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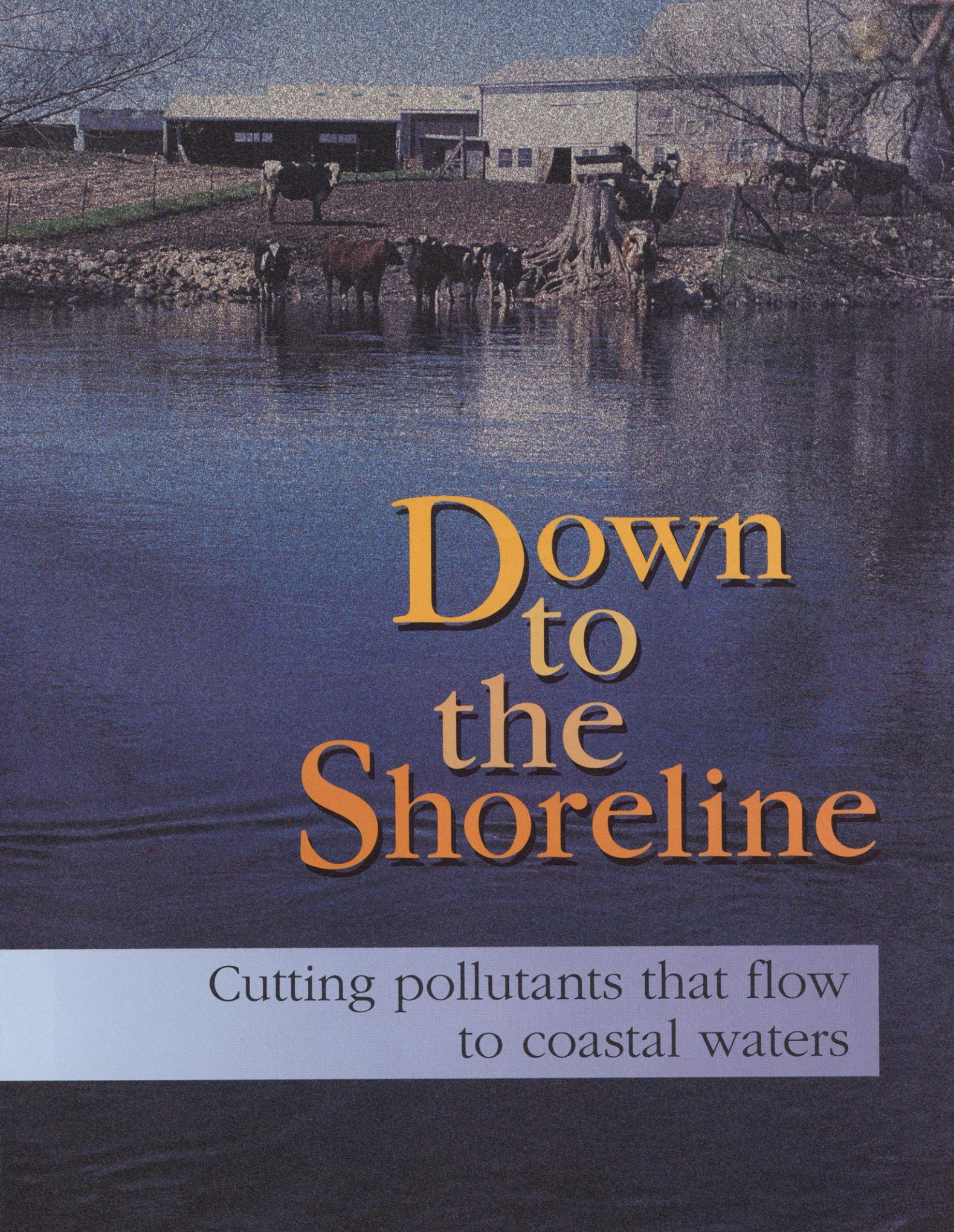


Down to the Shoreline

Cutting pollutants that flow to coastal waters

Turning toward the water

On farms, around homes and in town, coastal communities learn that what happens to the land happens to the water.

It's a struggle to keep the Great Lakes worthy of their name considering how we treat them. In Lake Superior and Lake Michigan, anglers can catch fish but need to carefully choose which fish to eat.

Swimmers can don their suits, but often can't enter the water: On 242 occasions (beach use days) in 1992 and at least 94 times in 1993, officials closed area beaches or issued health advisories in Milwaukee, Racine and Kenosha counties because of high bacterial counts.

Citizens can turn on the tap, but these days feel a little less assured of safe water: 403,000 Milwaukee area residents suffered flu-like illness and more than 100 people died in the spring of 1993 after drinking water became contaminated with the microbe Cryptosporidium.

Nearly a quarter century and billions of dollars after Wisconsin started cleaning up its industrial and municipal sewage treatment systems, water quality in Lake Michigan, Lake Superior, and the lakes and streams that drain to them has improved substantially. However, coastal waters haven't attained the fishable, swimmable status envisioned in the 1972 Clean Water Act.

The culprits are no longer mainly the factory outlet pipes or inadequate sewage treatment plants that used to pour bilious and toxic wastes into the Great Lakes and feeder streams. The culprit is us.

Our lifestyles and our daily activities — raking leaves, fertilizing lawns, driving and maintaining our cars, building our homes and offices, plowing our fields for crops, and cleaning manure from our barnyards — create pollution. Rain and melting snow pick it up and carry it to the Great Lakes and the network of streams, rivers and lakes that drain into them.

"Everybody in some way, shape or form has the potential to contribute to the problem," says John Bechle, a Brown County land conservationist. "Whether you are from an urban area or a rural setting, your day-to-day activities have an effect."

ANNE HOLY

A plume of clay and other sediments flow from the Nemadji River into the Lake Superior harbor just after a rainstorm. Sediment is Wisconsin's largest water pollution problem, by volume, and it takes hostages. Fertilizers, metals, pesticides and other chemicals often cling to sediment and are deposited by wind and water into lakes.

An abstract problem with tangible harms

Most of us know the problem as "runoff," but officials fittingly call it nonpoint source pollution: it's an unwieldy, abstract name for an unwieldy, abstract problem. Nonpoint source pollution runs across the land, not through a pipeline. It comes from a daunting and diverse number of activities and places, including agriculture, urban areas, forestry operations, marinas, modified wetlands and waterways, and eroding streambanks.

