Wisconsin natural resources. Vol. 9, No. 2 March-April 1985

Madison, Wisconsin: Wisconsin Department of Natural Resources, March-April 1985

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Wisconsin NATURAL RESOURCES

A report to citizens

March-April 1985 • Volume 9, Number 2

$2.50

Coping with toxics
Wisconsin since Earth Day, 1970
DNR's urban commitment

The DNR mission

Much accomplished, much to be done

C.D. "BUZZ" BESADNY, Secretary, DNR

In the private sector it's common to issue an annual report to stockholders. And customarily stockholders go right for the bottom line, the profit or loss statement. For DNR, reporting to stockholders is a bit more difficult. It's harder because all the citizens of Wisconsin, 4.7 million of you, are the stockholders and because protecting our environment and managing our natural resources is not easily captured in a "bottom line" number. The real "bottom line" is better expressed in how well DNR fulfills its mission, in the kinds of healthful, enjoyable, productive lives we lead here in Wisconsin, and the extent to which our children and their children will lead those same kinds of lives.

As hard as it might be to quantify the good that's been accomplished, we in DNR have an obligation to share with you, the stockholders, the progress that we've made and the progress still to be made. Because of what we do and what we stand for, there is no better time for it than during Earth Week. So we're proud to submit, for your consideration during the month in which Earth Week falls, highlights of the past and hopes for 1985 and beyond.

I hope this report gives you an idea of the kinds of activities we take pride in as your dedicated employees. I hope you see, as I do, the progress we are making in providing you with more recreational opportunities, with a cleaner and more healthful environment and a better understanding of how we all fit into the natural world. I also hope you see — and feel — the teamwork and cooperation that exists not only among our 2,500 employees stationed throughout the state, but between our employees and many Wisconsin citizens who assist us as volunteers, cooperators, local officials, business persons, farmers and others, all concerned in their own ways about the state in which we live.

Because space is limited, this report will not attempt full treatment of the many things that still have to be done. However, one area of concern demands a closer look. It is the problem of toxics in our environment. A special section in this report presents some of the details and outlines the challenges we face on this most troublesome of environmental issues.

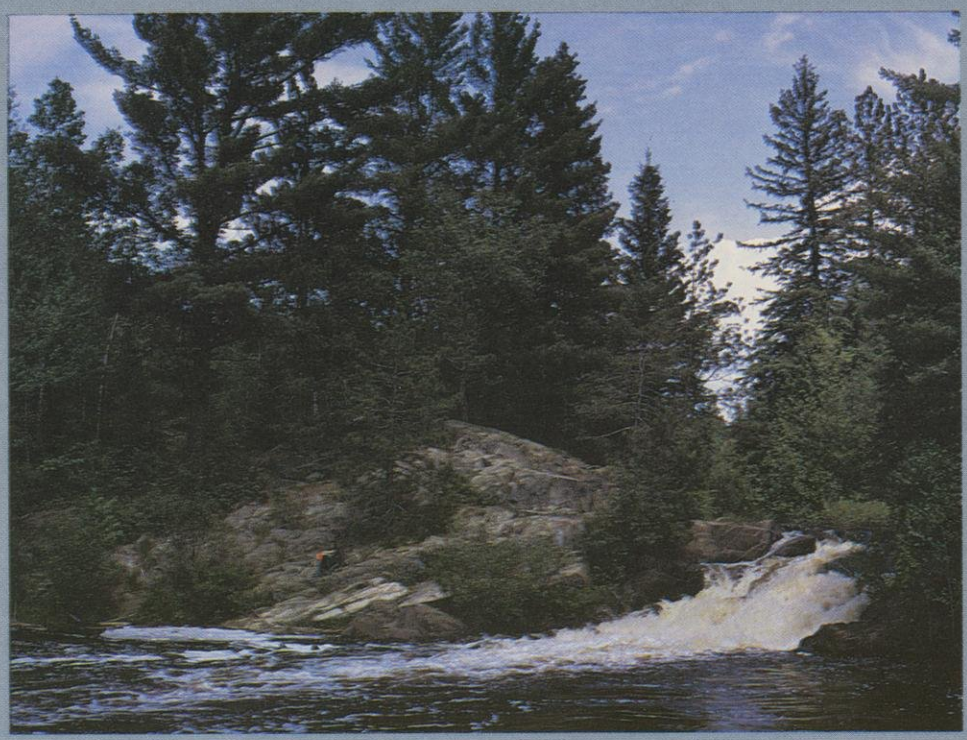
In recent years we in DNR have been especially proud of being open and responsive, of sharing information and of inviting public involvement in shaping Wisconsin's environmental future. Therefore, this report is not entirely DNR's, but yours as well, yours to take pride in, yours to find determination in — pride in what we have done together; determination in the fact that there is still much to do. It will take both to fulfill the mission you have set for us:

To protect and enhance our Natural Resources — our air, land and water: our wildlife, fish and forests.

To provide a clean environment and a full range of outdoor opportunities.

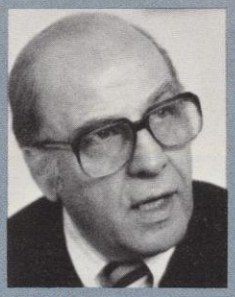
To insure the right of all Wisconsin citizens to use and enjoy these resources in their work and leisure.

And in cooperation with all our citizens to consider the future and those who will follow us.



Twelve Foot Falls on the North Branch of the Pike River in Marinette County. Photo by Staber Reese

Earth Day 15 Years Later



Gaylord Nelson

In this issue, Wisconsin Natural Resources salutes the public fervor for a clean and healthy environment that erupted on the first Earth Day, April 22, 1970, and has continued ever since. The magazine also salutes former Wisconsin Governor and US Senator Gaylord Nelson, who started it all "to show the political leadership of the nation that there was broad and deep support for the environmental movement."

Now head of the Wilderness Society, Senator Nelson said he had known from the beginning there would be a great deal of support for the first Earth Day, but was surprised when over 20-million Americans participated. Since that impressive start, more than a dozen important environmental laws have passed to clean US air and water, protect against toxics and pesticides, save endangered species and do much more. Billions of dollars have been committed to the environmental cleanup and the nation is a better place to live because of it. In the words of Senator Nelson: "So long as the human species inhabits the Earth, proper management of its resources will be the most fundamental issue we face. Our very survival will depend upon whether or not we are able to preserve, protect and defend our environment. We are not free to decide about whether or not our environment "matters." It does matter apart from any political exigencies. We disregard the needs of our ecosystem at our mortal peril.

"That was the great lesson of Earth Day. It must never be forgotten."

Computer graphics:
Conceived and photographed by Jean Meyer
Generated by Computer Graphics Specialist Donna Cox
Source art provided by James Caufield in cooperation with Michigan United Conservation Clubs.

Contents

Wisconsin Natural Resource Magazine (USPS #34625000) is published bimonthly by the Wisconsin Department of Natural Resources, 101 S. Webster St., Madison, WI 53702. Subscription rates are: $6.97 for one year, $11.97 for two years, $15.97 for three years. Second class postage paid at Madison, WI.

POSTMASTER: Send address changes to: *Wisconsin Natural Resources*, P.O. Box 7191, Madison, 53707.

March-April 1985 • Volume 9, Number 2

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Wisconsin Natural Resources is an official bi-monthly publication of the Wisconsin Department of Natural Resources, 101 S. Webster St., Madison, Wisconsin 53702. The magazine is sustained through paid subscriptions. No tax monies or license monies are used.

Subscription rates are: $6.97 per year, $11.97 for two years and $15.97 for three years. Please write for information regarding the availability and prices of past issues. Notification of address changes must include mailing label and new address. Allow six weeks. Send subscription information requests to: Wisconsin Natural Resources, P.O. Box 7191, Madison, Wisconsin 53707.

Second-class postage paid at Madison, Wisconsin.

Contributions are welcome, but the Wisconsin Department of Natural Resources assumes no responsibility for loss or damage to unsolicited manuscripts or illustrative material. Viewpoints of authors do not necessarily represent the opinion or policies of the Natural Resources Board or Department.

Coping with toxics

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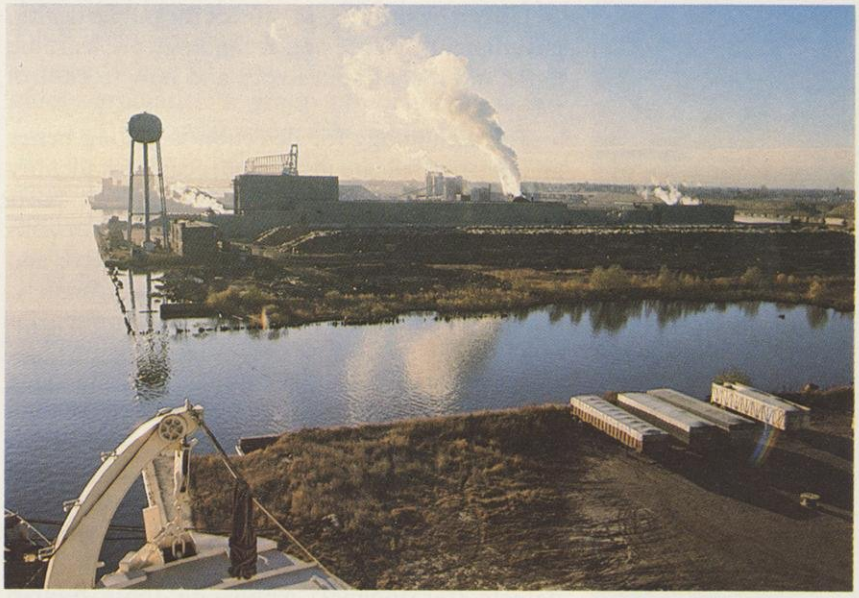
A symbol of modern ills



Toxic pollutants are ubiquitous and come from many sources. UW-Madison Ag Journalism photo

Toxic is a word we use to describe the worst in environmental contaminants: poisons, killers — skull and crossbones incarnate. The word has become a social symbol of modern ills in a world unwilling to guarantee that anything is "safe" or "pure." This perception has people very nervous. Air, water, land, food, fish and fowl, all have been described as contaminated, potential health risks or unfit for human consumption at some time or other due to toxicants.

In truth, the picture isn't that grim. We will not all die tomorrow or start clawing for the last drop of drinkable water. But it will become more and more important to understand how toxics move through our environment. Living with toxic contaminants will be expensive. We will have to practice environmental vigilance and make tough social choices.

Toxic pollutants are ubiquitous. They've been found in Arctic snow and Great Lakes sediments; in Chesapeake Bay striped bass and Mississippi River carp; in Sheboyganites and Brooklynites. They've been detected in human fat, blood and milk, and in livers, kidneys and lungs.

They come at the world from all directions. Some enter in runoff from farm fields, city streets and landfills. Others seep into well water from forgotten industrial waste sites or underground storage tanks. Accidental or deliberate chemical spills wend their way into ditches, streams and wetlands, or invisibly evaporate into the air. Dozens of different chemical wastes flow from pipes into rivers, while airborne substances ranging from fly ash and pesticides to invisible fumes and gases sneak into the sky from smokestacks, tailpipes and ventilation systems.

Once they reach the great outdoors, the lifespan of toxic chemicals ranges from a few hours for certain types of highly volatile substances to more than a decade for chlorinated compounds like PCBs or DDT. Contaminants that piggyback onto dust, soil, ash or sediment particles often linger the longest and spread the farthest. Chemicals attached to a microscopic fragment of clay suspended in the air can become interstate, even international travelers. In 1975, DDT applied in the Pacific Northwest to control a moth infestation was traced and detected later in rain falling in New York State. Toxaphene, used mostly on crops in the Dakotas and cotton in southern states, has been found in trout taken from an interior lake on Isle Royale surrounded by pristine Lake Superior.

Large surface waters like Lake Michigan and the world's oceans act as sinks for toxic compounds harbored in runoff, fallout and discharges. According to the International Joint Commission, 90% of the PCBs in Lake Michigan are the result of atmospheric fallout. Over 100 different chemicals have been identified in the sediments of Wisconsin's industrialized Lower Fox River and Green Bay.

Many of these synthetic compounds are so alien to nature that the usual arsenal of breakdown weapons — sunlight, air, water or bacteria — take virtually forever to do their job. A decade or two may pass before some pollutants buried deep in underwater sediments finally break down into nontoxic forms. The process takes less time if the pollutants escape burial and freely move around in the water where their "enemies" can reach them.

As toxic chemicals travel higher up the food chain, they become increasingly concentrated. Breast-fed infants receive more than 50 times the concentration of whatever PCBs their mothers happened to unwittingly ingest. Brook trout fry exposed to water concentrations of 0.5 parts per billion of toxaphene accumulated an average of 38 parts per million of the chemical during 15 days of exposure — a concentration factor of 76,000 times.

