continue to produce wildlife because DOT created new habitat and the city of Green Bay rezoned 100 acres for conservancy.**

Photo by Carl Burkart

# Sediment and birds at Bong Bridge

Donald Wilson, DOT Chief Planning Engineer, Superior

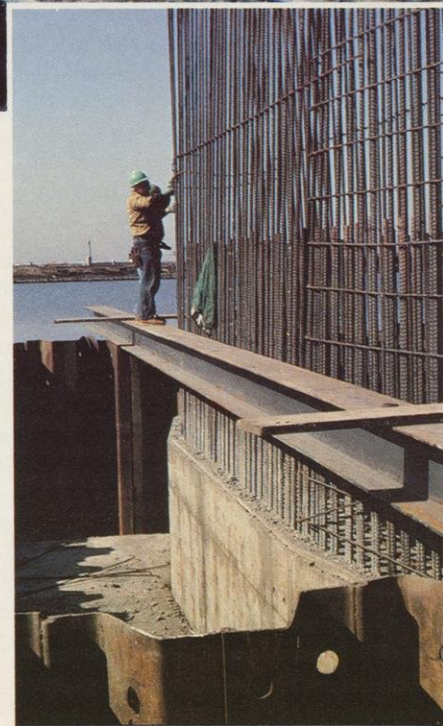


▲ Large boom collected construction debris to prevent contamination of the bay.  
DOT photo

▲ Curved construction was necessary so that ships passing beneath the 120-foot high central span would remain in the channel. Although it would have been most cost-effective, no dredged material was used for sand fill for fear of water pollution.

Photo by William Cronkrite

Caissons for building underwater bridge supports. Water pumped out of these was treated to remove pollutants before discharge into the bay.  
DOT photo ▶



Building the tall, graceful Interstate span over Superior harbor was an exercise in mitigation for gulls, terns and possible pollution.

The Bong Bridge, a major, \$70-million, 1.5-mile Interstate freeway bridge, opened to traffic a year ago this fall after a 15-year period of project development. It spans St. Louis Bay, a navigable waterway that separates Wisconsin and Minnesota at Superior. The bay is a major walleye fishery and provides important habitat for numerous game fish. Consequently, a number of environmental issues arose in planning, design and location of the new structure.

Wisconsin's DOT was the lead agency for project development. The project required close coordination between not only Wisconsin's DOT and DNR, but also their Minnesota counterparts, the Minnesota Pollution Control Agency and a number of federal agencies as well.

Bay waters are now relatively clean as a result of major investment in sewage treatment and pollution abatement facilities by local governments. However, bottom sediments are considered to be badly polluted due to prior years of inadequate waste treatment.

Undeveloped portions of the St. Louis Bay shoreline provide excellent nesting colonies for a variety of colonial bird species such as gulls and terns.

The new bridge is a high-level structure with 120-foot vertical clearance to accommodate big ship navigation. This height required construction of a high-approach embankment using thousands of cubic yards of sand fill. Nearest source of suitable sand was in the bed of the bay. Since the major cost is in hauling, savings possible by using sand dredged right on the site could be considerable.

Three environmental questions were investigated to determine whether this was feasible:

\* Could the material be dredged without re-polluting the bay from waste trapped in upper-level sediments? Lower level sands are relatively clean.

\* If an embankment were constructed from dredged materials could methods be found to prevent inclusion and subsequent leaching of pollutants?

\* How would eliminating a major shallow-water feeding area by dredging affect the fish population?

The first two questions could be adequately addressed, but there was insufficient information about the third and not enough time to undertake studies on loss of shallow water habitat. For this reason, DOT engineers decided against using any dredged material for sand fill.

Two other potential sources of water pollution were also evaluated in environmental studies for planning the new bridge. One involved actual construction and the other traffic, once the bridge was opened.

During construction, pollution could occur when bottom sediments were disturbed while bridge piers were being built into the bed of the bay. It could also happen during accidental spills of oil, paint, concrete-curing compound and similar materials.

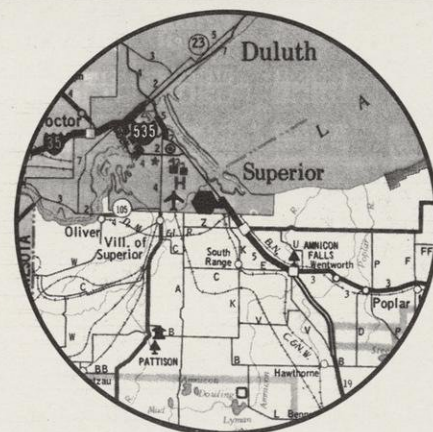
Potential water pollution once the new bridge opened to traffic could come from storm water runoff, which would wash vehicular oil, salt, rubber, metal and emission particulates off the bridge deck into the bay. It could also come from material spilled as a result of accidents on the bridge.

Construction-caused pollution was determined to be the most serious of the two. Storm water runoff was satisfactorily controlled by designing an appropriate drainage system and developing sound maintenance and bridge deck cleaning procedures. Accidental spills could be handled by coordinating pollution control and cleanup measures with local fire departments and the Coast Guard. Similar measures were planned for accidental spills during construction.

Normal practice for building underwater bridge supports or piers is to construct a water-tight shell or chamber called a caisson on the bed of the waterway. Once this is built, the water is pumped out and workers can safely descend inside. The caissons must be sunk into the bottom deep enough to create a tight seal that will allow pumps to handle water forced in by outside pressure.

In the case of the Bong Bridge, however, water inside the caissons would be polluted because wastes trapped in bottom sediments would be released into it by construction. Pumping this into the relatively clean waters of St. Louis Bay could cause damage. Therefore, it was decided that water from the caissons would have to be treated to remove pollutants before it was pumped into the bay.