In Wisconsin, urban and rural land uses are the primary sources of runoff pollution, and rushing water is the vehicle that delivers the load. Rainwater and snow melt flowing over farm fields and barnyards pick up animal wastes, pesticides, fertilizers, sediment and other pollutants and deposit them in the Great Lakes and their tributaries.

Rainwater and snow melt flowing over rooftops, parking lots, streets and construction sites carry used oil, metals, fertilizer, human waste, pet waste, household chemicals and sediment directly into nearby waters or storm sewer drains. These drains are gateways to a system of pipes designed to efficiently prevent floods, but they can also mainline the noxious brew into the Great Lakes and its tributaries without any treatment.

People often don't appreciate the connections among their daily activities, storm sewers and surface waters. They are rarely on the water shortly after it rains or they still think pollution is largely industry's problem, notes Tony Smith, a Manitowoc County soil conservationist.

"Maybe it would help if all landowners could see Lake Michigan from their cars and tractor seats," Smith muses. Actually, he's pleased with Manitowoc County landowners' efforts to control runoff pollution. "We live in a coastal county and it's easier for landowners to visualize the connections between their actions and the water quality in Lake Michigan."

Most of us understand how toxic pollutants concentrate in our food chain. Nonpoint source pollutants act in subtler ways. Eroding soil can upset the delicate balance of oxygen, nutrients and temperature particular to a river or lake ecosystem, making it difficult for native species to survive.

Sediment is one such pollutant. Soil particles on farm fields and construction sites are life-giving on the land, but life-threatening when carried into waterways by weather or wind. Sediment clouds waters, reduces visibility, smothers aquatic life and blocks the sunlight that aquatic plants need to produce oxygen and food. It fills in the pools below stream riffles that fish favor and reduces the water depth. Shallower streams, in turn, are more easily warmed by the sun, raising water temperature and decreasing the oxygen available to fish.

ROBERT QUEEN

People don't appreciate the connection between their daily activities, storm sewers and surface waters. Maybe it would help if they could see Lake Michigan every time they got into a car or onto a tractor. — *Tony Smith, county conservationist*

Phosphorus and nitrogen, the nutrients which make manure a valuable natural soil fertilizer, have a nasty multiplier effect in water. Microorganisms use oxygen to break down nutrients, robbing available oxygen for fish and other aquatic creatures. And the nutrients feed huge algal blooms which can turn water into a stinking, slimy mess — no good for nature, discouraging for swimmers and interfering with boat propellers. When these blooms and weeds die, they consume additional oxygen.

Property owners and anglers in Manitowoc County saw the power of phosphorus from runoff pollution in mid-March. They awoke to find Hartlaub Lake, a favorite fishing hole, filled with dead fish. Largemouth bass, perch, carp, walleyes and crappie all were victims of nonpoint source pollution.

"It was very disappointing," recalls Smith. "I had been working here for seven years on this project, and felt I was getting something done, then through coincidence and bad weather, boom! It's like building a house and having the wind blow it down."

Smith thinks that the dry summer and fall left the lake with low water and oxygen levels heading into spring. "When we got rain, the lake got a big charge of pollutant" that had to be broken down, monopolizing what oxygen was available.

"It's a creeping pollution," says Roger Bannerman, a DNR nonpoint source monitoring specialist. "By the time the effects are noticeable, you're on your way to losing the stream or lake."

Nonpoint pollution degrades water

This creeping pollution is taking a toll on Wisconsin's 1,017 miles of Great Lakes shoreline and the 10,122 miles of streams and rivers that drain into

COURTESY OF MILWAUKEE COUNTY HISTORICAL SOCIETY

Urban rivers and harbors could again be centers for fun and sport once runoff is curtailed. Many Milwaukee residents learned to swim in the Milwaukee River at Rohn's and Bechstein's swimming schools. Paddleboat and canoe rides were popular ways to beat the summer heat.

Lake Michigan and Lake Superior.

- None of the coastal shoreline miles have the full diversity of wildlife they are capable of supporting.
- Nonpoint source pollution accounts for the top six causes of environmental degradation: altered wildlife habitat, excess nutrients, excess sediment, decreased oxygen supply, increased turbidity, and altered stream flows.
- Nonpoint sources comprise nine of the top ten sources of pollutants impairing Great Lakes waters. The category "industrial point sources" ranks eighth.
- Wisconsin harbors contain five of 43 toxic hot spots on the Great Lakes. Industrial corridors were historically built along the rivers, and back lot disposal practices washed materials into the water over several decades. Pollutants buried in those sediments settled in the riverbeds and the Great Lakes. Remedial plans are recovering the Lower Green Bay/Fox River, the Menominee River, the Milwaukee Estuary, the Sheboygan River, and the St. Louis River harbor areas.

Great Lakes make Wisconsin great

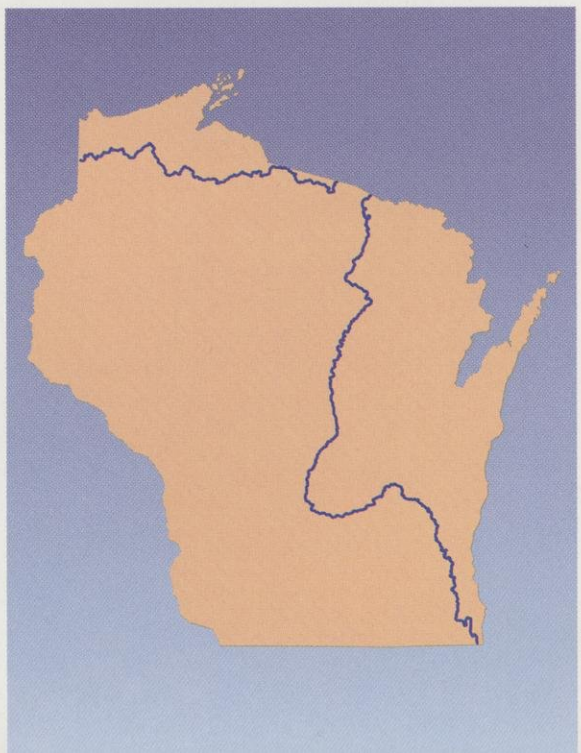
Cleaning up and controlling nonpoint pollution is critical to the health and economic futures of communities along the Great Lakes coast. About half of the state's five million people live in the 28 counties whose rivers and lakes drain into Lake Michigan or Lake Superior; more than two million people rely on the Great Lakes for the water they drink, and even more pull their water from wells replenished in part from the rivers and streams that empty into the Great Lakes. Most of the state's industry is located in the Lake Michigan basin. The lake is a magnet for tourism and a focal point for urban renewal.