"To protect and enhance our Natural Resources — our air, land and water: our wildlife, fish and forests."
—DNR Mission Statement

LIST OF PRIORITY POLLUTANTS

1. ACENAPTHENE
2. ACROLEIN
3. ACRYLONITRILE
4. BENZENE
5. BENZIDINE
6. CARBON TETRACHLORIDE
7. CHLOROBENZENE
8. 1,2,4-TRICHLOROBENZENE
9. HEXACHLOROBENZENE
10. 1,2-DICHLOROETHANE
11. 1,1,1-TRICHLOROETHANE
12. HEXACHLOROETHANE
13. 1,1-DICHLOROETHANE
14. 1,1,2-TRICHLOROETHANE
15. 1,1,2,2-TETRACHLOROETHANE
16. CHLOROETHANE
17. BIS (CHLOROMETHYL) ETHER
18. BIS (2-CHLOROETHYL) ETHER
19. 2-CHLOROETHYL VINYL ETHER
20. 2-CHLORONAPTHALENE
21. 2,4,6-TRICHLOROPHENOL
22. PARACHLOROMETA CRESOL
23. CHLOROFORM
24. 2-CHLOROPHENOL
25. 1,2-DICHLOROBENZENE
26. 1,3-DICHLOROBENZENE
27. 1,4-DICHLOROBENZENE
28. 3,3'-DICHLOROBENZIDINE
29. 1,1-DICHLOROETHLYENE
30. 1,2-TRANS-DICHLOROETHYLENE
31. 2,4-DICHLOROPHENOL
32. 1,2-DICHLOROPROPANE
33. 1,3-DICHLOROPROPYLENE
34. 2,4-DIMETHYLPHENOL
35. 2,4-DINITROTOLUENE
36. 2,6-DINITROTOLUENE
37. 1,2-DIPHENYLHYDRAZINE
38. ETHYLBENZENE
39. FLUORANTHENE
40. 4-CHLOROPHENYL PHENYL ETHER
41. 4-BROMOPHENYL PHENYL ETHER
42. BIS (2-CHLOROISOPROPYL) ETHER
43. BIS (2-CHLOROETHOXY) METHANE
44. DICHLOROMETHANE
45. CHLOROMETHANE
46. BROMOMETHANE
47. TRIBROMOMETHANE
48. DICHLOROBROMOMETHANE
49. TRICHLOROFLUOROMETHANE
50. DICHLORODIFLUOROMETHANE
51. CHLORODIBROMOMETHANE
52. HEXACHLOROBUTADIENE
53. HEXACHLOROCYCLOPENTADIENE
54. ISOPHORONE
55. NAPTHALENE
56. NITROBENZENE
57. 2-NITROPHENOL
58. 4-NITROPHENOL
59. 2,4-DITROPHENOL
60. 4,6-DINITRO-O-CRESOL
61. N-NITROSODIMETHYLAMINE
62. N-NITROSODIPHENYLAMINE
63. N-NITROSODI-N-PROPYLAMINE
64. PENTACHLOROPHENOL
65. PHENOL
66. BIS (2-ETHYLHEXYL) PHTHALATE
67. BUTYL BENZYL PHTHALATE
68. DI-N-BUTYL PHTHALATE
69. DI-N-OCTYL PHTHALATE
70. DIETHYL PHTHALATE
71. DIMETHYL PHTHALATE
72. BENZO (A) ANTHRACENE
73. BENZO (A) PYRENE
74. 3,4-BENZOFLUORANTHENE
75. BENZO (K) FLUORANTHENE
76. CHRYSENE
77. ACENAPTHYLENE
78. ANTHRACENE
79. BENZO (GHI) PERYLENE
80. FLUORENE
81. PHENATHRENE
82. DEBENZO (A,H) ANTHRACENE
83. INDENO (1,2,3-CD) PYRENE
84. PYRENE
85. TETRACHLOROETHYLENE
86. TOLUENE
87. TRICHLOROETHYLENE
88. VINYL CHLORIDE
89. ALDRIN
90. DIELDRIN
91. CHLORDANE
92. 4,4'-DDT
93. 4,4'-DDE
94. 4,4'-DDD
95. A-ENDOSULFAN-ALPHA

So successful are some of these upwardly mobile chemicals that the Environmental Protection Agency has estimated half of all Americans carry one to three parts per million PCBs in the fatty tissues of their bodies.

Driven by the need to protect the public health, government, science and technology are learning more and more about toxics and how to control them.

The technology for detection is getting better and better. Delicate instruments can now identify minuscule traces down to parts per million, parts per billion, even parts per trillion — horizons which our imaginations can barely perceive and medical experts cannot interpret. Unfortunately, our ability to identify potential toxicants outstrips our knowledge of how they affect living things. But scientists are at work on this problem, trying to find out how long-term exposure to tiny amounts will affect human health.

Scientists do know that certain compounds can cause cancer (carcinogens); others can damage genes and alter inherited characteristics (mutagens); and still others can cause birth defects (teratogens). Analyzing these human responses and determining how much of a toxicant will cause a disease are huge problems but technical and medical people are attacking them.

And it's all discouragingly complicated by the fact that most of the 60,000 compounds now in use by business and industry have never been researched for toxicity. They were developed before today's stringent testing was required. In addition, so many new compounds are being proposed, government testers are swamped. But we've found out a lot. For example, we know that at least 400 toxic substances are currently present in the Great Lakes ecosystem.

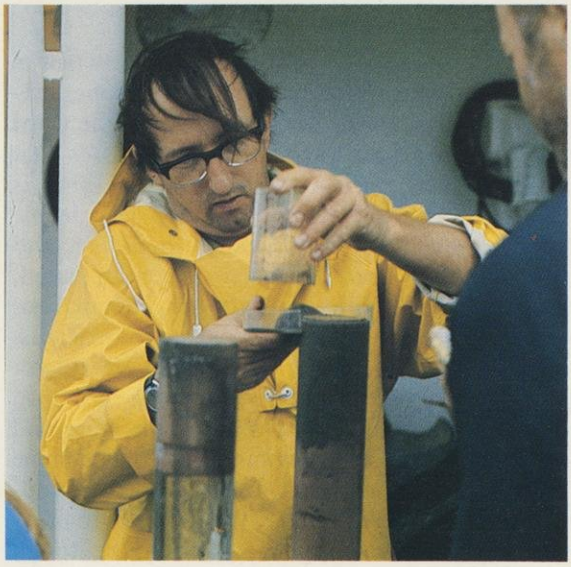
Despite this array of chemicals and the unknowns about their toxicity, government regulators believe they have identified the most dangerous ones and are gearing up to protect the public. EPA has listed 129 chemical contaminants as the main culprits and labeled them priority pollutants. While the federal government has acted on very few, in Wisconsin DNR is using these priority pollutants, plus some other known toxics as the basis for monitoring and regulation.

The department is working with state health officials to interpret results of environmental monitoring and to set standards for toxics in air, water and fish. It also works with agricultural experts on pesticides and relies on many federal agencies for technical expertise, regulatory guidance and monetary aid involving toxics.

DNR's technical services section coordinates toxics management in the state by mobilizing various experts to monitor environmental threats. Sophisticated programs are already in place that will form the basis for handling toxics that endanger surface water, groundwater and air in Wisconsin.

Sediment monitoring

The contamination of sediments in Wisconsin's industrialized waterways is a significant problem, partly because the sediments are out of sight and therefore out of mind. But the major reason is the complexity of the cleanup needed. To give an idea of the magnitude of the problem, the Environmental Protection Agency (EPA) estimates that right now as much as 110-million pounds of PCB lie in sediments of the aquatic environment in the US. Furthermore, we now believe that the sediments in certain aquatic systems are probably the major contamination sources for those waters.



▲Researcher readies a sediment core sample for analysis. Dave Edgington photo

▲Monitoring is necessary to help decide where to dispose of contaminated dredge spoil. UW-Madison Ag Journalism photo

▼Mercury turned up in sediment dredged from the harbor at Superior.

Why are sediments a major source? Part of the answer has to do with the physical and chemical properties of many organic compounds and most heavy metals. Sediments usually act as a settling basin or sink for certain compounds but unfortunately, the compounds may not stay there permanently. They may be reintroduced back into the aquatic environment and circulate through the food chain again.

A good example is the Lower Fox River's Little Lake Butte des Morts, in Winnebago County. Beneath a portion of this lake lies a contaminated bed of sediments with PCBs concentrations as high as 250 parts per million (ppm).

Other waters where sediments are known to be seriously contaminated with PCBs include the Sheboygan River, additional portions of the Lower Fox, and the Milwaukee River. Chemical concentrations in these places, however, are not as high as in Little Lake Butte des Morts.

Monitoring is essential to determine whether more dangerous accumulations like these exist. It is also important (and difficult) to track sediment movement in these systems and determine how available these sediment-bound contaminants are to aquatic organisms.

One technique DNR uses is to screen for organic compounds which may be accumulating. Since they are a depository for many contaminants, sediments can tell us what chemicals persist in the environment. For example, screenings below the outfall from a kraft pulp and paper mill lagoon revealed that two chemicals, tetrahydroretene and retene were accumulating in the sediments. This meant we should keep an eye on this location for possible toxic or other environmental effects.

Concentrations of Contaminants in Sediments of Selected Wisconsin Rivers

Location	Contaminant	Concentrations dry weight
		ppm = parts per million ppt = parts per trillion BDL = below detection level
Lower Fox River & Green Bay	PCB	<0.05-250 ppm
	Dehydroabietic Acid	<0.5-25.5 ppm
	Abietic Acid	<0.2-18.4 ppm
	Pentachlorophenol	<0.005-.72 ppm
	Retene*	BDL-26.0 ppm
	Tetrahydroretene*	BDL-8.0 ppm
	Phenanthrene	BDL-4.2 ppm
	Furan(1)	BDL-115 ppt
Petenwell Flowage (Wisconsin River)	Dioxin(2)	35-200 ppt
Milwaukee River and Estuary	PCB	<0.8-40 ppm
	anthracene/phenanthrne	1.4-63.9 ppm
	pyrene	1.8-88.0 ppm
	pentachlorophenol	BDL-4.6 ppm
Upper Fox River	PCB	0.01-2.7 ppm
	Alkylate 215*	<0.2-26 ppm
Sheboygan River	PCB	BDL-170 ppm

This table is for illustrative purposes only. Contaminants listed are not necessarily the only ones present in the system. Also, if a river is not listed it does not necessarily mean that contaminants are not present.

(1)2, 3, 7, 8 - Tetrachlorodibenzofuran

(2)2, 3, 7, 8 - Tetrachlorodibenzo-p-dioxin

**Toxicity not determined.*

Another sampling method, taking a sediment core, can reveal the dates of deposition of chemicals which can then be correlated with potential sources of contamination. For instance, in one case a core sample helped determine the dates of dioxin and furan deposition. This in turn enabled DNR investigators to trace them to production of a broad class of toxic compounds known as chloro-aromatics, a group of commonly manufactured industrial chemicals. Sediment data is also necessary to help DNR make dredging decisions. We must decide where dredged sediments are to be disposed of.

All in all, sediments are monitored to:

Help understand the environmental fate of chemical contaminants.

Gain knowledge about the historical input of contaminants and their sources.

Help make dredging disposal decisions.

And finally to one day help determine how best to rehabilitate our contaminated river systems.

These facts make sediment monitoring an essential part of the program to eliminate toxics from the environment.

Surface waters

Currently, DNR prevents most toxics from entering surface waters in two ways: by restrictions on direct discharge of industrial wastes and by requiring pretreatment before such wastes are sent to publicly-owned sewage plants. However, research has shown that this system doesn't stop the contaminated inputs to treatment plants from residential, business and institutional wastewater, nor from runoff after storms. These are hard to control at the source. Therefore, it is proposed to go one step further and place limits not only on identified toxics allowed to enter, but also on the effluent that comes out of publicly-owned plants.

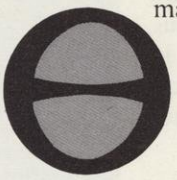
About 50 to 75 plants may be involved statewide, including the 24 largest ones plus some designed to handle only five million gallons per day. Where monitoring reveals the presence of heavy metals or cyanide, the plants will be required to modify treatment systems and reduce these discharges. Technologies exist to make the changes, and the requirement is already in effect in Milwaukee. It will soon be added for Madison, Green Bay and Kenosha while other systems will be required to monitor for possible toxics present in effluent.