Exact location of the bridge also posed problems. In order not to disrupt established neighborhoods, avoid environmentally sensitive areas and still connect with I-35, it was necessary to build the new bridge over a large, well-established nesting colony of ring-billed gulls. The ring-billed gull is a relatively new colonial bird at the western end of Lake Superior and a very aggressive and prolific species. It had displaced some less aggressive, less prolific colonial birds such as the common tern and several species of plover, one of which, the piping plover, is quite rare in the area. A concern was raised that bridge construction could disturb the ring-billed gull colony, causing them to move from their established nesting area



and put further pressure on nesting sites of the rarer colonial birds.

DOT engineers addressed this environmental concern on two fronts:

First, it was decided that pier construction in the vicinity of the gull colony would not take place during nesting season from early March through August.

Secondly, DOT contracted with the University of Minnesota-Duluth to develop a baseline study of nesting habits of the ring-billed gull. Purpose was to help determine how these birds would react to construction and to a major structure near their nesting colony. Part of the study consisted of a literature search on colonial species in general, and the ring-billed gull in particular. In addition, the colony would be monitored for a full six month nesting period to determine the normal success rate in laying, hatching and rearing chicks. Monitoring would also chronicle the effect on the colony of normal activities in the bay, such as shipping, pleasure boating and attacks from predatory species.

It was found that no significant data already existed, therefore, most results will come from the monitoring program. However, the information gathered will create a valuable data base for future decisions on bridge design and construction that could mitigate disturbance to gull colonies.

And this spring the colony of ring-bills was observed nesting and rearing their young, apparently successfully, with the new bridge completed and open to traffic.

On another environmental front, the old Arrowhead Bridge, including the Wisconsin side—long a favorite fishing spot, particularly for youngsters and elderly people—was scheduled to be removed after its replacement by the new bridge. However, through the cooperation by DNR and the city of Superior, arrangements were made to convert the Wisconsin end of the existing Arrowhead Bridge into a permanent fishing pier. As a result, anglers enjoyed the opening of fishing season this year at the same old spot—and watched the traffic move swiftly and safely across the bay on the new Bong Bridge. ●



# Highway 53, Rice Lake to Trego

Donald Wilson, DOT Chief Planning Engineer, Superior

Springs, a famed scenic river and a wildlife area all stood in its path. Avoiding serious harm was a major caper, but DOT and DNR pulled it off.

Three difficult natural heritage conflicts made prospects of extending the four-lane divided portion of US 53 northward from Rice Lake to Trego appear extremely dim when the project was first proposed.

Yet by modifying plans, relocating the corridor and careful design an acceptable proposal was created, and the construction project began last spring.

Highway 53 is an integral section of the north-south corridor from Chicago, southern Wisconsin and the Milwaukee area to northwestern Wisconsin, Duluth-Superior and north to the Minnesota Iron Range and the Canadian highway system at International Falls/Fort Francis.

This major highway corridor is served by a four-lane divided highway except for a 70-mile gap in Wisconsin between Rice Lake and Superior and a 90-mile section in Minnesota between the Iron Range and International Falls.

Wisconsin DOT plans to reduce the 70-mile gap in Wisconsin by extending the four-lane divided highway from Rice Lake to Trego, a distance of about 26 miles. This four-lane extension would bypass the Village of Haugen and the City of Spooner in order to provide an acceptable level of service for through traffic.

North of Rice Lake, land use begins to change from predominately valuable and intense agricultural use to forest and wetlands, providing habitat for a wide variety of wildlife species. This change is virtually completed north of the small community of Sarona. Existing US 53 at Sarona swings about four miles to the west to go through Spooner and then back east between Spooner and Trego.

The improvement concept selected for US 53 between Rice Lake and Trego consists of building two additional traffic lanes alongside the existing two lane highway except where relocations are required at Haugen and Spooner.

This concept was found to be the most acceptable from an environmental viewpoint because it results in fewer total miles of new highway and the least amount of new highway built in a new location.

Teamwork involving representatives of a half dozen state and federal agencies re-



**Beaver Brook Wildlife Area. The Highway 53 relocation around Spooner had to avoid it.**  
Photo by Merle Manion

sulted in the final selection of a highway location and design that had the least possible adverse impacts on the environment.

Working closely with DOT on early location and design studies and environmental assessment of various alternatives were DNR, the Wisconsin Department of Agriculture, Trade and Consumer Protection, the Federal Environmental Protection Agency, US Fish and Wildlife Service, National Park Service, and the Wisconsin State Historical Society.

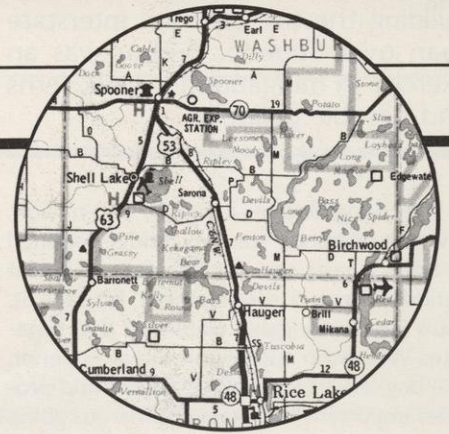
Three major environmental issues arose during project development. One involved a wildlife area, another a trout stream and the third a National Wild and Scenic river.

Beaver Brook Wildlife Area managed by DNR, extends south from Spooner along the east side of existing US 53 for a distance of about four miles. To the north is a major and ecologically valuable wetland along the Yellow River. To the south is a string of small lakes that extend from the wildlife area almost to the farming community of Sarona.

The wildlife area, wetland and chain of lakes present a major obstacle to any relocation east of Spooner. Relocation to the west was not feasible because a significant westerly redirection would result.