Lake Michigan, Lake Superior and their tributaries are defining features of the state and its culture. They are intrinsic to Wisconsin's history. As early as 6,000 years ago, descendants of the region's first human settlers mined copper from the south shores of Lake Superior. These waters were highways for a flourishing fur trade. Riverine networks opened up the region to logging, mining, agriculture and European settlement. Riverside towns harnessed water to drive gristmills, sawmills and factories.

The same activities that turned rivers into the engines of economic development used the waters as civilization's sewers. The logging industry denuded the Northwoods, allowing massive soil erosion and sending leaves, sawdust and other organic wastes into the waters. Industrial waste, including tannery scraps and chemicals, mixed with human waste poured into the rivers. It created such a putrid, toxic mix that the city of Milwaukee regularly pumped Lake Michigan water into the Milwaukee River to flush it out. In Green Bay, the East River won the two-word headline "It Stinks" in The Green Bay Press-Gazette in 1948. Ten years later, people were dumping perfume in the river to mask the stench.

Polluted sediments can lodge for decades in the giant catch basins of the Great Lakes. Lake Superior is the world's biggest freshwater sink and it has a pretty effective stopper: only one percent of the lake water flows out of it during a year. It takes 191 years — nearly two centuries — to completely turn over the water.

"It took a long time for people to degrade those waterways," says Bechle. "We're not going to correct those problems overnight."



DNR MAP

Nearly half of Wisconsin's population live where waters drain to the Lake Superior or Lake Michigan coast. The coastal zone nonpoint source plan provides strategies for curbing runoff and pollution in these regions from agricultural practices, forestry operations, eroding streambanks, marinas, modified wetlands and river damming.

DEAN TVEDT

(left) **Silt and sediment streaming from construction sites can carry up to 75 times the pollution load per acre as croplands. Urban erosion controls since this 1978 photo slowed losses.** *(below)* **By controlling slope, protecting exposed soil, planting fast-growing cover crops and installing barriers, we can minimize the materials eroding into water from construction.**

ROBERT QUEEN

Some solutions easy, others very tough

Returning the Great Lakes to swimmable, fishable quality means preventing pollution in the first place. Individuals, municipalities, industries and the state all have a role in achieving that goal. Prevention starts with low-tech, low-cost changes in our habits and practices. It includes simple measures like recycling used car oil, riding the bus to work, diverting rainwater from paved areas, or placing straw bales on the downslopes of construction sites to trap eroding soil.

In rural areas, the measures mean adopting farming practices that keep the manure, fertilizer and pesticides on the soil and the soil in the fields. In urban areas, it means keeping chemicals, trash and leaves out of the storm sewers and keeping soil on building sites.

Achieving these goals is easier said than done. Land development makes controls on runoff pollution a moving target. The average acre under construction loses 30 tons of soil to a lake or stream in a year, according to DNR estimates based on monitoring at a subdivision in Germantown. That rate is 75 times the average amount that cropland loses.

Commercial land that is stripped of its vegetation and paved with impermeable materials doesn't filter out pollutants as soil does, nor can storm water soak in. As water flows faster, it can overflow storm sewers, erode streambanks and flood downstream areas.

Opportunities for development also tantalize some farmers who might otherwise make changes to prevent nonpoint source pollution. Real on-farm income, adjusted for inflation, dropped nearly 60 percent in Wisconsin from 1969 to 1992, compared to 25 percent for the nation, according to the 1995 Status of Wisconsin Farming. Worried about their future profits and survival, many farmers are opting to sell. In 1993, buyers paid nearly $500 more per acre for the 91,000 acres of Wisconsin farmland sold for nonfarm uses; that total acreage constituted 21 percent of the farmland sold that year.

So much development is going on that I think some people are hesitant to enter a state program that requires them to maintain improvements for 10 years, says Andy Holschbach, who directs Ozaukee County's Land Conservation Department.

In a show of cooperation unparalleled in any other drainage basin in the country, 25 communities in the Milwaukee River Basin and more than 350 rural landowners took action to curb urban runoff. The 25 communities and the DNR have invested $10 million to deal with urban runoff. They have taken actions including:

- beefing up enforcement of construction site erosion controls
- assessing and modifying practices such as street cleaning and cleaning catch basins
- raising public awareness regarding urban runoff
- preparing storm water management plans, constructing detention basins and other best management practices.

Wisconsin efforts

The Federal Coastal Zone Act Reauthorization Amendments of 1990, require 29 coastal states to develop programs to reduce nonpoint pollution entering the Great Lakes and the oceans. Wisconsin turned in its proposed plan in July, according to Rob Carnachan, DNR coordinator of the coastal zone nonpoint source plan.

One big challenge states face is finding money to implement the plan — the federal mandate didn't come with a budget. Governor Tommy Thompson's analysts estimate this one program will cost $50 million the first year and much more in the future.

Another is dealing with nonpoint pollution on a far larger scale. "We're challenged to blend the current program, which pinpointed distinct watersheds across the state, with a new emphasis to manage the whole coastal watershed," says Carnachan.

Wisconsin focuses on controlling runoff in those watersheds that have the worst water quality, places with unique natural communities that should be preserved, and waterways which are most likely to respond to treatment. More than 300 distinct watersheds drain the land. Since 1978, the state has funded voluntary clean up and prevention activities in 76 of those watersheds. Local governments receive the funding, and they, in turn, sign up landowners and other potential polluters in the watershed to participate in the program.

And then there's the hammer — runoff control programs are gradually shifting from *encouraging* potential polluters to prevent the problem to getting flexibility to *require* pollution prevention measures throughout the coastal watersheds where runoff is considered a critical problem.

Wisconsin ahead of the game

Other DNR programs also build runoff control into their work. For example, hazardous waste inspectors recommend ways to store and handle materials so they won't spill or drain into waterways. Foresters recently published a field manual for loggers, landowners and land managers describing how timber sales, logging roads and stream crossings should be built and maintained to minimize runoff.