In its present program, that keeps track of toxics on the list of priority pollutants, DNR sets numerical limits on the amounts of these chemicals that can be directly emptied into surface waters. If they're emptied into publicly-owned sewage plants first, and the plant is designed to discharge more than five million gallons of effluent per day, pretreatment is required. Currently there are 24 such plants which discharge a total of 596 million gallons daily. In these larger systems the program is administered locally, while at smaller plants DNR administers pretreatment

96. B-ENDOSULFAN-BETA
97. ENDOSULFAN SULFATE
98. ENDRIN
99. ENDRIN ALDEHYDE
100. HEPTACHLOR
101. HEPTACHLOR EPOXIDE
102. A-BHC-ALPHA
103. B-BHC-BETA
104. R-BHC-GAMMA
105. G-BHC-DELTA
106. PCB-1242
107. PCB-1254
108. PCB-1221
109. PCB-1232
110. PCB-1248
111. PCB-1260
112. PCB-1016
113. TOXAPHENE
114. ANTIMONY
115. ARSENIC
116. ASBESTOS
117. BERYLLIUM
118. CADMIUM
119. CHROMIUM
120. COPPER
121. CYANIDE
122. LEAD
123. MERCURY
124. NICKEL
125. SELENIUM
126. SILVER
127. THALLIUM
128. ZINC
129. 2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN
130. ABIETIC ACID
131. DEHYDROABIETIC ACID
132. ISOPIMARIC ACID
133. PIMARIC ACID
134. OLEIC ACID
135. LINOLEIC ACID
136. LINOLENIC ACID
137. 9,10-EPOXYSTEARIC ACID
138. 9,10-DICHLOROSTEARIC ACID
139. MONOCHLORODEHYDROABIETIC ACID
140. DICHLORODEHYDROABIETIC ACID
141. 3,4,5-TRICHLOROGUAIACOL
142. TETRACHLOROGUAIACOL
143. XYLENE

"And in cooperation with all our citizens to consider the future and those who will follow us." —
DNR Mission Statement

when needed. Statewide, the program requires about 500 industries to pretreat toxic wastes before discharging them to sewage plants. Sometimes an industry is able to save pretreatment costs by substituting a non-toxic chemical for a toxic one in its manufacturing process, or by recycling and recovering the toxic for reuse in manufacturing.



Hazardous Waste

Earth Day 1970	Earth Day 1985
No record of hazardous waste production sites or production levels	**All hazardous waste production sites identified and quarterly or annual production reports required**
Hazardous and non-hazardous wastes mixed for disposal with no standards for treatment, storage or disposal sites	**Separate disposal regulations with stringent standards for hazardous waste treatment, storage and disposal sites**
Unregulated transport of of hazardous wastes with no record of shipments	**Licensed hazardous waste transporters required to file shipping papers**
Little recycling of hazardous wastes	**More than half of all hazardous wastes recycled**
No groundwater monitoring or clean up efforts at hazardous waste handling sites	**Groundwater monitoring requirements at all hazardous waste handling sites and inventory of more than 2,500 sites for restoration programs**

Ongoing concerns:
Complement stricter waste disposal limits with more recycling efforts.
Apply new groundwater protection standards to handling of wastes.
Evaluate, rank and restore abandoned waste disposal sites.

Nonpoint sources

Dangerous levels of toxic chemicals are more frequently measured in urban runoff than in drainage from farm fields. At least 20 toxic chemicals are found in urban runoff including lead, chromium, copper, zinc, dieldrin, lindane, chlordane, pentachlorophenol, PCBs, touluene and benzene. There are many others and more are being discovered all the time.

Toxics are generated by runoff from all types of urban land uses, but industrial and commercial areas show much higher concentrations than residential runoff. These concentrations increase with intensity of use. For example, runoff from heavily traveled roads is more contaminated than from lightly traveled ones; heavy industrial areas show higher rates than warehouse locations.

Except for accidental spills, most sources of toxics are the everyday events that take place in a city all the time. There are plenty of examples: washoff from dirty industrial storage areas, corrosion from zinc including the downspouts on your house, corrosion of chrome-plated metal parts, corroding vehicle parts, leaching wood preservatives, emissions of lead and hydrocarbons from cars and trucks, and washoff of pesticides from your lawn and garden.

DNR is trying to find techniques that will prevent these toxics from entering streams, lakes and groundwater. It's harder to do it in established urban areas than in developing ones. For example, detention basins can be effective but it's difficult to find land for them in established areas — easier in developing areas. Other controls being evaluated include infiltration trenches, drywells, porous pavements, grass lined drainages, springtime street cleaning, fall leaf pickup and catch basin cleaning.

DNR's nonpoint source pollution control program already supports practices for controlling toxics from erosion at construction sites and from stormwater. A model ordinance is being drafted for enactment by communities that want to control toxic runoff on their own.

Urban runoff control strategies are also being developed as part of the priority watershed program. Among the 26 priority watershed projects, six are developing significant urban runoff controls—one in the Oconomowoc watershed and five in the Milwaukee River Basin.

Hazardous waste management

Wisconsin people and industries generate a little more than six million tons of waste every year. Most of it goes to the state's 1,068 licensed landfills, or gets recycled, incinerated or spread on the land. However, about 120,000 tons per year are hazardous or toxic and require careful management. In the past this was not recognized and unknown amounts of these dangerous substances were buried in landfills all across the state, many of which have long been abandoned. DNR has mounted an intensive effort to find and neutralize them.

Hazardous wastes currently being generated in the state that were once a threat to public health because they were improperly disposed of at landfills, are now under control. Safety standards for their management and transportation, proper security at landfills and attention to spills and spill prevention minimize most problems.

Today, Wisconsin's toxic wastes are recycled, re-used, treated, stored or shipped out-of-state to landfills especially designed to handle them. Right now, no Wisconsin landfills are so designed, though some may be in the future under stringent DNR regulation.

DNR classifies wastes as "hazardous" or "acutely hazardous" so industry will recognize them as materials that need special handling. A manifest system tracks hazardous wastes from production through treatment or disposal. They must be tested to determine what constituents can

and can't be safely handled at landfills. The cost of safe disposal has encouraged many businesses to look for substitute materials or develop comprehensive waste management programs.

To attack the hidden threat from unknown buried hazardous wastes, DNR has just completed an exhaustive year-long search for abandoned landfills. As of January 1, 1985, 2,717 have been located. Next step is to screen and rank them according to their degree of threat to public health and the environment. When hazardous substances are discovered, the sites will be ranked according to the number of people at risk, the threat to water supplies and other dangers. Specialists will respond immediately if there is any imminent threat to human health or water supplies.

It is already known that at least 250 of the 2,717 do contain hazardous substances that might contaminate the environment. Twenty have been designated for cleanup with federal Superfund money. Monitoring programs at these sites are either underway or being developed. Remedial action may consist of groundwater pumping and treatment, properly closing sites with a compacted clay cap to minimize leaching, or in a few cases, actual excavation for reburial in a secure site.

No hazardous wastes are currently disposed of in Wisconsin landfills. The wastes are either recycled, re-used, treated, stored or shipped out of state to landfills especially designed to handle them.

Toxics in sludge, the leftovers from municipal and industrial treatment plants, are also an environmental problem. DNR is studying land disposal of these wastes and may restrict it when toxic constituents are high. Sludge is now analyzed for toxic content and, based on this, certain disposal methods are required that will minimize impact.

Studies are also underway on how best to handle the many small amounts of hazardous wastes that find their way to landfills from households and businesses. Special dropoff points may be necessary so that these chemicals can be picked up and safely disposed of.

Surface and Groundwater Quality

Earth Day 1970	Earth Day 1985
Recognition of nonpoint source pollution problems	**Programs to control urban and rural nonpoint pollution sources**
Inadequate regional planning for water use and usability	**Standardized regional plans to protect and improve water quality**
Water quality monitoring	**Monitoring complemented by sampling of fish and wildlife for toxics**

Ongoing concerns:
Apply new standards needed to protect groundwater and continually update water quality standards.
Evaluate biological impacts of toxics on fish and wildlife.

Air

In the past decade general air quality in Wisconsin has improved for such pollutants as smoke, sulfur dioxide and ozone, as the result of state and local cleanup efforts.

However, there are still thousands of chemical vapors and dusts in air that come from manufacture, use or disposal of industrial, agricultural and household products. Although they are not new, the exponential growth of the chemical industry over the past 50 years plus increased knowledge about pollutant effects have resulted in a new awareness. This was highlighted recently through reports of deaths and injuries from chemical industry accidents.

More detailed information about the identity, location, amount and fate of contaminants in Wisconsin's air will help shield us from insidious chronic effects which, while not as dramatic as these acute chemical accidents, can still cause human health problems. Such effects include asthma, bronchitis, blood and organic diseases and cancers.

Although the federal Clean Air Act requires EPA to list and regulate emissions of toxic substances, to date federal regulations have been established for only a handful. Wisconsin law, however, requires that DNR ensure that there are no emissions into the ambient air of hazardous substances in such quantity, concentration or duration as to be injurious to human health. The

Specialist measures particulates in an air pollution analyzer. Photo by Jean Meyer

Toxic Air Emissions Reported by Wisconsin Industry (tons)

- Antimony = 2.41
- Arsenic = 2.428
- Barium = 45.61
- Bromine = 44.16
- Chlorine = 1,612.87
- Cyanide = 1.26
- Fluorine = 650.14
- Hydrogen Chloride = 111.709
- Hydrogen Fluoride = 75.405
- Lead = 9.116
- Manganese = 2.598
- Mercury Compounds = 2.598
- Nickel = 1.03
- Nitric Acid = 4.259
- Phosphoric Acid = 3.58
- Selenium = 5.248
- Sulfuric Acid = 18.036
- Tin = 3.568
- Vanadium = 3.019
- Trichloroethane = 209,168 gallons
- Methylene Chloride = 95,771 gallons

Air Quality

Earth Day 1970	Earth Day 1985
Air pollution problems statewide, but no emission permits or reviews of pollution control equipment	**Improved air quality statewide with emission permits issued for most sources and approval required for new emission sources before construction**
No record of sites where industrial emissions exceeded air quality standards	**Industrial emissions controls at most identified problem sites**
Minimal auto emissions controls for hydrocarbons and carbon monoxide	**Stringent emissions control equipment and testing for all cars in southeast Wisconsin**
Mostly unregulated incinerators and open burning	**Incinerators and open burning regulated to meet air quality standards**
Limited and simple air monitoring of particulates only	**Expanded and enhanced air monitoring of particulates, organics and other pollutants**

Ongoing concerns:
Update emission permits for all regulated air pollution sources.
Apply new standards to better evaluate and control problem levels of fine particles in the air.
Establish standards needed to evaluate and control problem levels of toxics in the air.
Learn more about air transport of pollutants that yield acid deposition and the environmental effects of acid deposition.

The Hazardous Emissions Task Force

A special DNR task force is investigating the need to regulate hazardous emissions in Wisconsin. The seven member group will define toxic emissions, recommend a rulemaking method that will limit the emissions and protect public health, examine the health effects of methylene chloride and 1,1,1-trichlorethane to determine whether present rules regulating them are adequate, and recommend which sources should be exempt from permit requirements because they pose no threat to public health, safety or welfare.

The hazardous emissions task force is reviewing about 800 toxic substances, and it's expected that Wisconsin emission limits will be recommended for more than 500.

state, therefore, has established a Toxics Emissions Task Force that will list chemical compounds of concern and provide guidance for establishing regulations to control their emission. Regulations will not be enacted unless a clear "cause-effect" link between emissions and ambient concentrations of toxic air pollutants is established.

Currently, emissions from known toxic pollutant sources are regulated through a permit system. The amount allowed for each source assures that the ambient air surrounding it is safe to breathe. The safe level is set at 2.4% of the "threshold limit value," the concentration limit which a normal worker may be exposed to for eight hours without adverse effects on health. The 2.4% is set by the Occupational Safety and Health Administration. It is arrived at by considering the potential hazard for 24 hours of exposure and adding a protection factor for children, the elderly and the sick.

The impact of emissions is determined through computer modeling that uses such information as pollutant type, industrial process, amount of emission rate, location and release point. Allowable limits are developed to assure safe air quality. A permit then restricts the source to that emission level.

Toxic air pollutants are found not only in urban areas with lots of industry but throughout our state. Some examples:

Contrast between a new and an exposed filter from a high volume air sampler in Milwaukee. Photo by Dean Tvedt

1. Wood processing operations in northern Wisconsin use resins and glues which put ambient formaldehyde 60 times higher than background levels into the air. Formaldehyde is a respiratory irritant sometimes detected in the workplace and in buildings made with materials containing such resins, and in the air just down wind from particle board manufacturing plants.

2. In southeast Wisconsin, air near sanitary landfills sometimes contains aromatic hydrocarbons, compounds which can be carcinogenic.

3. Settling lagoons for separating water from industrial sludge near Green Bay have been found to release organic compounds to the air.

DNR has just begun a program to identify and evaluate toxic chemical concentrations in air. Many are present in very small, yet potentially harmful amounts. Consequently, technically complex, expensive and time-consuming monitoring techniques are required. In the field, to measure certain toxic air pollutants, analytical chemists use colorimetric and infrared monitors. Other air samples must be analyzed in the laboratory. Expansion of DNR's air toxics program to include more monitors and more intensive sampling is planned for the next two years.