An easterly Spooner relocation, therefore, would either have to be east of the wildlife area, wetland and lake chain or would have to go west of this obstacle.

A relocation west of the wildlife area would have to squeeze into a very narrow corridor between the wildlife area and the Yellow River wetland on one side and the developed area of Spooner on the other. This narrow corridor became known as the Near East Spooner Relocation while the alternative completely to the east of the wildlife area became known as the Far East Relocation.



The Near East idea was favored locally because, being closer to Spooner, it was perceived as being able to provide better service to the city. Further study in cooperation with the State Historical Society, however, uncovered a major and significant archeological site where this narrow corridor crossed the Yellow River on the eastern fringes of Spooner. Highway construction here would destroy the site and lose for all time the important understanding of early Native American culture it might yield. For this reason, along with lower cost and less potential for delay, DOT selected the longer Far East Spooner Relocation as the route of the new four-lane highway.

The trout stream is Little Mackay Creek and associated Little Mackay Springs. Between Spooner and Trego, existing US 53 joins with US 63 and squeezes between the Chicago & Northwestern Railroad tracks to the east and the creek to the west of the highway. The springs and creek are valuable brook trout water.

Through close coordination with DNR, highway elevation was changed and steep roadway sideslopes designed so that two additional lanes could be built without hurting the creek and springs.

Also along the route is the Namekagon River, part of the National Wild and Scenic River System. Just north of the small community of Trego, existing US 63 branches off and US 53 continues on north to Superior while 63 goes northeast to serve Hayward. The intersection of US 53 & 63 at this location is only a few hundred feet from the Namekagon.

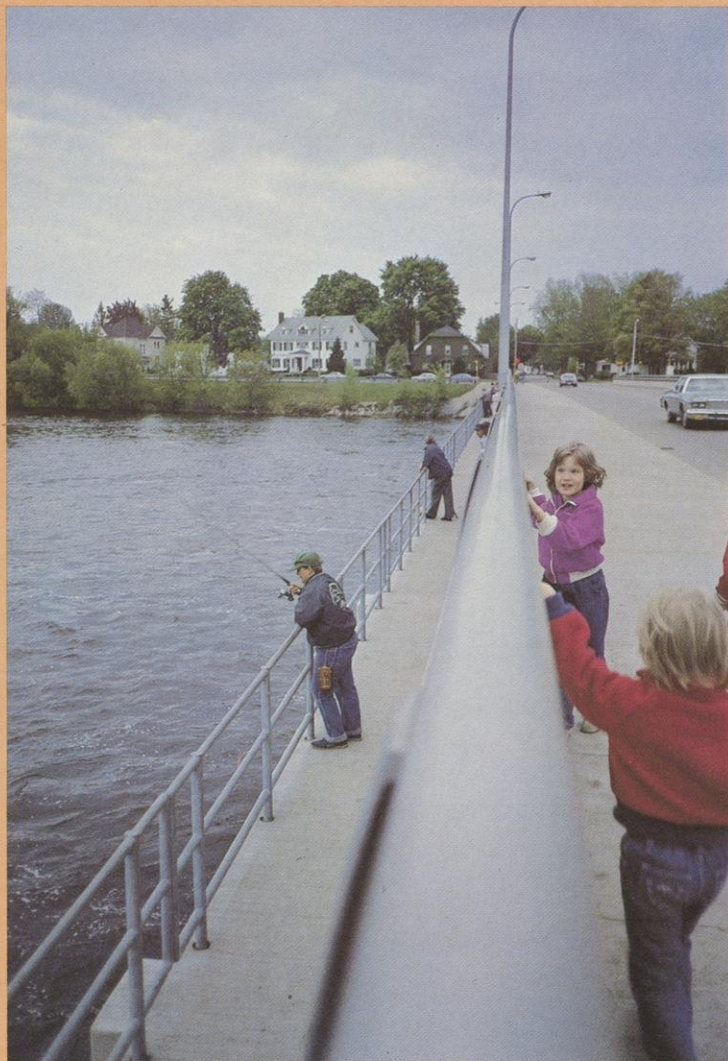
The National Park Service and DNR, in the interest of preserving the quality of the scenic river system, advised against building a new crossing at any point significantly removed from the existing one. DOT engineers decided to keep the intersection where it is with little change in the configuration and the road will cross over and along the existing causeway. The result is a suitable intersection with US 63 and a river crossing that will have the least adverse effect on the scenic quality of the Namekagon River. ●



The new Port Washington Marina. DNR contributed more than a million dollars in matching money to this recreational boating project. DOT makes grants for improvements to commercial shipping facilities of about \$2-million per biennium.  
Artist's rendition by Warzyn Engineering



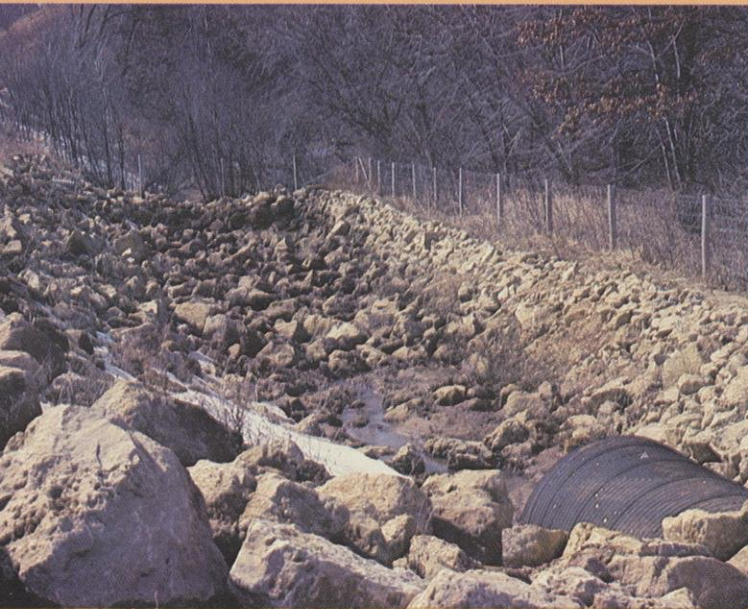
Early bridge construction techniques often caused more damage than necessary to natural resources because engineers first build an island on the streambed from which to operate machinery. This is now avoided whenever possible. The environmentally acceptable technique shown here was used by DOT on the new highway 51 bridge over the Wisconsin River at Tomahawk where machinery is operated from a raft. DNR and DOT also worked together here to minimize boating hazards during construction.  
Photo by Dale Lang