These DNR programs are complemented by other state efforts to curb runoff pollution:

- The Department of Agriculture Trade and Con-

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(left) **A new manual shows loggers and landowners how to minimize runoff and pollution flow when harvesting timber, building logging roads and using heavy equipment near water.**
(right) **We see a stronger commitment from urban and rural people to work together to control pollutants carried in runoff; a recognition that each has a role in causing pollution and in preventing it.**
— Ruth Johnson, DNR water resources specialist

sumer Protection's (DATCP) Farmland Preservation program gives farmers tax credits for using tillage practices that slow and decrease erosion. The state also shares part of the costs to have a crop consultant evaluate how much pesticide and fertilizer a particular crop on a particular field needs.

- The Department of Transportation has updated policies, design and specifications so its engineers and contractors incorporate storm water and erosion control planning in every agency project.
- The Department of Industry, Labor and Human Relations requires erosion controls as one- and two-family homes are constructed. A similar measure would require erosion controls at commercial construction sites smaller than five acres. Bigger construction sites must already meet low-erosion standards. DILHR also shares part of the costs for replacing aging septic systems.

Many counties and municipalities are taking action on their own to prevent nonpoint source pollution. Brown County passed an ordinance requiring farmers to leave uncultivated a 35-foot strip of land along streams that run through their property; Door County was the first county to require that septic systems be updated when a property is sold or transferred.

Making the connection

Federal programs to clean up coastal waters are dovetailing with state and local efforts to increase public awareness and action.

"The Cryptosporidium problem closed the loop for people who now realize that what goes into the river goes out into the lake and can hurt their health," says Carolyn Johnson, a University of Wisconsin-Extension urban water quality educator. "[That crisis] also built more support, understanding and participation in the Milwaukee River Priority Watershed Project."

Ruth Johnson, a DNR water resource specialist who works to convince rural landowners in the Milwaukee River Priority Watershed to install pollution control measures, sees signs that rural landowners and city people are treating the program as more of a partnership now.

"Over the past three years on the job, we've seen a stronger commitment to working together, rural and urban, a willingness to recognize that each has its own significant role in causing the pollution and in preventing it," says Johnson.

"There's a growing realization of the scope of the problem," Johnson says."We no longer have the luxury of working on our own."

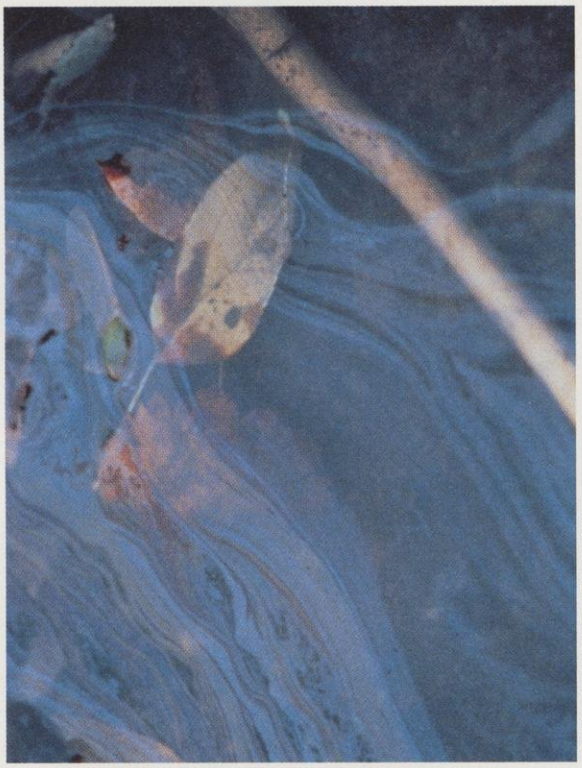
Johnson and others working to clean up the Great Lakes and tributary waters such as the Milwaukee River, feel encouraged by their success so far.

"I feel there has really been a dramatic improvement in the water quality and shore maintenance from all of the areas I've seen," says John D. Buechel, a key organizer of the Downtown Milwaukee Kiwanis Club's 13th annual campaign to clean up the river banks in county parks. Their first event drew 100 people. Almost 4,000 are expected to help in cleanup projects this year. "It improves the view for the natives who live here and for visitors."

What they are seeing is a swell of businesses, residents and tourists returning to the Great Lakes and coastal waters. Milwaukee's Summerfest music festival and a host of other cultural and ethnic events are celebrated on its Lake Michigan shore; Racine and Kenosha pumped money into their lake fronts in recent years; Cedarburg sponsors a winter festival along the Milwaukee River, and Saukville draws in thousands of visitors with its Crossroads Rendezvous.

"We're no longer turning our back on the river," Ruth Johnson says. "We're turning toward the river."

When it rains, we pollute



DNR WATER RESOURCES MANAGEMENT

Storm water in town can carry 20 or more toxic pollutants directly into streams, rivers and lakes.

Most of us would never think of pouring used car oil into Lake Michigan, spreading fertilizer over the Fox River or tossing Fido's droppings into Superior Harbor. But many of us still don't think twice about throwing motor oil out with the household trash, repeatedly fertilizing our lawns, or scattering Fido's droppings with a high-powered squirt from a hose. The effects are largely the same: we are polluting the lakes and streams we count on for clean drinking water and for recreation. Anything that we put on our driveways, our streets, our lawns, or our construction sites can and likely will end up in our surface waters.

"Most people don't make that connection," says Roger Bannerman, a DNR specialist who has monitored what storm water carries in many urban areas. "They think it goes to a treatment plant and then into the lake or stream."

A 1994 telephone survey of Waukesha County residents supports Bannerman's statement: half didn't know that in most communities storm water is not treated before entering the water.

Tests show urban storm water can dissolve and carry 20 toxic pollutants (most from auto and truck use) in concentrations that exceed standards for industry discharge pipes. Contaminants in storm water discharges have been a major reason for beach closings in the Milwaukee, Kenosha and Racine areas in recent years. Storm water contains several substances in amounts that can harm wildlife and the environment; impacts on human health at those concentrations are unknown.

Storm water monitoring recently completed in 14 Wisconsin, Michigan and Minnesota communities along Lake Superior found good news and bad news, according to Jeff Prey, DNR water resources specialist.