Pesticides and VOCs in Drinking Water

Private Wells

There are more than 500,000 private wells in Wisconsin, and thousands are added each year. Traces of pesticides were detected in 24 susceptible private wells in 13 counties during the first 15 months of DNR's program to assess groundwater quality in the state. Samples were drawn from 359 wells in 38 counties and given more than 1,500 tests.

Volatile organic compounds (VOCs) were found in 138 of 836 wells sampled. Tests show that, overall, the state's drinking water is of good quality.

Water in the private wells containing pesticides and 39 of those with VOCs was unfit for human consumption.

Owners of wells found to be contaminated above health advisory levels are eligible for assistance under a victim compensation provision of the state's groundwater protection law.

Pesticide contamination was found in samples from private wells in Dane, Dunn, Iowa, Marathon, Monroe, Oneida, Pierce, Portage, Richland, St. Croix, Sauk, Waukesha and Waushara counties.

Pesticides detected in the samples included atrazine in 12, a derivative of Dacthal in three, ethylene dibromide (EDB) in three, Dinoseb in two and Furadan, Amiben, Dual, Sutan-plus and Lasso in one each.

Investigators ran separate tests on aldicarb, a chemical used to kill worms in potato crops. They found it in 201 of the 944 wells sampled. Seventy contained more than the 10 parts per billion considered safe for human consumption.

VOCs, a class of chemicals that includes gasoline, metal degreasers, cleaning fluids and industrial solvents, were found in private wells in 23 counties. Gas stations, painters, metal workers, electronics firms and many other businesses use them.

"To protect and enhance our . . . water . . ."
—DNR Mission Statement

Crop dusting of pesticides, unless carefully done, can contaminate ground and surface water. UW-Madison Ag Journalism photo

Drinking Water Supply

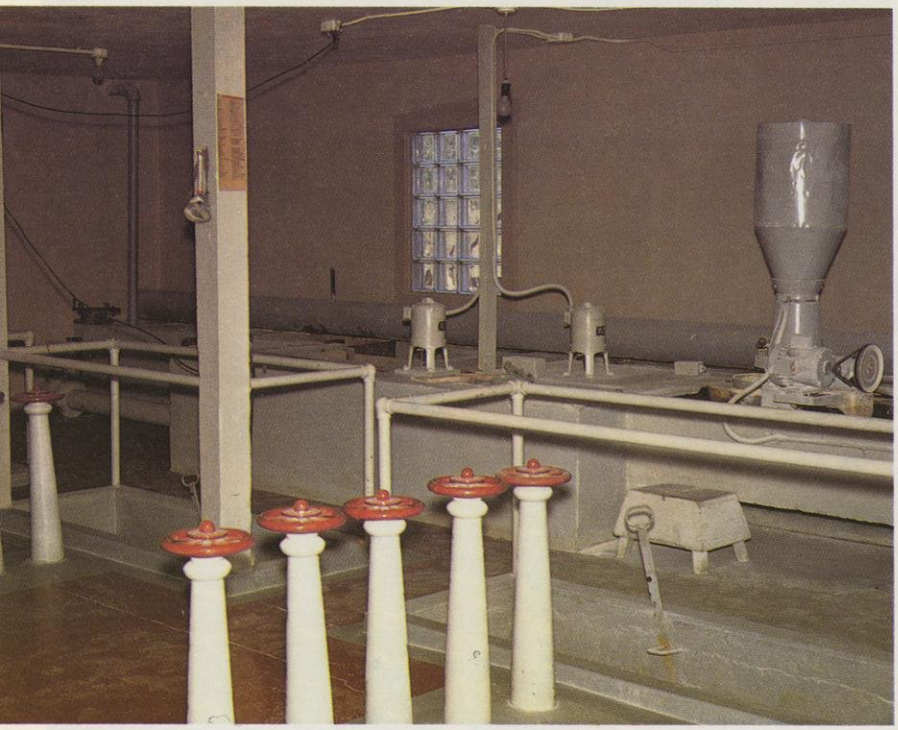
Community Wells

Midway through a two-year program of testing community water systems for synthetic chemicals, DNR has found 74 of approximately 1,350 wells with detectable levels of volatile organic compounds. Twelve show concentrations above state health advisory levels. These wells have either been disconnected or are being treated to reduce VOCs.

In all, 11 different VOCs have been detected in Wisconsin community wells. Chemicals found most often are trichloroethylene (TCE), tetrachloroethylene (PCE), 1-1-1 trichloroethane and the dichloroethylenes. Of the wells exceeding health advisory levels, highest concentrations have been found in Hartland Well #3 (270 parts per billion TCE), Rothschild Well #5 (220 ppb PCE), Wausau Well #6 (170 ppb TCE) and Delevan Well #4 (87 ppb TCE). One part per billion might be visualized as a family of five people compared to the world's population, or one second every 31.7 years.

Earth Day 1970	Earth Day 1985
Some public water supplies not monitored	**All public water supplies monitored**
Limited sampling for water quality	**Improved lab procedures to analyze trace organics and toxics**
Public water treatment facilities not always well run	**Improved operations through training programs**
Minor problems with water tastes and odors	**Technical assistance to improve water aesthetics**

Ongoing concerns:
Provide safe drinking water supplies and prevent future contamination problems.
Inform public of water content guidelines and any necessary consumption precautions.



DNR continually tests the state's 1,300 community water systems for toxics and other contaminants. These are operating controls for a filter system. DNR photo

The 74 wells with detectable levels of chemicals represent slightly less than 6% of the wells sampled. That is a decline from 1982 when 208 wells sampled turned up 51 that were contaminated or roughly 25%. That decline might be deceiving, however because earlier sampling concentrated on larger wells in urban areas.

The sampling shows that chemical contamination of wells is not restricted to a particular part of the state, but is related to geology, well depth and proximity to urban and industrial areas. Problems are most likely to occur in older developed areas where the chemicals have had more time to seep down into the groundwater.

So far, levels detected in Wisconsin community water supplies do not pose major health risks.

Those with unacceptable amounts of VOCs can shut down the wells, or blend the water from several wells to reduce overall concentrations. A community may also construct a new well or remove VOCs through aeration or filtration with activated carbon.

Where very small traces of VOCs are detected, DNR will continue to monitor the drinking water. By this fall, tests will have been conducted on all 2,400 wells used in community water systems.

Radium in Community Water Systems

DNR also conducted tests to measure the level of naturally-occurring radioactivity in community water. They show that 46 community systems exceed the state drinking water standard of five picocuries of radium per liter of water. (A picocurie is a measure of radioactivity.) Radium concentrations in the 46 systems range from 5.7 to 34.3 picocuries per liter.

DNR is working to reduce levels where they exceed the standard. In Wisconsin, radium in groundwater is highest in deep sandstone capped by a layer of shale, occurring along the eastern edge of the state. Elevated radium concentrations can also be found in crystalline rock such as granite, occurring in the northern part of the state.

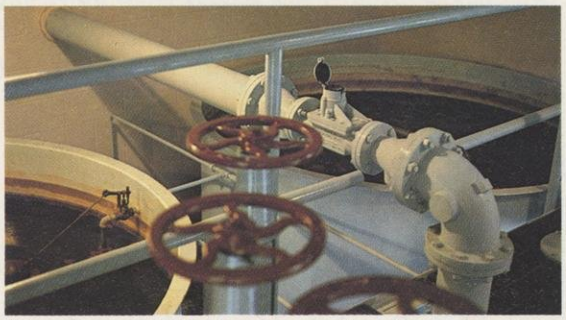
There are no proven health effects from consuming low concentrations of radium in drinking water, but there is a calculated risk of bone cancer from lifetime exposure to the substance. It's estimated that in a community with 10,000 population and a radium concentration of five picocuries per liter, one additional case of bone cancer can be expected every 160 years. The estimate is based on animal toxicity studies and on occupational exposure of workers who used radium to paint watch dials prior to World War II.

Radium can be removed effectively by water softeners similar to those used in many Wisconsin homes. Properly operated and maintained systems can remove more than 90%.

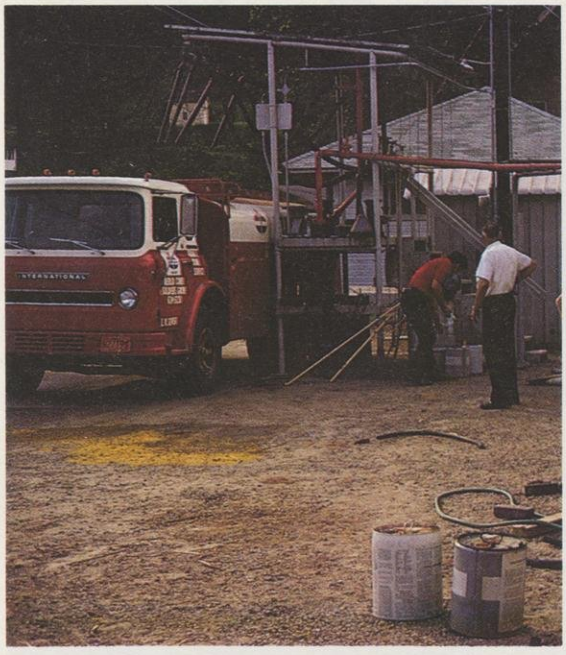
Continuous Testing of Community Systems

In addition to the special groundwater studies of pesticides, volatile organic compounds and radioactivity, DNR regularly tests the 1,300 municipal and other community water supplies for 13 contaminants as required by the federal Safe Drinking Water Act. These include the heavy metals, arsenic, nitrate, coliform bacteria and trihalomethanes which may form when organic material in water is chlorinated. Any failure to meet drinking water standards triggers a variety of responses, including a direct written notice to all affected consumers. While tests have revealed some problems, the overall quality of community drinking water in Wisconsin rivals any in the country.

Wisconsin's 13,000 small public water systems such as restaurants, motels, gas stations and parks are tested annually for bacteria and once every five years for nitrates. Contamination is sometimes found, and, when it is, can be corrected by drilling a new well, repairing the old one or sometimes by removing the source.



Mineral removal filter in a community water system. Up to 90% of the naturally occurring radium in water supplies can be removed by a properly operated and maintained home water softener. DNR photo

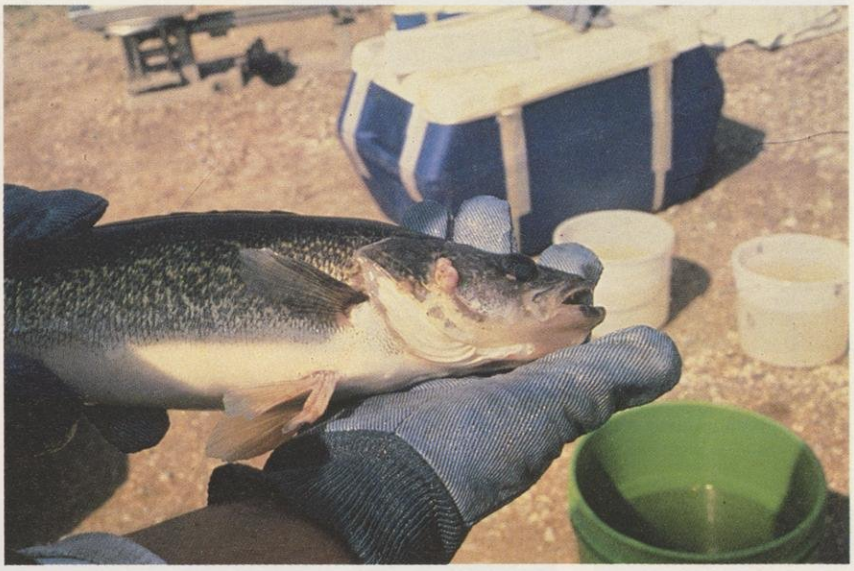


In the early 70's, pesticides were accidentally siphoned into a community system from a supplier's tank when pressure in the system dropped after it was shut down for repair. The contaminant was quickly discovered and flushed out. DNR photo

Toxics in Fish

DNR has been collecting and analyzing a variety of fish for selected chemical contaminants for almost a decade. Sampling results indicate that fish from most Wisconsin waters do not contain toxic pollutants. That's good news to the more than three million anglers who fish the state's 15,000 lakes and 25,000 miles of streams. But the distressing part of the story is that toxics do indeed exist in Lake Michigan, in parts of the Mississippi River, parts of the Wisconsin, parts of the Fox and several other places. Despite a PCB decline in our industrialized rivers, levels remain above federal health standards in many areas. A hopeful sign is that those found in Great Lakes fish have shown a continuous drop.