A special \$42,000 fishing ramp on the bridge across the Menominee river was a joint DNR-DOT project in cooperation with the cities of Marinette and Menominee, Michigan.  
DNR photo

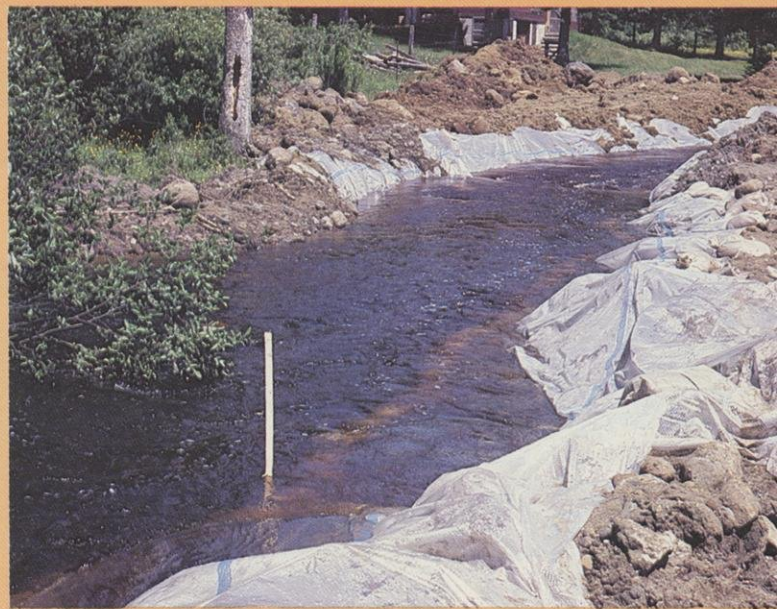


Abandoned railroads often become bike trails or highways, or sometimes DOT finds a way to continue train service. This is DNR's Military Ridge Trail between Madison and Dodgeville. One segment became part of new Highway 18-151 in a DOT project. DNR currently operates 10 bike trails. When rail lines are abandoned DOT has first priority on their use, DNR second.  
Photo by Maynard A. Schneider



A rock-lined settling basin along I-94 at Eau Claire protects trout in Lowes creek from being doused with muddy water in storm runoff from a residential area. The project required design modifications and long negotiations, but finally resolved a suburban flooding problem and protected the trout stream too. The project will be carefully monitored to see that it does the job.

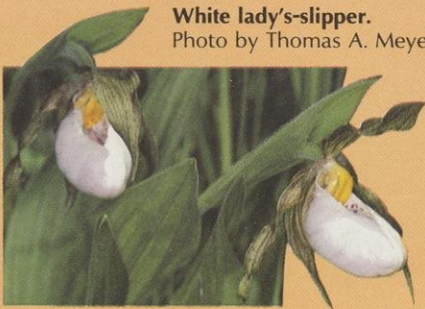
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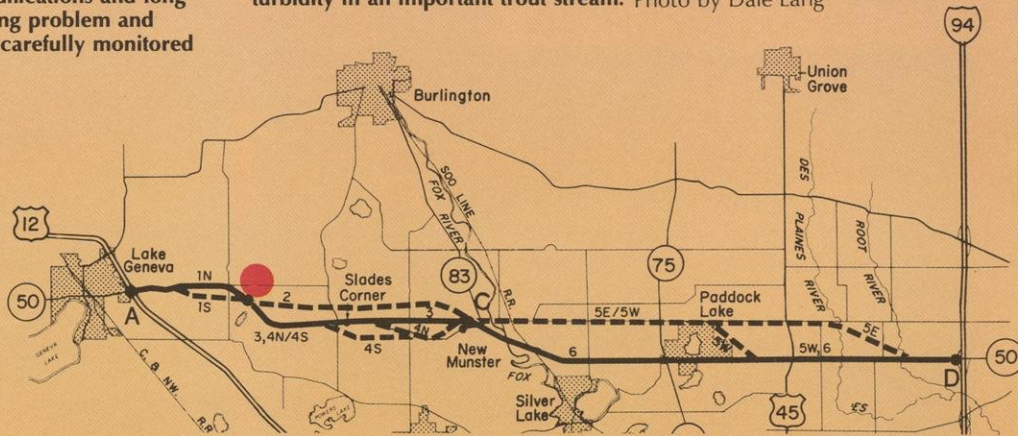
The North Branch of the Peshtigo River in Forest County was lined with plastic by DOT during bridge construction to prevent erosion and turbidity in an important trout stream. Photo by Dale Lang

White lady's-slipper.

Photo by Thomas A. Meyer



When Highway 50 between Kenosha and Lake Geneva is rebuilt, DOT engineers will avoid a rare kind of wetland known as a calcareous fen located near Spring Valley Creek. Improvement will be along the old highway right-of-way rather than into the wetland. Only 153 fens like it are known in all of North America, mostly in Wisconsin, Minnesota and Ohio. They are characterized by such unusual plants as lesser fringed gentian, grass of Parnassus, Ohio goldenrod, beaked spikerush and white ladies-slipper.