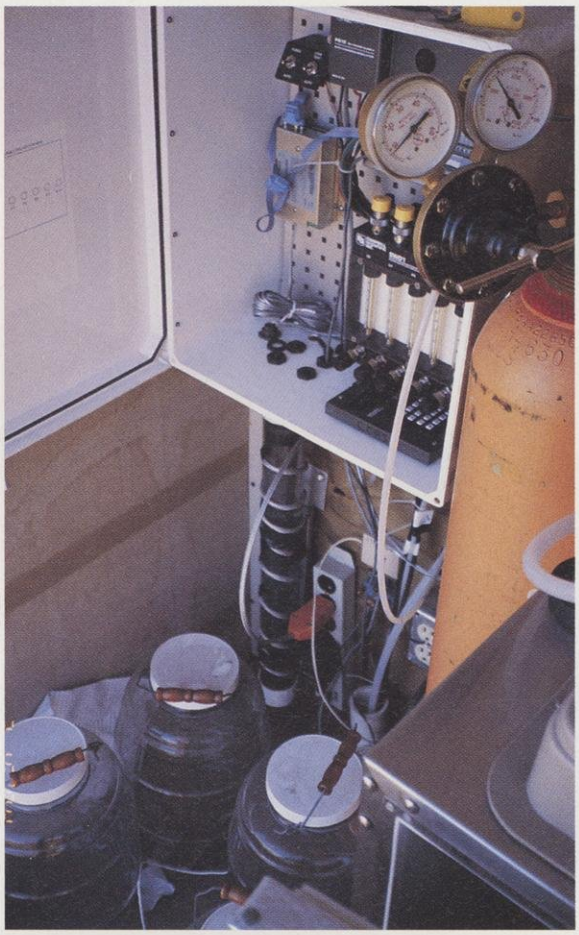
The storm water didn't contain mercury, polychlorinated biphenyls, or seven other pollutants of concern to experts. But it did contain lead and zinc in amounts exceeding standards, and contained polycyclic aromatic hydrocarbons (PAHs), at levels 10 to 15 times the standard. Lead and zinc can be toxic to fish and impair human health as well. PAHs, a by-product of fuel combustion, can cause cancer in people and aquatic organisms.

He suspects the by-product is coming from atmospheric pollution that settles onto streets and rooftops and is washed into storm water sewers. Prey notes that PAH readings were higher at monitoring stations near high traffic areas. Monitoring results will be presented to various state and Canadian-U.S. groups to get help in interpreting potential human health and water quality implications.

Perhaps no Wisconsin community has had more reason to be concerned about storm water contamination than Milwaukee. In the late 1970s, Illinois and Michigan took Wisconsin's largest city and its sewerage district to court for discharging inadequately treated wastewater into Lake Michigan. Downtown Milwaukee was serviced by aging sewers that carried both storm water from the streets and wastewater from homes and industry. The combined water and sewage mix overloaded the treatment works and overflowed into nearby streams whenever more than one-tenth inch of rain fell: 50 times in some years.

The city chose to settle its legal troubles by investing in a $2.3 billion overhaul of its wastewater collection and treatment system. The overhaul included digging 17 miles of underground tunnels to store up to 400 million gallons of wastewater and storm water until it can be treated by the city's treatment plants. The tunnels are expected to eliminate overflows in separated sewers and reduce overflows in combined

ROGER BANNERMAN



JOHN THOMAS MINNESOTA POLLUTION CONTROL AGENCY

(left) **Monitoring pollution traffic. Holes about a foot deep and six inches in diameter can hold sample jars to collect storm water from streets. After the storm, the water is tested.**
(right) **Automated samplers track sediment, metals and other pollutants that flow down roadsides and into storm sewers.**

sewers to less than two per year.

Smaller communities are also getting into the act.

"We've been very proactive — some of that has to do with the fact we've been forced into it, some of it because we realized and understand that some of these things had to happen," says Jeff Vito, public works director for the city of Superior. "We live on Lake Superior, it's an asset to our community and to the surrounding areas, and we need to be conscious of that fact."

Vito and other Superior officials are working with the DNR to develop a city-wide plan for managing storm water. Vito doesn't expect major changes in the city's day-to-day operations because Superior is already doing a lot.

"In the last five years, we've doubled our street-cleaning efforts," he says. Sweepers now start running in April, making passes twice a week down main thoroughfares, once to twice a week in commercial areas, and once a month through residential areas. This summer, the city will be stenciling pavement near storm sewer drains with words warning residents against dumping pollutants in the sewers. Vito hopes the action will make residents think twice before dumping car fluids, car washing detergents and household cleaners down the drains.

"People are more aware of opportunities to recycle motor oil, but I still think some dumping occurs," Vito says. "So many people saw their parents do it years ago — generally it's just an ingrained habit and a lack of education."

Across the state, the Village of Grafton has also taken steps to manage storm water and curtail pollution into the Milwaukee River, which runs through the downtown.

This spring, the village is building the second of two detention ponds to store storm water until the pollutants can be filtered out and cleaner water released. The pond's $127,000 cost is shared by the village and the state priority watershed project says Mark Gottlieb, village engineer and director of public works. The village also received state cost-sharing on the first pond.

"The ponds were not just a one-shot deal, but are part of an overall commitment from the village board to better manage our storm water," he says.

That commitment included writing formal policies for street maintenance, increased street sweeping, improvements in maintaining and washing public vehicles, and salting only main thoroughfares, bridges, hills and other trouble spots in winter.

The village even installed a detention pond at its industrial park to prepare for the day when businesses will face stringent storm water discharge requirements. "That makes our park a better place to locate," Gottlieb says. "If a business can say, 'I don't have to do this because Grafton is already taking care of it,' we think that puts us in a better position to attract and retain industry."

Prey and other state environmental officials are enthusiastic about the storm water management efforts that local governments are making. But they caution that individuals must also take responsibility for managing storm water by making some lifestyle changes. "Ultimately, it comes down to how often you drive your car, how much fertilizer you put on your lawn or your rosebushes," Prey says. " We need to encourage lifestyle changes."

Citizens of their watersheds

At first, Joel Aulik thought he was hearing the punch line to a tired joke.

"You know what your first reaction is when someone says he's from the government and he's going to help you," recalls Aulik, who owns a cash crop farm near Newton, Wis. "'Yeah, right.'"

But Aulik heard Tony Smith out. The Manitowoc County soil conservationist described how they could work together through the Wisconsin Priority Watershed Program to keep Aulik's 160 acres from eroding and polluting the creek that meanders through his property.