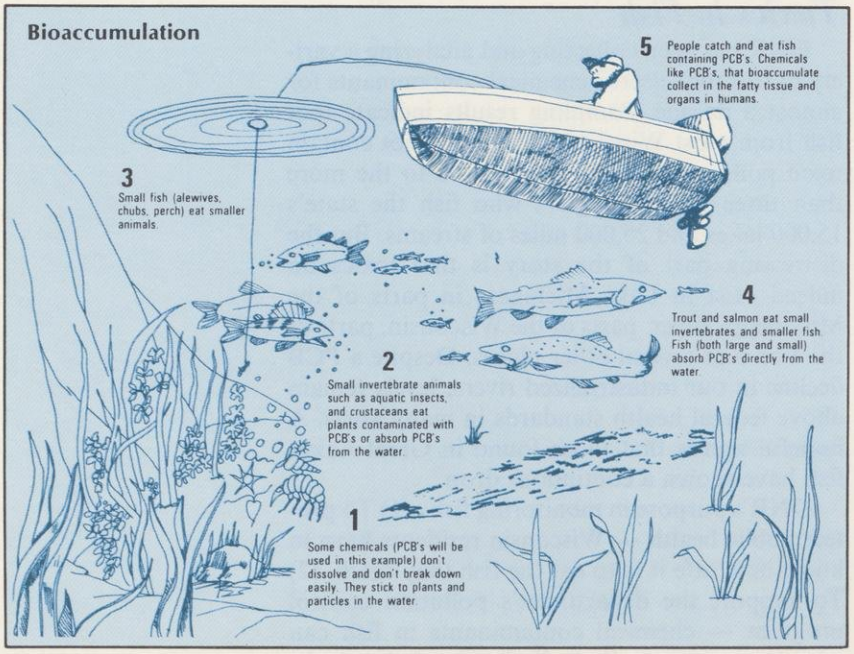
DNR's purpose in monitoring fish: (1) To protect public health --- Wisconsin residents have to know how safe it is to eat the fish they catch. (2) To support the department's pollution control program --- chemical contaminants in fish can stimulate action to limit discharge of chemicals. By testing up to 400 different species and sizes of fish each year from waters all over the state, DNR continually updates advisories for consumers based on US Food and Drug Administration health standards.



Toxics are suspected as the cause of this tumor on a walleye taken at the mouth of the Lower Fox River. Photo by Dennis Weisensel

The Wisconsin Department of Health and Social Services issues consumption guidelines for certain waters when a particular species has too high a concentration of contaminants. Waters found with contaminated fish include 436 miles along the Great Lakes, 143 miles of inland streams and 59 miles of the Mississippi River. These fish are grouped into four categories according to health risk, and should only be eaten selectively. PCBs are the chemicals most often found in excess of FDA tolerance levels. In Lake Michigan, carp and lake trout 25 inches or larger contain extremely high concentrations because PCBs enter the lake through the atmosphere and from tributaries. Over the past ten years, PCB levels in Lake Michigan fish have shown a

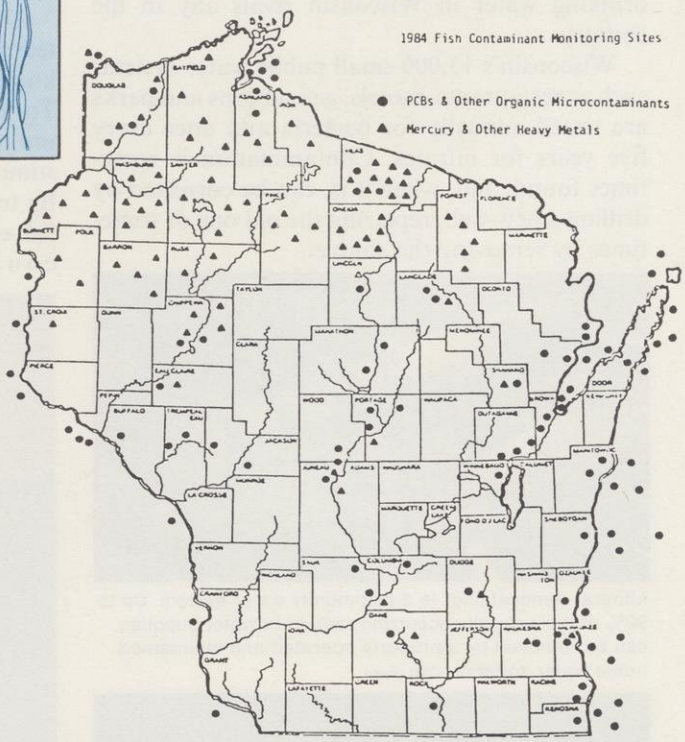
". . . Protect . . . our fish . . ."
—DNR Mission Statement



decreasing trend, but that trend may be slowing. Where PCB pollution sources have been located and the discharges stopped, contamination levels in fish have dropped.

At Sheboygan Falls, prior to 1978, there was improper disposal of an oil-absorbent material containing PCBs. Fish in the Sheboygan River and mouth of the Onion River still exhibit extremely high contamination. However, levels have dropped dramatically from a high of 970 parts per million (ppm) to a point where none of the samples analyzed in 1983 exceeded 100 ppm.

In the industrialized areas of southeastern Wisconsin, tributaries to Lake Michigan also contain fish with elevated PCBs. Carp in the Pike,



Tests on ground-up samples of fish flesh like these have turned up toxic contamination in certain species taken from the Great Lakes and from about 200 miles of Wisconsin stream. Photo by Lee Liebenstein

Fish are collected for toxic analysis with special stream or lake shocking equipment. Nets and traps are also used.
Photo by James Escalante

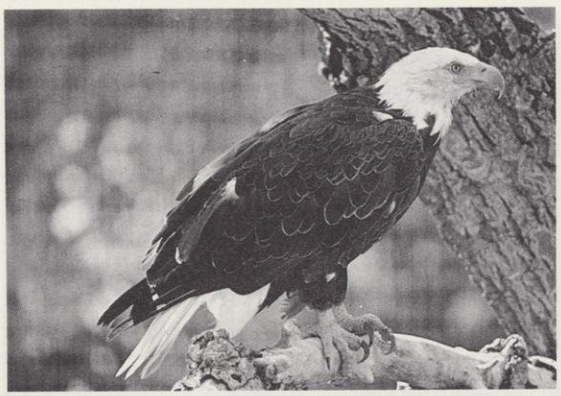
Menomonee, Kinnickinnic and Milwaukee River, from Cedar Creek to the mouth, consistently exceed tolerances. In addition, bluegill, northern pike and white sucker here are contaminated in all but the Pike River.

Carp larger than 26 inches and catfish bigger than 30 inches in the Mississippi River from Prescott to and including Lake Pepin also exceed tolerances. The source is suspected to be municipal and industrial discharges upstream at Minneapolis-St. Paul.

Although PCBs are not a problem in the Wisconsin River, at the Petenwell flowage four of five carp tested for dioxin in the summer of 1983 exceeded guidelines and DNR banned commercial carp fishing. Other species, including sportfish, are not contaminated. While the cause of contamination is not clear, recent studies by DNR and the Wisconsin Paper Council have revealed that some pulp and paper mills on the Wisconsin River used dioxin-contaminated slimicides prior to 1980.

Following the detection of dioxin in the Petenwell Flowage, an extensive search was conducted in water bodies where dioxin would most likely be found. Included were rivers flowing through industrialized areas and lakes treated with the herbicides 2,4-D and 2,4,5,T, compounds suspected of being contaminated with dioxin. No dioxin was found in any fish from the fifteen locations sampled.

DNR's 1985-87 budget calls for geographical expansion of fish monitoring as well as a search for previously unanalyzed chemical contaminants. Samples will be collected from more locations and species to provide a wider cross-section of information. The results will give better protection to human health and allow biologists to better manage the fishery.



Toxics are suspected as the cause for reproductive failure in bald eagles along the south shore of Lake Superior.

Toxics in Wildlife

DNR has added wildlife to its monitoring programs. Besides complementing overall efforts to eliminate chemical contaminants, the monitoring will also evaluate wildlife as an indicator of environmental quality.

Recent research by several state agencies and the US Fish and Wildlife Service indicates wildlife, in some places, show environmentally-induced stress. In Wisconsin, contaminants are suspected as the cause of a near reproductive failure in bald eagles along the south shore of Lake Superior and in Forsters terns along lower Green Bay. Other Green Bay birds exhibit abnormally frequent birth defects, such as cross-bill deformities in young cormorants.

Such observations have increased concerns about wildlife elsewhere in Wisconsin and the possibility of human health risk in consuming wild game. The new monitoring program will assess the quality of wild game taken by hunters and trappers and may also tell us something about how environmental contaminants affect life cycles of the species sampled.

The primary consideration in choosing which game species to sample was whether people regularly eat them. There were also five other ecological criteria:

1. ***Habitat preference.*** If an animal inhabited marshes, woods and fields, it ranked above species that frequented only one or two areas.
2. ***Geographic distribution.*** Animals found statewide ranked above those found only at select locations.
3. ***Feeding habits.*** Animals highest on the food pyramid, such as predators, ranked above others.
4. ***Longevity.*** Animals that lived longer ranked higher.
5. ***Annual movement.*** Species that do not migrate ranked higher than those that do.

The top composite rankings went to the mallard duck, Canada goose, woodcock, white-tailed deer, raccoon and ring-necked pheasant. These were the species monitored.

To ensure representative samples, animals were collected from the state's six different geographic regions characterized by similar soil types, earth surface features and original plant communities. Sites with little measured environmental contamination were chosen as well as those with known problems like agricultural pesticide or industrial pollutants. For example, since dieldrin was once used on cherry orchards in Door County and since industrial PCBs remain in the Milwaukee, Sheboygan and Upper Fox rivers and Lake Pepin, specimens were taken in those places for testing.

Mallards, collected at 19 locations in August and September prior to migration, were taken from such places as Green Bay, Lake Pepin, Petenwell Flowage and the Mississippi River.

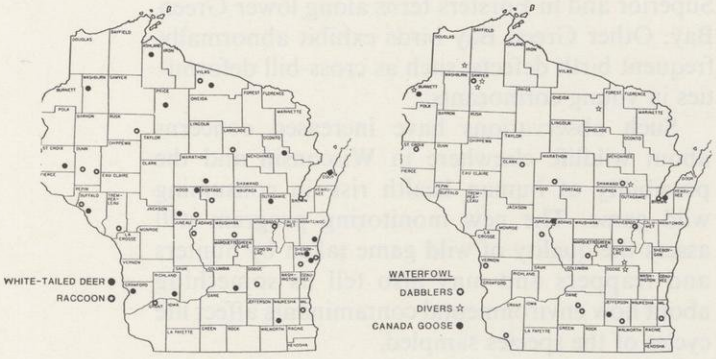
"Protect . . . our wildlife . . ."
—DNR Mission Statement

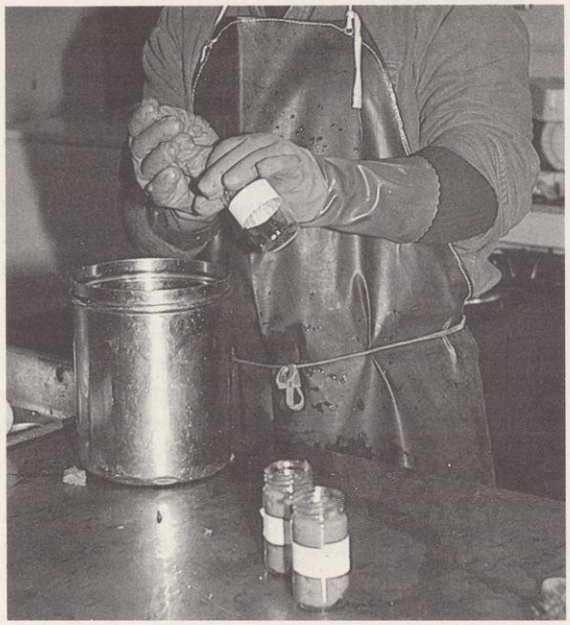
Cross-billed deformities are abnormally frequent in birds along lower Green Bay. Photo by Tim Kubiak

Others were sampled at areas considered clean like the Madison area lakes, Horicon and the Mead Wildlife Area.

Canada geese were collected at Crex Meadows, Petenwell Flowage, Rock Prairie and the Bay Beach Sanctuary on Green Bay.

Woodcock were sampled throughout northern Wisconsin. Because they feed mostly on earthworms and are actually considered "meat eaters," woodcock should provide some information different from other species sampled.





Three composite samples of wildlife meat are taken for each species at each site. One is stored for future use, another analyzed for heavy metals and the third for pesticides and industrial pollutants.

Both deer and raccoon were sampled statewide.

Raccoons are a prime indicator species because they live among both terrestrial and aquatic environments and eat both plants and animals.

Pheasants were sampled at nine sites, seven in the primary range in southeast Wisconsin, one site where there's a remnant population in St. Croix County, and finally, the Poynette Game Farm.

Three to seven animals were used from each site to make a composite sample — breast and leg muscles from game birds, a roast or steak from deer and fat and livers from raccoons.