The 23-mile, four-lane improvement will eventually run from I-94 near Kenosha to Lake Geneva. About 55 acres of wetlands will be lost to the project in the Palmer Creek-Fox River area, but will be replaced on an acre-for-acre basis to provide habitat for northern pike and waterfowl. Construction of the leg from I-94 to New Munster should be completed by 1989, but work on the remainder is at least 15 years away, based on current traffic projections.

Lesser fringed gentian.

Photo by Thomas A. Meyer



For more about the environmental impact of road construction and other projects, contact: Department of Natural Resources Bureau of Environmental Analysis & Review Box 7921 Madison, WI 53707 or Phone 1-800-BEAR DNR (1-800-232-7367)

## Why wetlands deserve protection

Wetlands act as huge natural sponges, soaking up and slowly releasing flood waters and runoff, absorbing nutrients and pollutants before they enter lakes and streams.

Not long ago, engineers aimed their transits from wetland to wetland, charting and building new roads through them — not out of malice, but because neither farmers nor developers nor most anybody had any use for "swamps".

But today we have learned that their ecological function is essential to our well being. Wetlands are a rich and complex world of single-celled animals and whispering sedges, of sunlight, water and soil. They

reduce flood volume, control storm runoff, recharge groundwater, filter out pollutants and sediment, help control erosion and provide spawning, feeding and breeding habitat for numerous fish and wildlife.

Long ago, before Wisconsin was settled, there may have been 10-million acres of wetlands covering nearly one-third of the state. Today there are only about 2.5-million acres remaining, and we are draining, filling or otherwise losing them at the rate of 40,000 to 50,000 acres a year. Nationally, the loss is nearly half a million acres annually.

Protecting what remains only makes good sense. ●

# Madison's South Beltline

Harold E. Meier, DNR Environmental Impact Coordinator, Fitchburg  
Michael T. Neuman, DNR Environmental Specialist, Madison

**DEMOLITION DERBY  
SOUTH BELTLINE, DAILY**

The point-counterpoint of environment versus safe highways and the mitigating compromises that grow out of such clashing responsibilities is nowhere better illustrated than in the long, agonizing negotiations that led to relocation of Madison's South Beltline.



The Madison South Beltline project has been the subject of great controversy ever since its original planning nearly 25 years ago. The project has raised the interest not only of environmentalists and highway officials, but also the emotions of city and community planners, business leaders, persons interested in public safety, motorists, political leaders and area residents. Now, after 25 years in planning, the Madison South Beltline is about to be built.

The plan involves construction of a 6 1/2 mile segment of US 12 and 18, passing through the southern portions of the cities of Madison and Monona between Lake Monona and Upper Mud Lake. The proposed freeway, which would include a total of six lanes, would close an obvious gap between two already completed freeway segments. The freeway would correspondingly reduce serious traffic congestion and a very high accident fatality rate which have been of concern to both citizens and government.

A major obstacle for the project has been the physical setting in which it is located. The existing highway is tightly located between a highly developed residen-

tial and commercial area and an ecologically sensitive marshland of the Yahara River system. The developed area includes numerous residences, shopping areas, office buildings, apartment buildings, manufacturing areas and commercial establishments abutting the existing highway. To widen it to freeway dimensions would displace numerous residences and businesses and cause widespread disruption to people interested in using the area. On the other hand, relocation of the freeway into the Yahara River's ecologically diverse and sensitive Upper Mud Lake ecosystem has its own environmental drawbacks.

The area comprises 1,000 acres of wetland and river environment inhabited at various times of the year by numerous wild-life species. There are 72 different kinds of birds including the horned grebe, blue-winged teal, wood duck, red-tailed hawk, sandhill crane, killdeer, and others; a large number of mammals of which mink, muskrat, raccoon, fox and deer are best known; many amphibians and reptiles including painted turtles, leopard frogs, American toads and garter snakes plus familiar fish species like bluegill, walleye, largemouth

**Finally, a decision after 25 years of thought, discussion and increasing traffic congestion.**  
DOT photo

bass, northern pike, crappie, perch, catfish, bullhead and many minnows.

The Upper Mud Lake wetland system helps protect surface water and also offers research and educational opportunities. Its scenic amenities are enjoyed by many and the hunting, fishing, hiking, bird watching and other recreation it provides are unique and irreplaceable. For a long time environmentalists objected to a marshland route for the relocated beltline. In a 1976 referendum city of Madison voters overwhelmingly opposed relocation.

But 25 years of thought and discussion can produce change, compromise and new ideas. Now a decision to relocate has been agreed upon by most of those involved. Its basic premise is that almost every detrimental environmental impact will be mitigated as much as possible by some alternate environmental improvement. The story of how and why the Madison beltline decision was finally reached and the implications it has for other big highway projects around the state is worth telling. ●

# Give and Take

*Robert Pfefferkorn, DOT Public Information Officer, Madison*

Negotiating resolution of the conflict was a long struggle, but it led from roadblock to roadway.

If there was a single factor leading to the February 1, 1984 consensus to relocate the South Beltline, it was the determination of key leaders to resolve the issue without further delay. Although they were not alone in this resolve, C. D. "Buzz" Besadny and Lowell B. Jackson were instrumental in ending yet another chapter in Madison's long history of frustrated public works projects.

Besadny, secretary of the Department of Natural Resources, and Jackson, secretary of the Department of Transportation, represented different perspectives. Each man, each department is charged by the State of Wisconsin with different missions: to preserve and protect natural resources; to provide safe and efficient transportation.