Now Aulik's a believer. "I'm really happy with what's been done," he says. His streambank is stabilized with large rocks, or riprap; seedlings sprout in orderly rows in an 80-foot-wide strip alongside the stream, and his fields are planted in ribbons that follow the land's contours.

"In 20 years it will be really nice when the trees grow, and of course, it will help the water quality," Aulik says.

His satisfaction reflects comments from more than a dozen farmers and municipal officials enrolled in the voluntary program, which has been the workhorse of Wisconsin's efforts to prevent runoff pollution. It's the centerpiece of the state's plan to meet federal law designed to protect coastal waters.

Priority watershed grants share the costs of installing measures to control runoff pollution with eligible landowners and municipalities. The program also pays for local governments to hire staff who provide planning and engineering help on approved projects. Those living in priority watersheds have at least three years to sign up for grants. The controls or practices are installed in the subsequent five years.

To curb the herd. Federal, state and local programs provided incentives to head off farm pollution for 17 years. Voluntary programs attracted 3,700 farmers, but didn't convince holdouts that runoff controls were worth the investment.

ROBERT QUEEN

Participants must agree to continue the practices for at least 10 years after the last practice has been installed.

But the 17-year-old program also has come under increased scrutiny because there are no tidy ways to measure its effectiveness. It is both expensive and difficult to quantify improvements after runoff controls are installed. Many factors could account for changes in water quality over time: temperature, rainfall amounts and seasonal vegetation all change the water. The 76 watershed projects completed or in progress across the state have done much to reduce nonpoint source pollutants in surface waters, but progress toward improving water quality has varied from location to location. Some projects reduced phosphorus loadings from barnyards, but didn't significantly reduce sediment and nutrients from fields and urban areas. "The very nature of the problem we're tackling here has made it a challenge to measure consistent improvement in every watershed," says Becky Wallace, head of the Nonpoint Source program at the DNR. "In some cases, the lack of participation by the owner of a single highly-polluting site can offset the gains made through voluntary cooperation everywhere else in the watershed." While more than 3,700 contracts have been signed with landowners and municipalities, there are still holdouts whose properties are considered "critical sites" for the program's success.

"The disappointment from me is we can't get 100 percent of the people to buy into that system," says Charles Jarman, a dairy farmer in Door County who installed a manure storage structure through the program.

To reach those who hadn't signed up, the Legislature gave authority to force owners of critical sites to join the program. Legislators softened the blow by providing a greater share of the costs to install the pollution control methods for holdouts who otherwise would suffer financial hardship.

"I think this back-up enforcement arrangement is going to be a good part of the program," says Jim Baumann, a DNR policy engineer involved in creating the Wisconsin Priority Watersheds program back in the mid-1970s.

Such an approach would have been dead on arrival back in 1978. Agricultural lobbyists opposed mandatory regulation."They asked for an opportunity to try a voluntary program," Baumann recalls, "but it's now obvious that something more was needed to get holdouts to participate."

Towns and farms take action together

"The Milwaukee River, in a lot of ways, is the focal point of our community," says Mark Gottlieb, Village of Grafton engineer and public works director. "There was a lot more awareness of how actions in Grafton affected water quality in the Milwaukee River watershed."

ROBERT QUEEN

We didn't prescribe solutions, says Bruce Reisterer *(left)*. We tried to work with farmers and other landowners to find solutions that stemmed pollution.

Rudy Stadler wanted to get ahead of future regulations and get some financial help to improve the Ozaukee County farm where he raises 55 head of cattle and 40 pigs. "Cost sharing is the big thing — otherwise I couldn't have done it," he says. "It cost me $15,000 on a $55,000 project."

Stadler's barnyard slopes down to a picturesque stretch of the Milwaukee River that's a favorite with canoeists. Manure used to run into the river during heavy rains. Under the cost-sharing agreement, he extended the pavement on his barnyard, erected a cement wall around the yard and built a roofed concrete pit so he could scrape and store manure in the winter.

"If the river gets a bad name, my property would be worth less," he says. "The cleaner the river gets, the more my property is worth."

Stadler also appreciates that he doesn't have to haul manure out to his fields in freezing winter weather, or slosh around in mud and manure up to his knees during spring thaw.

The county conservationists and other local government officials have worked hard to build good relationships with the landowners and municipalities. "The first three years of it was a communication job," says Bruce Reisterer, a Manitowoc County conserva-

ROBERT QUEEN

Solutions can be as expensive as paving part of the barnyard or as simple as putting a gutter on the barn to divert rain away from manure and nutrients.

tion agent who works on the Seven Mile/Silver Creek Priority Watershed. "We didn't try to come along and prescribe solutions to the farmers. We tried to work with them to find solutions — simple things such as taking the paperwork out to them instead of asking them to come to the office."

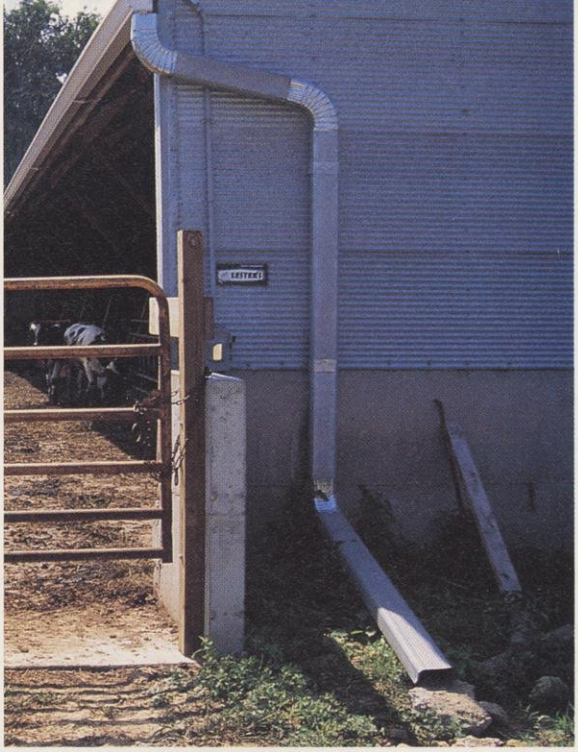
"We did a lot of work to pull this together into one comprehensive package," says Tony Smith. "It was simpler and lessened the confusion."