Each finely-ground composite sample was divided into three portions, one frozen for possible future use; another to be tested for the heavy metals mercury, lead, nickel, chromium, cadmium, copper and arsenic; and a third to be analyzed for pesticides and industrial pollutants.

Commercial chemicals being evaluated are either banned or restricted by the Environmental Protection Agency. They include chlorinated hydrocarbons such as Chlordane, DDT, DDD, DDE, Aldrin, Dieldrin, Endrin, benzene, hexachloride,insecticides and fungicides, and chlorinated biphenyls, commonly known as PCBs. All of these chemicals are known to accumulate in animal fats and concentrate as they move up through the food chain.

The chemical analyses is being done at the Wisconsin State Laboratory of Hygiene on the University of Wisconsin-Madison campus. Approximately 100 composite samples will be analyzed this year at a cost of about $300 apiece.

In the future, more species from more locations will be tested for a wider variety of chemicals. First results will start coming out this spring. Hopefully, they will show little health risk to humans, but if any show up, DNR will be prepared to act to prevent harm.

Statewide Summary 1984 Wildlife Contaminant Monitoring Program

Species	No. Collected
Mallard	70
Redhead	3
Merganser	4
Ringneck	8
Canada Goose	17
Woodcock	32
Pheasant	26
Prairie Chicken	5
Deer	48
Raccoon	33
Total	**246**

DNR toxic data reveals geographic health links

Investigations planned

Building on statewide toxics data collected by DNR, Wisconsin health officials will try to pinpoint geographic areas in the state where disease or deaths might be linked to contamination of the environment or work places. Starting next summer, localities picked out as health-threatening by statistical analysis will be investigated by a joint health-environmental team.

The State Division of Health says that more than 50 acute or chronic disease outbreaks are reported each year that suggest an environmental cause. At least 15% of the 5,000 annual deaths in Wisconsin suggest an occupational cause.

Backing up both DNR and health workers will be expanded testing capability at the State Laboratory of Hygiene. The lab will be able to find out whether there are toxic elements in body tissue, and using a new short-term test can measure effects of toxic substances on cells or bacteria. This will enable DNR to do broad screening of the environment. If tests show toxics are present, scientists can then zero in on the specific substance. It is hoped the new technique will result in a significant speed up in the process of identifying toxics in the environment. Test results will also let scientists assess the actual risks toxics pose to human beings.

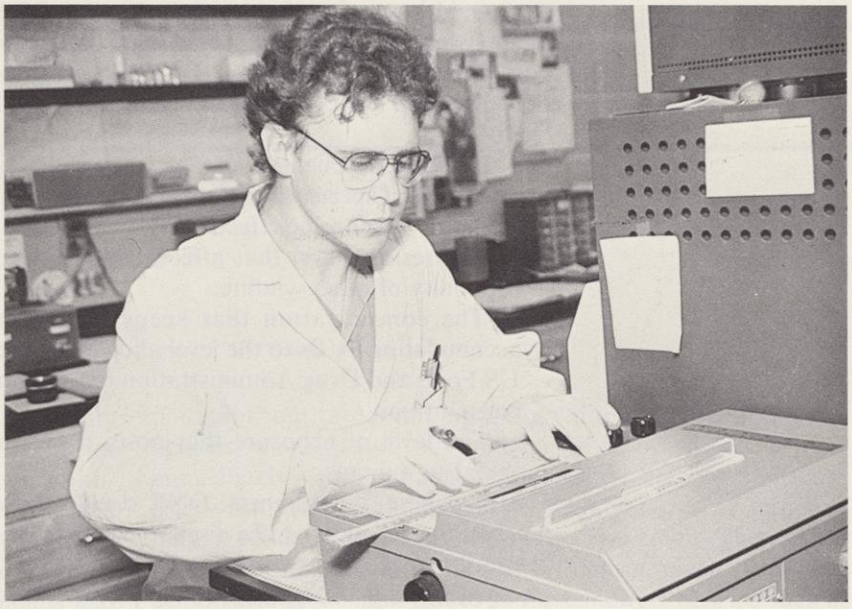
The Division of Health's new environmental surveillance system will link a variety of heretofore independent statistical records. Among them are death certificates; worker's compensation claims; hospital discharge surveys; birth certificates and the state cancer reporting system.

Coordinating this data by county and ZIP code will identify illnesses or deaths that may have occurred due to endemic toxic exposure in the region. DNR monitoring data will form the basis for these comparisons.

If the surveillance system finds a problem, a team from the Division of Health, with assistance from the federal Centers for Disease Control will make a site inspection to identify potential toxic substances, possible routes of exposure and extent of potential exposure to area residents or workers.

Such an evaluation might include extensive medical tests of residents or employees.

A report would ultimately be made to the community, employer or employees detailing what was found, stating how to correct the hazard and making recommendations for further study.



New equipment at the State Laboratory of Hygiene will increase analytic capability for toxics.
Photo by Sara Ballard

Are you at risk?

Science, technology and judgement decide

In its environmental programs to protect people, air, water and wildlife, DNR uses a combination of hard science, intricate technology, and professional and social judgement. All these come together in the risk assessment and regulatory process for toxic substances. DNR must assess environmental effects, determine allowable concentrations at which these effects will not occur and develop regulatory programs to make sure standards are not exceeded.

Polychlorinated biphenyls (PCBs) are a good example. No longer manufactured because of their persistent quality and detrimental effects on people and wildlife, PCBs are still widespread in the environment and can occur as byproducts of manufacturing processes. To control discharges in Wisconsin, DNR first evaluated studies on PCBs' health and environmental effects. This resulted in five different numbers or "criteria" that could be used to determine how much PCB might safely be discharged. These same five numbers are calculated whenever DNR sets regulations for other toxic substances. They are derived from:

1. Levels of the chemical at which acute effects are noted in species living in lakes or streams.
2. Levels for chronic effects.
3. The residue level that affects reproductive capability of other wildlife.
4. The concentration that keeps fish from accumulating PCBs to the level allowed by the US Food and Drug Administration for human consumption.
5. The level of exposure that poses a health threat to humans.

Using these five numbers, DNR decides how much of the chemical can be discharged. The concentration that would show direct, acute effects on aquatic life is different, for example, than the concentration that might affect human health. DNR's policy when regulating toxics is to make sure that concentrations are kept at levels that protect the most sensitive species.

In the case of PCBs, the most sensitive effects are reproductive problems in certain wildlife and potential cancer in humans who eat contaminated fish. Discharge levels, therefore, are limited to levels that will not pose a threat to people, fish or wildlife.

This same process is used for setting limits on other toxic substances. It ensures that in a society where toxics are everywhere, risks will be kept as small as possible. Although the procedure is based on the best science and technology available, it can never entirely eliminate the risks associated with use of toxic substances.

That's not hard to see when you consider the uncertainties in every part of the risk assessment process. Human health criteria, for example, are almost always based on animal toxicity studies, and there is always some judgement involved in translating laboratory animal experiments to human health effects in a complex environment. In addition, regulations on toxic substances are always decided in the public arena, where political and economic questions come into play. How do the benefits of a chemical outweigh its risks, for example? Are the people exposed to the substance the same ones who will benefit from its use? What alternatives are there to the use of a certain substance? Are the alternatives worse than the existing use?

To some people, the inclusion of these considerations is wrong because it removes the risk assessment process from the realm of objective science. To others, it represents a check on a process they consider technologically cold and insensitive. Social, political and economic judgements are part and parcel of any process that attempts to define "acceptable" or "reasonable" levels of toxic substances in the environment. Moreover, there will always be data gaps and limits on the ability to quantify risks.

What's on the horizon in the area of toxic substances risk assessment and regulation? Changes will take place in several areas as we continue to learn more about the effects of certain toxic substances and their behavior in the environment. On the basis of new data, new criteria will be established to limit levels of various toxics in the environment. New administrative codes will spell out precisely how these new criteria will be translated into discharge limits and management practices. But one thing is certain — no matter how advanced the science of assessing and managing risks associated with toxics becomes, we will never be able to eliminate the risks entirely.

"And in cooperation with all our citizens to consider the future and those who will follow us."
—DNR Mission Statement

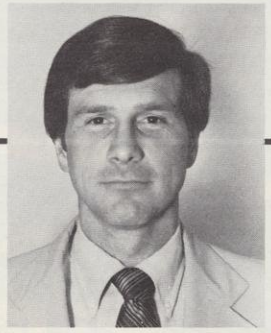
No cause for panic

DNR Secretary C.D. "Buzz" Besadny says what we have learned so far about toxics is not cause for panic but for thoughtful concern, in-depth scientific investigation and reasonable and serious dialogue among all citizens. Besadny has asked the Legislature to fund major studies that will reveal more about the nature and extent of toxics in the Wisconsin environment. He pledged a new look at current DNR regulations to make sure they are adequate and promised prompt, prudent action when presented with data that could affect the public's well being.

The Secretary also said DNR will encourage the private sector to take initiatives of its own to reduce toxics and urged a cooperative approach toward this goal. He pointed out that although the toxics issue is controversial and confusing, there should be no confusion on where DNR stands. "We stand for the public interest, for public health and environmental protection," said Besadny.

Science, technology and professional and social judgment help establish toxic levels that protect people, wildlife and the environment. Photo by Jean Meyer

Risk



Lyman Wible

"Because toxic contaminants show up in air, water and solid wastes, it is important that control efforts be highly integrated," according to Lyman Wible, administrator of DNR's Division of Environmental Standards. "It's also important to approach the entire toxic contamination issue in a thoughtful and rational way. We must make every effort to use the most advanced techniques not only to identify potential problems, but to estimate the actual risk to humans and our natural environment."

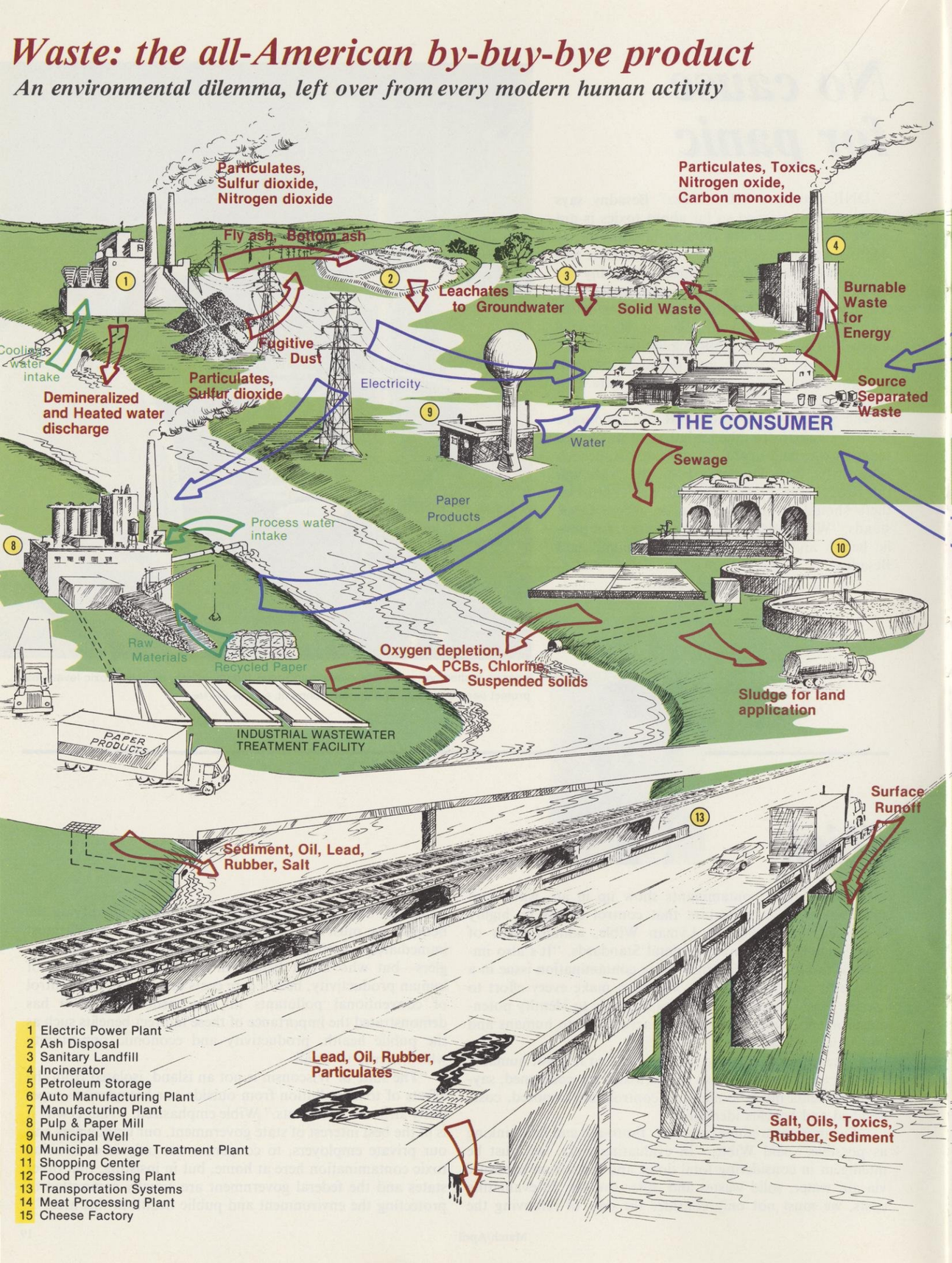
At the same time, Wible emphasized that it is not humanly possible to eliminate all risk where toxics are concerned, saying judgments must be made as controls are imposed, costs weighed and benefits identified.