After the public hearing there were two viable options for the Beltline: a freeway on the existing corridor or relocation south of South Towne Mall across the crest of Mud Lake marsh.



**DNR Secretary C.D. "Buzz" Besadny. "We have done the right thing to protect the environment, both human and natural."**

But Besadny wrote Jackson a month later outlining DNR's reaction to the draft environmental impact statement. He opposed relocation and urged that the new road be built along the Beltline's present corridor where there would be fewer environmental impacts.

"The State of Wisconsin has lost large areas of wetlands during the last 50 years. Recent legislation that increases the protection afforded to urban wetlands indicates public concern about these resources.

"Our stewardship of Wisconsin's natural resources demands a strong commitment to protection of valuable environmental assets such as Mud Lake Marsh..."

The first step toward resolution of this fundamental conflict of transportation need versus environmental values was a meeting between Jackson and Besadny in late June. The purpose of the meeting was "to determine if it was at all possible for the two agencies to continue consideration of both alternatives presented in the draft environmental impact statement."

Nearly everyone who had traveled Madison's South Beltline agreed that a no-build option was unrealistic. Something had to be done. The secretaries agreed. They directed DOT and DNR staffs to work toward resolving the conflict.

This mutual decision signaled a willingness to compromise.

During the summer and on into fall, DOT and DNR staff followed through to create a mitigation proposal that could make the relocation alternative acceptable from an environmental viewpoint. And DOT engineers looked at mitigation measures for the existing location such as noise barriers and a sunken roadway to lessen impacts of a freeway on nearby residents.

They also reviewed an alternative four-lane freeway on the existing corridor proposed by a UW-Madison planning professor. The proposal was rejected because DOT engineers concluded four lanes could not handle present, much less projected, traffic demands.

The mitigation plan that came out of this DOT-DNR cooperative effort reduced wetland requirements from 31 to 22 acres. In addition, DOT agreed to re-create 20 acres of wetlands that had been destroyed years ago and to enhance an additional five acres of existing wetlands.

The size of the Mud Lake marsh complex would remain at 1,000 acres.

After his review of the mitigation plan, Secretary Besadny identified further DNR concerns in a letter on October 17, 1983:

"While the plan is ... a best effort to mitigate the wetland acreage lost to direct wetland filling necessary for construction of the road bed and bridge approaches, a net loss to the environment will occur if relocation is chosen, even with the proposed mitigation.

"Because re-establishing wetlands is an essential element of the proposal, public ownership of...those wetlands immediately adjacent to these areas is important.

"Public ownership is not mitigation in itself, but in this case DOT acquisition...would be necessary to protect public investment in the recreated wetlands."

In response, DOT agreed, among other things, to:

- Acquire wetlands north of the right-of-way and just west of existing US 51.
- Give the mitigation plan equal priority with construction of the highway itself.

In December 1983, DOT completed a socioeconomic study of both alternatives. It found that building on the existing corridor would have these effects:

- Thirty-six homes would be removed while the relocated freeway would move only 28.

- Nineteen businesses with 84 employees would be displaced while only three with 15 workers would be displaced by the relocated freeway.

- Traffic congestion would be severe during at least two of the four years of construction. Backups and associated accidents would increase.

- Businesses would suffer. For two of the four years during construction, approximately 100 establishments would likely lose 20 to 50% of their business. For the other two, 35 to 45 businesses would have a small loss. Not only would they lose current patronage, they would also fail to acquire new clientele.

- Property values would go down, rents would decline and there would be a higher turnover in tenants both during and after construction.

- Cohesion of the neighborhood would be reduced by establishing a formidable barrier between residents and businesses currently located on both sides of the Beltline.

- Noise levels would be perceptibly raised and exceed federal noise level criteria at 191 locations of which 26 would have no practical abatement measures. Conversely, with a relocated freeway, noise would be noticeably reduced from current levels.

- Noise barriers or walls, some up to 30 feet high and up to a half-mile in length would be required.

- Quality of the visual environment would be reduced because of the elevated freeway and retaining walls at interchanges.

These findings firmly documented the fact that relocation coupled with positive

mitigation of environmental factors was the alternative of choice.

A three-paragraph letter from Besadny in January of 1984 capped nine months of intensive negotiations at all levels of the two departments that even included informal breakfast meetings between the two secretaries.