Smith's boss, Tom Ward, director of the Manitowoc County Soil and Water Conservation Department, credits his staff, the farmers' progressiveness, and the DNR's flexibility. When the project ends later this year, it will have signed up 78 percent of targeted landowners and will have exceeded goals for lowering phosphorous.

Ward says the DNR gave the local governments the time to work with individual landowners. DNR enlarged the list of pollution control practices eligible for cost-sharing, and that allowed counties to best address the circumstances on a particular parcel. "That flexibility is critical to customer service when you're relying on voluntary participation."

What the program has done, Ward says, is stirred the drink: it's made people aware of the connection between their activities and water quality, how changing their practices can lay the foundation for future efforts to protect water quality.

"We've done the cost sharing and the practical application, now the community has to take ownership," Ward says.



ROBERT QUEEN

How you can help on the farm

- If your county is involved in a priority watershed project, sign up to participate. Take advantage of the project's technical assistance and cost-sharing for installing conservation practices.
- Develop and follow a conservation plan for owned and rented land. County land conservation agents can help with planning.
- Follow a nutrient budget for crop production. A nutrient budget will help reduce runoff pollution and fertilizer costs.
- Use conservation tillage, contour strip cropping, and crop rotations. These practices reduce cropland erosion and runoff.
- Manage barnyards and manure spreading to minimize nutrient and bacterial runoff.
- Fence streams to keep out livestock and protect waterways from grazing damage. Woodlots and other sensitive areas are other good candidates for fencing.
- Monitor fuel use from underground gas and oil tanks to ensure they don't leak.
- Allow natural buffer strips between streams and waterways and cropland. Buffers prevent sediment and nutrients from reaching the water and can provide wildlife habitat.

— University of Wisconsin-Extension/Wisconsin Department of Natural Resources

An opening for cleaner water

Charles Jarman doesn't need test results to see how farming practices can affect water quality in Door County.

"As long as I can remember, with our shallow well, every spring the water got brown and that was just plain from manure spreading," says Jarman, who milks 85 cows on a family farm near Sturgeon Bay. "I can spread manure on one of my fields and turn the water in my son's well brown."

That direct link between land use and drinking water quality is the reason the county sought help to protect its groundwater in the early 1980s. The watershed received the state's first funding to keep runoff from degrading groundwater as well as surface water.

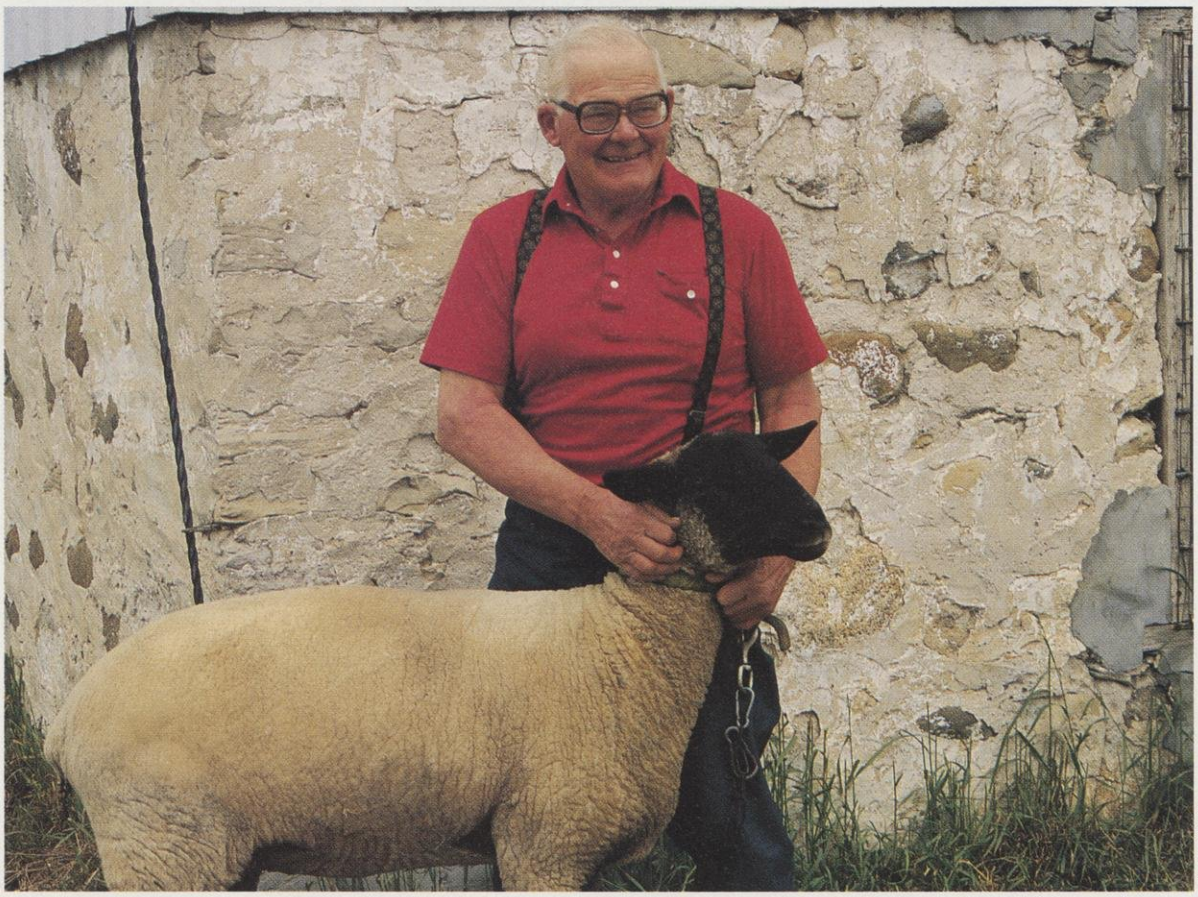
"We just found it unacceptable that priority watershed projects up to that time didn't apply to groundwater," says Bill Schuster, Door County conservationist. "There was a clear need in Door County." A 1992 study found 35 percent of all privately owned wells in the county may be contaminated.

Door County's picturesque northern reaches, a land of fruit orchards, dairy farms, white Cape Cod cottages and upscale shops, belied a troublesome mix of geology, soil morphology, and hydrogeology. Shallow soils — less than 18 inches deep in one-quarter of the land north of Sturgeon Bay — cover bedrock containing the groundwater residents count on for their drinking water. Shallow soils mean pollutants can move more quickly through to groundwater and are less likely to be filtered out by microorganisms or trapped in the pores between soil particles.