"The important point is to be as thorough and far-thinking as possible," said Wible. "In evaluating risks, we must be intelligent in considering total doses and risks from exposure via air, water, solid wastes and other sources. In evaluating costs, we must not only consider the cost of removing the pollutant, but of continuing the pollution. In identifying the benefits, we must not only understand who will benefit most immediately—such as commercial fishermen and sport anglers—but who might benefit in the long run in terms of human productivity, health care costs and so on. The control of conventional pollutants in Wisconsin since 1970 has demonstrated the importance of these indirect benefits such as the public health, productivity and economic opportunity which accrue to us all.

"The state of Wisconsin is not an island, isolated from the effects of toxic pollution from outside our boundaries—especially airborne pollutants." Wible emphasized. "That is why it is in the best interest of state government, our landowners and our private employers, to cooperate not only in controlling toxic contamination here at home, but in insisting, that other states and the federal government are equally committed to protecting the environment and public health in this area."

Waste: the all-American by-buy-bye product

An environmental dilemma, left over from every modern human activity



1 Electric Power Plant
2 Ash Disposal
3 Sanitary Landfill
4 Incinerator
5 Petroleum Storage
6 Auto Manufacturing Plant
7 Manufacturing Plant
8 Pulp & Paper Mill
9 Municipal Well
10 Municipal Sewage Treatment Plant
11 Shopping Center
12 Food Processing Plant
13 Transportation Systems
14 Meat Processing Plant
15 Cheese Factory

The all-American by-product

Half the trash by 1990

JOHN REINDL,
Recycling Coordinator

Garbage. Trash. Rubbish. Junk. Sludge. Solid waste. All of these terms can describe the 6½-million tons of material thrown away annually in Wisconsin. It's an enormous problem — so large that every year it could bury a typical city street, curb to curb, six feet deep and 500 miles long.

Solid Waste

Earth Day 1970	Earth Day 1985
No standards for operation of municipal dumps or for landfill design	**Burning regulations, cover requirements and design specifications at licensed and inspected municipal landfills**
Little consideration of recycling	**Funding, technical assistance and educational materials to promote recycling**
No groundwater monitoring	**200 groundwater monitoring sites**
No regulation of mineral exploration, mining or associated waste disposal	**Comprehensive mineral exploration, mining and associated waste disposal laws**

Almost half the solid waste produced in Wisconsin comes from three industries — pulp and paper mill sludge (1.3-million tons), electric utility ash and sludge (1-million tons) and foundry sand (600,000 tons). The other half comes from other industry, business and homes. The makeup of these wastes is nearly 50% paper, 20% food and yard wastes and about 5% each for metal, glass and plastic. The remainder is wood, bulky objects, demolition debris and a wide variety of miscellaneous objects.

Most of Wisconsin's solid wastes are ultimately disposed of in landfills. DNR estimates that less than 10% of these wastes are recycled. The state has 1,068 sites that cover more than 20 square miles. While properly designed and operated landfills do minimize the impact of solid waste disposal on the environment, many were built before comprehensive state standards were enacted. Even the best ones use up valuable land, have the potential for gas migration and water pollution and bury valuable resources. For example, the paper landfilled in Wisconsin each year represents the equivalent of 20-million trees. In addition, nearly two billion metal cans, one billion glass bottles, 300-million plastic containers and four million tires are buried each year. Recycling or incinerating Wisconsin wastes to produce steam or electricity could save enough energy to heat 300,000 homes annually.

Recycling has other advantages too. First, it creates new jobs. According to federal statistics, in 1982, over 2,000 people were employed by over 200 recycling businesses in the state. The annual payroll was over $30-million; annual sales were $200-million. Recycling also provides industry with a source of low cost, energy conserving raw materials. In 1982, for example, about a third of the raw materials used by Wisconsin Paper mills — 1.2-million tons — was waste paper, recycled into new products. Over the last several decades, the cost of recyclable waste paper has increased much less than the cost of wood pulp, and using recyclable waste paper as a raw material can save up to the equivalent of 100 gallons of gasoline per ton of paper, when compared to the use of virgin wood pulp.

Of course, recycling and source recovery have problems, too. The demand for (and price of) recyclable scrap varies along with the economy. Markets are also limited in size, and are presently incapable of using all the material that could be collected or incinerated. Developing a recycling or resource recovery system means a change from the status quo of landfilling. It would make solid waste managers examine alternatives and create a demand for information and technical and financial assistance. Also, recycling and resource recovery will help reduce environmental pollution. Using them will cut back on the need for landfills, save resources and promote economic development.

Based on the many benefits that will accrue, DNR wants to reduce the amount of waste going to landfills by 50% by the year 1990. It will also try to boost resource recovery substantially.

The approach is three fold: (1) encourage waste reduction and reuse, (2) increase the market demand for recoverable materials and energy and (3) promote the development of alternatives to land disposal through information and education programs, technical and financial assistance and through regulations as required by state laws.

Under the first category — encouraging waste reduction and reuse — the major emphasis will be on hazardous wastes, which total about 125,000 tons annually. In 1983, 56% of these wastes were either reused or recycled. That same year, 40 to 45 of the state's 680 hazardous waste generators recycled their wastes. Many industries have found that making changes in the kind of raw materials used, or in manufacturing processes, reduces or eliminates generation of hazardous wastes. Some electroplaters, for example, have found that eliminating chemicals containing cyanide does this. One manufacturer found that by recycling a mixture of solvent, waste oil and waste metal chips, it could reuse the solvents in its plant, sell the waste oil to a recycler and sell the metal chips to a scrap dealer, totally eliminating the need to dispose of any hazardous wastes in a landfill. In

Recycling creates jobs and saves energy, resources and landfill space.
UW-Madison Ag Journalism photo

". . . . to consider the future and those who will follow us."
—DNR Mission Statement

another example, a large manufacturer in the Milwaukee area found that solvents mixed with waste oil make good fuel for the company's boilers, fuel that can be burned safely and meet air pollution standards.

DNR is also encouraging reduction and reuse of solid waste where feasible and has made planning grants available to counties for this purpose.

In addition, DNR will promote expansion of markets for recoverable materials and energy. Legislation enacted in the spring of 1984 provides a sales tax exemption for recycling equipment, thereby promoting expansion of recycling operations. Four-hundred thousand dollars in cost-sharing grants are also available from DNR for projects demonstrating innovative techniques or new methods of recovering or recycling waste materials. These grants — for up to 50% of the cost of the project to a maximum of $75,000 — are available to private businesses, non-profit organizations and local units of government. Columbia County received the first grant through legislative action, and DNR will begin accepting additional applications in June.

The state will also fund a major research project on the feasibility and effectiveness of large scale composting. Although many people and some communities compost food and yard wastes, this demonstration project will try to find the best and least expensive way to compost mixed household waste in combination with sludge from a sewage treatment system. The project will experiment with shredded and unshredded waste, waste with and without recyclable materials removed, at least three different ratios of sludge and solid waste and an assortment of techniques for shredding, mixing and aerating the compost piles. Columbia County, which has been a leader in recycling, will do the experiment with faculty from UW-Stevens Point as technical consultants. Results will be made available to communities throughout the state.

New legislation requires all state agencies, not just DNR, to develop recommendations that discourage land disposal of solid waste and encourage recycling. Additional proposals to expand markets are expected from these recommendations. DNR will also work with communities and industries to promote new methods of recovering materials and energy.

Developing alternatives to land disposal is also high on the agenda if the 50% waste reduction goal is to be reached. DNR will increase information and education programs on recycling and resource recovery with fact sheets, audio-visual aids, displays and educational materials for use in schools. Technical assistance is already being provided on request, at statewide conferences and by letter or telephone in response to specific questions. A 50% cost-sharing program is available to help communities examine the feasibility of building a recycling or resource recovery facility.

State law now requires that there be recycling centers and also requires that alternatives to land disposal be considered by applicants for land disposal facilities. Counties of under 50,000 must establish at least one waste oil collection facility and if the county also has more than 10,000 people, by July 1, 1986, it must have at least one facility for collecting newspapers, glass, aluminum and plastic. In counties of over 50,000, responsibility for collection facilities shifts to cities, villages and towns. In 21 counties to date, there are about 50 waste oil collection sites. Furthermore, landfills that are open to the public and taking in less than 50,000 tons of waste a year are also required to have a collection facility for newspaper, glass, aluminum and plastic.

The goal of a 50% reduction in the amount of waste landfilled by 1990 is ambitious, but achievable. The benefits of reduced reliance on landfills, conservation of natural resources and energy, along with economic development demand that it be pursued aggressively.

High technology is not necessary to separate materials for recycling. UW-Madison Ag Journalism photo

Four-million tires are buried every year in Wisconsin's 1,068 landfills. Photo by John Reindl

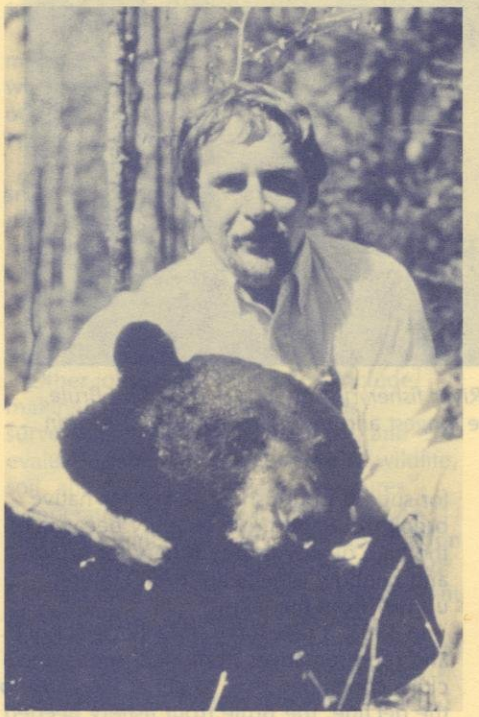
Research News

Overharvest of bears

Rhinelander — The Wisconsin bear harvest has changed dramatically in the last decade. License sales have almost tripled since 1974 and the average annual harvest from 1980 to 1984 was almost double that of 1973 to 1979. As a result, "Some disturbing trends are showing up," says wildlife research biologist Bruce Kohn.

According to Kohn, "All our survey information shows that the bear population has been overexploited in recent years. Since 1981, harvests have exceeded an allowable level and we are at a point where the bear population can't sustain itself if yearly harvests greatly exceed 500 animals." Harvests peaked in 1982 at about 1,400.

Kohn is also concerned because the average age of bears taken during 1980-84 has dropped to about four years and the proportion of yearling bears has jumped from around 5% in the 1970s to about 33% in the 1980s. **Hunters are now less selective about the age and size of the bears they hunt, according to Kohn. "All of this can mean problems in a species that does not reproduce until age four," he points out.** A bear sow produces two to three cubs every other year.



Wildlife biologist Bruce Kohn poses with a 487-lb. bear he temporarily immobilized for his research. The bear is 11½ years old, which Kohn determined by examining one of the teeth under a microscope.

In his study, Kohn used harvest, sex, and age information collected at DNR hunter registration stations, as well as observed reproductive rates. He then plugged all the data into a computer population model, which simply adds and subtracts animals as they are born and die each year.

According to the model, there was a fall population of 5,500 bears in Wisconsin in 1979 but only 4,000 in 1984. These numbers were substantiated by the number of bear visits to bait stations run by wildlife managers in each county of the bear range. The large drop in population resulted from the large harvests of recent years, Kohn concludes.

The population model predicts that the number of bears will increase gradually to the 1979 level if future harvests through 1987 average around 500 bears, but will decline if harvests continue to hit or exceed 700.

To reduce the harvest, a DNR committee has proposed a quota system. Until the legislature approves such a system, DNR may mandate a two-day season in 1985 followed by a quota system in 1986. The Conservation Congress, the Wisconsin Bear Hunters Association, and the Wisconsin Wildlife Federation support the quota system idea.

Minnows, shiners and darters

Madison — "This report is dedicated to the nongame fish, whose interrelationship in the aquatic ecosystem is generally not well documented or appreciated."