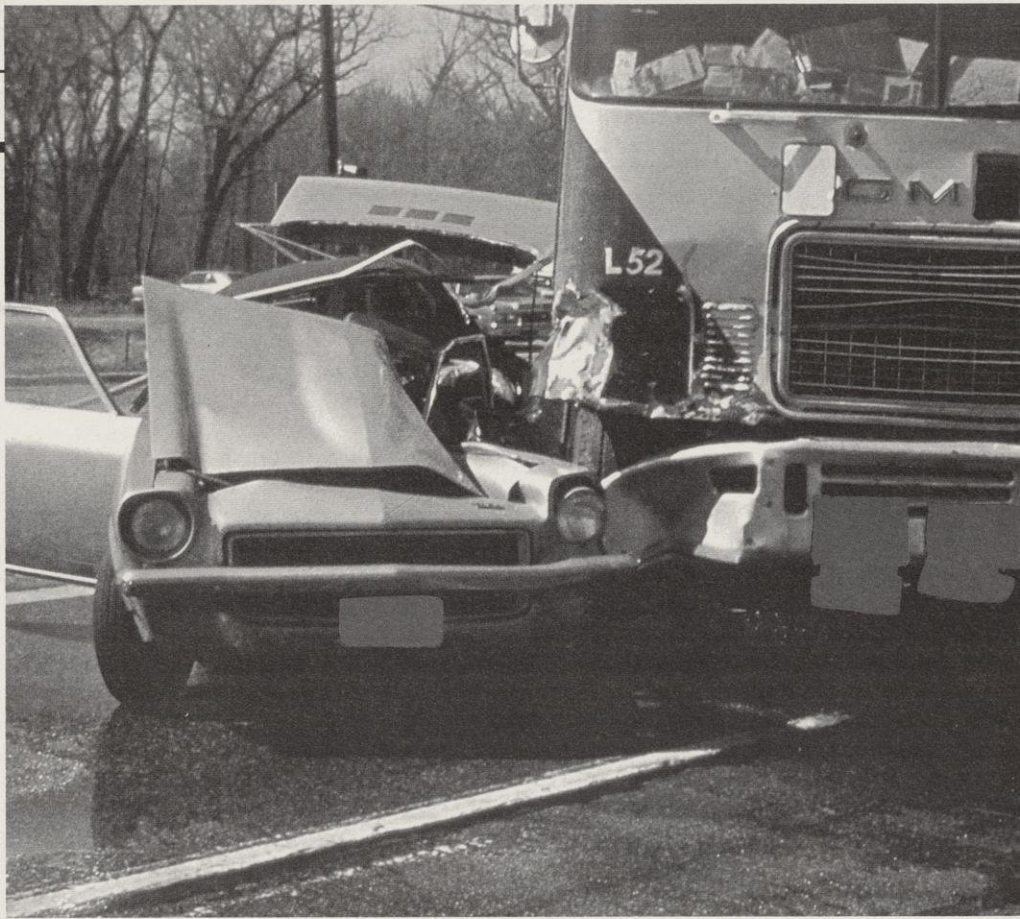
"The mitigation plan includes every reasonable effort," Besadny wrote, "to reduce overall impacts to the environment. In view of the plan, and your further analysis of human impacts, I withdraw my objection to the relocation alternative as now proposed. I believe we have done the right thing to protect the environment, both human and natural."



**DOT Secretary Lowell B. Jackson. "Consensus born of public involvement can be an essential element in the process of developing sound and achievable transportation projects."**

After reviewing all of the pros and cons, Jackson concluded:

• "From the perspective of the people who live, work or do business in the effected area, the freeway on existing location has greater adverse impacts than the freeway on relocation. Because of the extensive mitigation plans cooperatively developed by DOT and DNR, and despite the necessary incursion into the wetlands by the relocated freeway, adverse impacts to the wetlands have been significantly reduced. My reexamination and additional study of the total environmental issues confirm that the relocated freeway is the better choice." ●



**The high accident rate concerned citizens and government.**  
Photo courtesy of DOT

## Consensus from public participation

An important element in the final decision on the relocated South Beltline freeway was the growing consensus among the public at large. Although at one time sides were highly polarized, this consensus emerged through an intensive participatory process.

Since 1961, there were nine public hearings, 15 or more public informational meetings, two Environmental Impact Statements, input from two citizen's committees, hundreds of public letters and comments, and innumerable articles in the public news media. More than \$2 million was spent on this public involvement since 1962 to reach the point of decision in February 1984.

Of the many citizens who testified at the last public hearing in May 1983, or who submitted written testimony, a majority favored relocating the freeway.

The relocated freeway ultimately received support from every local unit of government affected by the project.

"Engineering decisions should be made by qualified professionals," says Lowell Jackson, secretary of the Department of Transportation, "but this case demonstrates that consensus born of public involvement can be an essential element in the process of developing sound — and achievable — transportation projects."

DNR Secretary C. D. Besadny expressed his satisfaction in these words: "When this project is complete we will have restored a portion of the environment that was previously lost and established a statewide precedent for DOT financing of environmental restoration in similar cases." ●

# Mitigation becomes re-creation

*"The first prerequisite of intelligent tinkering is to save all the pieces."*—Aldo Leopold  
Beltline builders will try to do it.

The first earthmovers were expected to begin excavating and filling for the new quarter-mile Yahara River Bridge and the first wildlife pond early this fall.

But earlier this summer contractors at the pre-bid conferences were somewhat puzzled by the specifications. "Wildlife ponds? Removing and replanting great gobs of swamp like so much sod? Underwater planting? Forbs? Excuse me?"

Some veteran road builders wondered what it all had to do with pouring concrete for a highway.

For example, design engineers asked grader operators to build a pond while borrowing fill and to re-create lost wetlands. It turns out that re-creating major wetlands in conjunction with a road project is a unique and evolving art. Design engineers candidly admit, the book hasn't been written yet.

On the other hand, area biologists invited to review the plans last spring were cautiously enthusiastic.

"It's an exciting approach. It's obvious that Betsy has given this a lot of thought," commented Virginia Kline, botanist at the UW's Arboretum in Madison.

Betsy Day, a graduate student in water resource management, smiled. The meeting marked the end of her first year on the job as the specialist hired by DOT to plan details of the Beltline mitigation plan.

Ralph Blum, chief design engineer for DOT's Madison area district, is still amused.

"A year ago she stopped by our office to gather technical information to critique our mitigation plan," he says, "and she asked, 'By the way, are there any job opportunities around here?' So we hired her."

One of Day's first targets is a mound of foundry sand west of the Yahara River and just south of Wisconsin Physicians Service

headquarters. Dumped there long ago, it will likely be removed to restore the old bulkhead line — the legally drawn line that defines, in this case the wetland's edge. When the graders begin their work, they will be expected—according to the plans—to salvage the surface of the marsh for replanting in other areas. The top two-foot layer of soil and indigenous vegetation covering some 3.5 acres will be preserved and spread over graded restoration and enhancement sites.