Large, fractured crevices in bedrock serve as conduits from the surface to groundwater. More than 60 barnyards were sited on soils shallower than 20 inches. Many of the more than 600 septic systems in the area also were sited on shallow soils; a number were poorly maintained.

"We certainly have more good wells than bad, but what we're trying to do is keep the bad wells in the minority," Schuster says.

Nearly a decade after upper Door County received



JEAN B. MEYER

In coastal Door County and other areas where fractured bedrock underlays thin soils, nonpoint pollution can quickly contaminate the ground, the shoreline and drinking water. In the old days, I could spread manure on one of my fields and turn the water in my son's well brown. Now, I want to make a difference. I want to make it possible for farmers to get some help to do the right thing.
— Charles Jarman, farmer

ROBERT QUEEN

DNR WATER RESOURCES MANAGEMENT

(page 14) **Voluntary programs to stem nonpoint source pollution are fine, but it's now obvious that something more was needed to get holdouts to participate.**
— Jim Baumann, DNR policy engineer
(left) **Storm sewer, friend and foe. It prevents floods but acts as a pipeline between our actions at home and the nearest lake or coastline.**

How you can help at home

- Take the bus or carpool. Most toxic pollutants in urban runoff come from using cars and trucks.
- Recycle used motor oil. Don't dump oil on the ground or down the sewer.
- Clean up after your pets. Pet waste can create pollution problems when rain washes it into nearby lakes and streams.
- Use fertilizers, weed killers and pesticides carefully and sparingly. Clean up any chemicals spilled on a driveway, street or ditch before rain can wash them down the sewer or into a stream.
- Compost grass clippings and leaves. Raking them to curbside runs the risk that they will get washed into storm sewers and may ultimately "fertilize" local streams and lakes.
- Limit use of toxic or hazardous products. Keep them away from storm sewers, lakes and streams.
- Cover bare soil with a mulch and seed it as soon as possible. Doing so minimizes erosion.
- Maintain septic system properly. Have regular inspections and licensed pumping every couple of years.

— University of Wisconsin-Extension/Wisconsin Department of Natural Resources

priority attention, the state has approved a second project, the Red River/Sturgeon Bay Priority Watershed. This effort, including Brown and Kewaunee counties, will focus on preventing nonpoint source pollution of surface waters and ground water.

The Upper Door County program has been a success. The county signed contracts covering 109 of the 149 farm sites where potential runoff problems are deemed significant.

Corrective practices include installing barn gutters and earthen berms that divert runoff away from barnyards, says Paul Klose, a Door County conservationist. "We try to stress keeping clean water clean," Klose says. "We can never clean the water up to what it was before it got into contact with manure, but we can do our best to keep it from running across the barnyard."

Jarman was one of the first farmers to sign up for the cost-sharing program. He consolidated his herd onto one farm site, paved his barnyard, and installed a steel containment structure behind his barn to hold liquid manure and wash water from his milk house. "I figured that sooner or later the regulators and the practices would come up with milk house regulations, and as long as I was tackling that, I thought, 'Why not do the whole job at once to avoid coming back and do it later in pieces?'" Jarman recalls.

He would do certain things differently today than he did in 1987 — he would opt for a concrete containment structure instead of steel, for one — but he's been pleased with the results. Since he began landspreading milkhouse wastes and manure, his fertilizer bill has dropped from $12,000 a year to $2,000.

He also is pleased to do his part to protect groundwater. Jarman became so interested in the topic that he's now a member of the county's land conservation committee.

"I want to make a difference, and I want to make it possible for farmers to get some help to do the right thing," Jarman says.

Marina alert

ROBERT QUEEN

Watch fuels and bilge water too.
(cover) **The coastal connection. Even urban waters like the Milwaukee River carry runoff and a mix of pollutants from farms, wooded lots, suburban development, city streets and businesses to the lakeshore.**
(photo by Robert Queen)

If ever a state was made for boating, it is Wisconsin.

With 14,973 lakes, 32,010 miles of rivers and two Great Lakes, the state is a mecca for canoes, sailboats, motor boats and other watercraft.

But the abundance of water recreation also means that operators of the 526,973 watercraft registered in the state need to exercise caution to protect the quality of the waters they enjoy. The normal operation, servicing and maintenance of boats, especially motorized boats, produces wastes which must be properly handled by boat owners and the marina operators who rent them slips and sell them supplies. Because marinas are located right on the water, there's no soil or vegetation to stop pollutants like hydrocarbons, metals, toxics, paint chips and sewage from entering a lake or river.

The good news is that waste from marinas "can be very easily managed so it has a negligible impact on the environment," says David Liebl, a pollution prevention specialist for the University of Wisconsin-Extension's Solid and Hazardous Waste Education Center. Most problems, he says, result from poor practices and ignorance.

Liebl says that fuel spills and incorrectly pumped bilges are the most frequent causes of pollution at marinas. The bilge is the lowest inner part of a ship's hull, and bilge water is water that collects there, often mingled with fuel. To prevent these and other problems, boaters should:

- use oil-absorbing material in bilges, and then wait to pump out bilge water until they are back in port and can use the marina facilities in place for that operation.
- take care in fueling the boat. Properly moor it, pay attention during the fueling process, and don't remove the nozzle from the tank until fueling is completed.
- confine sanding, painting and boat cleaning activities to designated areas with impermeable pads and berms to catch wastes.

"It's important for marina operators to educate users on proper pump out procedures," Liebl says. A January 1995 survey indicated that not all marina operators are educating their customers about best management practices: only a third of the 76 Great Lakes marina operators in Wisconsin said they have a public education or training program for boaters explaining proper waste disposal. But two-thirds of the marinas had established rules for fish cleaning at their sites, and a like proportion encouraged the use of oil-absorbing material in bilges and discouraged the use of cleaning agents containing phosphates, ammonia or chlorinated solvents that are toxic to aquatic life.

The survey was designed to reveal whether marina operators were doing on their own what the U.S. Environmental Protection Agency would require them to do if pending federal regulations stand.

To educate marina operators about the best practices to use and pass on to their customers, the Department of Natural Resources conducted a workshop in Superior in March 1995. Other sessions are planned for marina operators in Wisconsin's other coastal regions.

Written by Lisa Gaumnitz

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