Where the marsh surface is dominated by undesirable exotic species such as reed canary grass, the excavated materials will be moved away to an approved upland site.

"In the old days," Blum says, "we'd just toss it off to the side. Trucking it out drives up costs considerably."

In about the same area, which will be near the west end of the new bridge, three wildlife ponds will be dug. One will be about three feet deep, and two, at the suggestion of Dane County naturalist Wayne Pauly, will be six feet deep, a depth that makes it easier for turtles to survive through the winter. Two other ponds, one at each depth, will be dug east of the river. Mats will be used underneath earth-moving equipment to reduce unnecessary scarring.

Day acknowledged that introduction of unwanted species is a concern. When graders disturb vegetative cover, it is like opening a large wound in the earth and exotic seeds can be carried in by the wind, animals, or trucks to infect the native wetlands. Mulching materials will be watched closely for unwanted species like ragweed, nettle and purple loosestrife.

But the plan is to eliminate non-native species as much as possible, and seed or

transplant indigenous grasses and forbs. Forbs are non-grass herbs such as thimbleweed, New England aster, various coneflowers and blackeyed susan.

Some seven species of grasses will be seeded, including big and little bluestem, and prairie rye. The seed and forb mixtures are designed to create both wet prairie and dry prairie. Rootstock will be collected next April and planted according to specific instructions to help insure high survival.

A sedimentation pond will be built near a site that had been filled and used as a miniature golf course.

"In many ways," Day says, "our re-created marsh will turn out to be different than what was there before the fill was hauled in. What we will be trying to re-create will tend toward the wet side."

Still, the biggest unanswered question at this point is: Who will manage the publicly owned land? Not set up to maintain wetlands, DOT has talked with officials of Monona, DNR, the UW Arboretum, and Dane County.

Blum said that Dane County is the most logical candidate since the county has already taken responsibility for the E-Way Corridor. DOT staff are confident a suitable arrangement will be made.

"The plan looks fine," observed Marita Roherty, of the Wetlands Association, "but we're concerned about the follow through."

"We do new things every year," Blum responded. "We're not too concerned that what we specify won't get done. It will!"

"We committed ourselves to mitigation," says Bill Wambach, director of the Madison area district, "and we're going to do it the best way we know how." ●

## Saving the Wetlands

The history of Beltline planning ever since the 1970s has been a series of design modifications to mitigate adverse wetland impacts caused by relocation. Developed in cooperation with DNR, the changes include:

- Shifted alignment of the roadway—farther from Upper Mud Lake and closer to the existing Beltline.
- Smaller median widths.

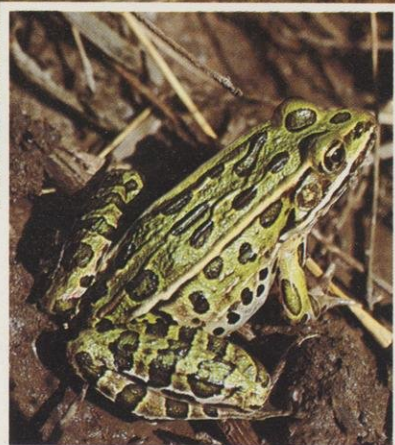
- Compact diamond design for the interchange rather than a cloverleaf.

- Northward relocation of an interchange.

- Narrower and longer bridges over the Yahara River.

These changes reduced wetlands required for the project from 71 to 31 acres by the time the Draft Environmental Impact

Statement (EIS) was issued in May 1983. Efforts to mitigate environmental damage continued that summer and fall during DNR's review of the Draft EIS. This resulted in further reducing wetland requirements to only 22 acres. To make up for this DOT agreed to re-create 20 acres of prior wetlands and enhance an additional five acres already in existence. The upshot is that the



**The land of the freeway and the home of the leopard frog.**

Photo by Mark Wallner

**New route of Madison's South Beltline will eat up 22 acres of wetlands, but DOT will re-create that amount and build sediment and wildlife ponds as well as doing other environmental enhancement work. Photo was taken prior to construction of Southtown Mall.**

DOT photo

- Restore as wetland property owned or acquired by DOT south of the freeway.
- Construct two wildlife ponds on DOT lands south of the freeway and east of the river.

- Build three additional wildlife ponds west of the river.

Relocate a drainage channel to connect the wildlife ponds, reduce runoff contamination and possible stagnation and enhance the quality of water flowing into Upper Mud Lake.

- Construct a sediment pond south of the freeway to prevent siltation of Upper Mud Lake during storms and to handle accidental highway spills.

- Acquire private land north of the freeway and west of US 51 and remove fill from it to re-create wetlands.

- Fill part of the horseshoe channel east of the Yahara River to create a contiguous



**Abandoned miniature golf course will be removed and wetlands restored.**

Photo by Greg Matthews

1,000 acre Mud Lake marsh complex will remain approximately the same size, although the roadway will run through and divide a portion of it.

In other parts of the mitigation plan, DOT agreed to:

- Shift the freeway to the north side of the sewer line, reducing disturbance to Upper Mud Lake and wetland needs by nine acres.

- Construct a sediment pond at the discharge of an existing drainage structure southwest of the US 51 interchange.

- Dig a wildlife pond and remove fill to re-create a former wetland on an old miniature golf course site.

wetland south of the highway, thus eliminating a highly disturbed shoreline and stagnant water condition.

- Remove old foundry sand fill from beyond the bulkhead line which will re-create several acres of wetlands.

- Guarantee public ownership in perpetuity for all DOT-acquired wetlands on both sides of the freeway to prevent future development. ●

**Back cover: The yellow throat is a characteristic marsh bird. Saving its habitat and that of other wetland wildlife when transportation needs intrude keep DOT and DNR liaison personnel busy.**

Photo by Richard Wunsch