DNR's Bureau of Research is publishing a series of reports to document the distribution of all fish in all river basins of the state. Called ***Distribution and Relative Abundance of Fishes in Wisconsin,*** the project is about half completed.

Traditionally, minnows, shiners, darters and other kinds of nongame fish receive little attention. However, they comprise 77% of the 150 fish species in Wisconsin waters and play a major role in maintaining sport fish populations as prey for predators. To establish a comprehensive data base on all fish species, researchers began to sample the state's river basins in 1974.

This baseline information on fish communities can be used to determine

unseen changes in a river, lake, or stream. For example, some species have a lower tolerance for poor water quality and their absence can indicate problems. The data can also be used to determine the range for particular fish species. Project findings have resulted in the addition of 17 species to Wisconsin's endangered and threatened species lists.

Project leader Don Fago says the series is also useful in preparing environmental impact statements, developing DNR master plans, and guiding future research.

The four major river basin reports published so far cover the Greater Rock River; the Black, Trempealeau and Buffalo; the Red Cedar; and the Root, Milwaukee, Des Plaines and Fox rivers.

Most of the fish collections are at the Milwaukee Public Museum, where they can be analyzed to compare present and future levels of environmental toxicants and pollutants.

Funds for field collecting ran out in 1980, but an effort will be made to renew them this year.

This issue of ***Research News*** is the second in a series of reports to the public on Bureau of Research efforts to find out more about how to protect the environment and improve natural conditions for fish and wildlife.

Kent Klepinger, director of the bureau, says "Work now being done by researchers is especially important because of today's increasing pressures on the environment." He adds that keeping the public informed on research activities is just as vital as the work itself.

Researching the Brule — a 48-mile challenge

A comprehensive pilot study on the Brule River fishery is now under way. The Brule, in Wisconsin's northwest corner, is both the longest and most famous trout stream in the state.

Brule — DNR fishery biologists are developing a long-term research plan for the 48-mile Brule River, where anglers say fishing quality has declined during the past 10 to 15 years, especially for brook and brown trout that remain in the river year-round.

The Brule, in Wisconsin's northwest corner, is both the longest and most famous trout stream in the state. It has a rich history as an important link between Lake Superior and the upper Mississippi River watershed, along with a reputation for superb trout fishing — first for native brook trout and more recently because of the high quality trophy fishery for brown and rainbow (steelhead) trout coming upriver from the lake.

In 1983, a task force of DNR personnel and representatives from local sportsmen's clubs concluded that, to get at the cause of the decline, the Brule trout fishery needed a comprehensive research project. With federal funding for a pilot study, researchers, in close cooperation with fish managers, began developing a long-term research plan.

Studying the river is a challenge. It is vast, variable, and long stretches are without road access. Local residents, canoeists, and anglers compete for recreation, and a mixed bag of prized trout contribute to making it a dynamic and complex ecosystem.

To further complicate the picture, migrating salmon are now coming up the river and their impact on the ecosystem is another unanswered question.

Robert DuBois, research biologist in charge of the pilot study, says fish managers here need basic information on numbers: how many resident trout live in different sections of the river, how many trout are harvested by how many anglers, how many big ones come up the river to spawn, and how many smolts leave the river.

To gather this quantitative information, fish managers are conducting the most complete creel census that has ever been done on the Brule. Given the length of the river, it amounts to quite a feat.

To get further data, DuBois will be collecting trout with several kinds of gear. Since much of the river is too wide, deep, and swift to sample fish using standard procedures, he will also try to resolve which collecting gear will work best in various habitats.

DuBois will also sample the population of organisms eaten by trout, and identify portions of the river in need of habitat improvement. He also expects to use radio telemetry to track how well trout migrate past a lamprey barrier between Lake Superior and the river, and to determine what portions of the Brule these trout use for spawning.

Endangered resources fund

Survey explores income tax donations

Madison — You know that line labeled Endangered Resources Donation on your Wisconsin income tax return? Using a mailed survey to sample 1,000 Wisconsin residents, DNR researchers tried to determine just how many people actually saw that line and how they responded to it.

The survey helped evaluate a shortfall in 1983 donations for DNR's Bureau of Endangered Resources, which depends solely on taxpayer generosity for its operations. Donations will continue to be the only source of money this year and in the future for programs that protect, research, and manage the 42 animal and 107 plant species that are endangered or threatened in Wisconsin.

"One of the most important things we found out was that 60% of the non-contributors surveyed had never heard anything about the endangered resources program until they received their survey in the mail," says sociologist Ann Cary, who conducted the study. In contrast, 40% of the contributors knew about it even before they filed their taxes. "All this implies we need more exposure," Cary states.

Only about 1.6% of Wisconsin's taxpayers donated to the fund. According to Cary, the two most commonly listed reasons for not contributing were lack of information about how the funds would be used and not seeing the donation line on the tax form. Only 10% of the non-contributors said lack of a tax refund was a reason.

A profile of the contributors suggests they are more likely to be 25 to 35 years old, hold a college or advanced degree, and live in cities, especially those with populations of 100,000 or more. In areas without large cities, rural or farm residents were more likely to contribute than those living in towns or small cities.

Men and women showed no significant difference in tendency to contribute. Hunters were as likely as non-hunters, and anglers were as likely as non-anglers to contribute. However, contributors were twice as likely as non-contributors to be members of outdoor or wildlife-related organizations.

Ron Nicotera, director of the Bureau of Endangered Resources, says, "The survey results helped convince us that we should rely more heavily on the mass media and professional tax preparers to inform people. It also told us we should highlight what we do with the money and where the line is on the tax form."

On the 1984 state income tax return, the Endangered Resources Donation is highlighted in green ink. It is Line 54 on the long form and Line 21 on the short form.

Research News

Written and designed by
Charmaine Daniels

Wildlife management on private lands

Horicon — A new approach to wildlife management that will emphasize restoration of habitat on private rather than public lands is under way in Dodge County, and DNR's Bureau of Research will help measure its effectiveness. Called the Dodge County Private Lands Wildlife Project, the program is designed to promote practices that benefit both farmers and wildlife.

In some cases, cost-sharing will be available to participating farmers. Federal, state and local organizations are cooperating on the pilot project, which also aims to reduce soil erosion and improve water quality.

Begun in 1983 with three demonstration areas, the project will be fully operational by 1987, at which time researchers will compare the three to three others without improvements.

Traditionally, DNR has targeted only public lands for wildlife management. But as DNR researcher Bill Vander Zouwen states, "If we're going to have any farm wildlife left in the future, we're going to have to have the cooperation of private landowners who control the habitat."

To provide food and shelter for wildlife, the agencies will urge farmers to set aside wet areas, try rotational grazing, establish warm-season grass pastures and winter food plots, plant protective cover, use strip cropping and no-till seeding of winter wheat. DNR's Bureau of Wildlife Management and county officials will work with landowners to try and implement some of these practices.

In addition to helping pheasants and mallards, the project will benefit blue-winged teal and other ducks, bob-o-links, other songbirds, cottontail rabbits, and Hungarian partridge.

So far, the researcher's role has been to select study areas and map out habitat problems and solutions based on previous research. "Later on in the study, our job will be to find out how well the animals respond and to measure resulting changes in the hunting harvest," Vander Zouwen says.

Other jobs in the team effort include making initial landowner contacts, surveying attitudes of landowners, and evaluating the cost-effectiveness of wildlife, soil, and water conservation measures. Cooperating agencies are DNR, the U.S. Fish and Wildlife Service, Soil Conservation Service, and Agricultural Stabilization and Conservation Service, the state Department of Agriculture, Trade and Consumer Protection, UW-Extension, and the Dodge County Land Conservation Department.

According to Vander Zouwen, "The overall plan and the amount of inter-agency cooperation make this program one of the most comprehensive and intensive private lands wildlife programs in the country."

If it's successful — and benefits outweigh costs — it represents a whole new approach to wildlife management in the state.

Wildlife habitat on private farmland is becoming increasingly important to the future of wildlife populations.

The future of DNR research

Madison — After decades of primarily fish and wildlife-related research stemming from its roots in the old Wisconsin Conservation Department, the Bureau of Research will soon examine its mission for ways to include more environmental research, including issues related to air, water, and solid waste.

Betty Les, the bureau's planner, expects to see a new direction emerge, with a more comprehensive and integrated approach. "It's time to look at the big picture because environmental issues have grown tremendously," she says.

To develop the bureau's expanded mission, Les will be working with people from every division and many bureaus to develop the department's first strategic and long-range plan on research needs and objectives. "Basically, we'll be deciding where we are, where we want to go, and how to get there," she notes.

Acid test on a northern lake

Vilas County — An impenetrable plastic barrier 200 feet long and 16 feet deep has sliced Little Rock Lake in half! In a classic study involving control vs. experimental conditions, DNR researchers will acidify half of a typical northern lake and compare it to the untreated half, in order to simulate the effects of acid rain.

"As we acidify half of the lake, some organisms will probably disappear and bottom-dwelling algae may invade," says researcher Paul Garrison. "The most important part of our experiment is that we're monitoring the whole lake system, which means we'll have a much better idea about what causes these changes."

The acidification will be done in stages. At each stage, researchers will check water chemistry, sediments, decomposition rates for organic material, and the types and abundance of plants and animals in the lake.

Currently, they are studying what effects the barrier itself may have. Use of a barrier or "sea curtain" is new to lake studies.

When the experiment ends, the lake will be returned to normal. If necessary, fish will be restocked.

The study is being jointly conducted by DNR, UW-Madison and Superior, University of Minnesota, U.S. Geological Survey, and U.S. Environmental Protection Agency. DNR is responsible for site management and research on algae and bottom-dwelling invertebrates.

Long-term ecological study

What determines water quality in Madison area lakes?

Madison — Why is the water quality in the lakes around Madison better in some years than others? What are all the factors that contribute and how do they interact?

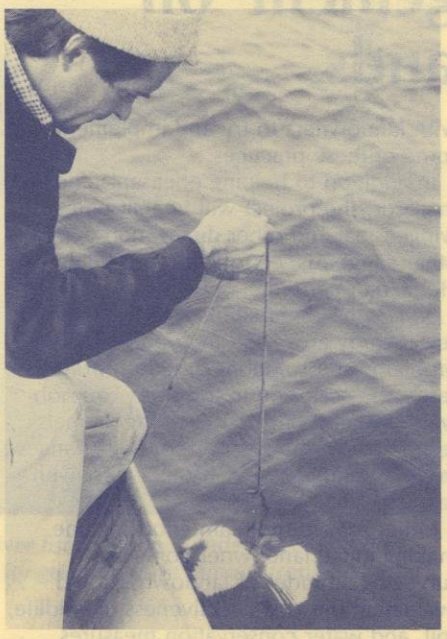
DNR research limnologist Richard Lathrop is trying to answer these questions based on a comprehensive 10-year study of Lakes Mendota, Monona, Waubesa, and Kegonsa. **"This project is really the first that has looked at the whole ecology of each lake with enough data to account for natural cycles and year-to year-variation," Lathrop says.**

With nine years of study completed, Lathrop suspects that seasonal water quality in these lakes has as much to do with their internal biology as with external factors, such as urban and rural runoff. Although he believes runoff is a major problem, Lathrop says a management plan for the lakes must be based on a thorough understanding of the lakes' internal mechanisms. **"We haven't really understood the ecological interactions in these lakes in a detailed, holistic way before," says Lathrop.**

"Water quality is strongly affected by the type and abundance of plants and animals in these lakes," he says. "For example, when we have a dramatic increase in the larger zooplankton that eat a lot of algae, we have clearer water."

But what controls the zooplankton that controls the algae that controls the water quality? Yearly variations in fish populations can have a strong effect, Lathrop says. "An abundance of perch or cisco in one year can consume a lot of the larger zooplankton that would otherwise be left to feed on the algae."

Weather is also very important. Wind and turbulence can dilute algae concentrations or suspend certain algae that would otherwise sink. When suspended, these algae compete with and reduce the impact of other, less desirable algae.



From his work boat, limnologist Richard Lathrop lowers a Secchi Disk into Lake Mendota. The disk is a tool to measure water clarity.

An important part of the study is to compare the ecology of the four lakes. "They are all affected by the same weather, but Lakes Mendota and Monona have different thermal layers because they are deep, while the other two are shallow and not thermally layered," Lathrop notes.

To gain a unique historical perspective and compare changes in aquatic populations, Lathrop and other researchers uncovered data from old DNR files and University of Wisconsin theses, some from the late 1800s.

Devil's Lake water quality

Baraboo — Devil's Lake at Devil's Lake State Park has long been one of the state's most popular recreational resources because of its beautiful setting and excellent water. In recent years, however, water quality there has shown some signs of deterioration.

Sparked by concern of the park staff and the public, a DNR task force began monitoring the lake in 1981. Since then, biologists have analyzed water quality data collected by park staff and have surveyed aquatic plants and fish in an effort to understand what causes the lake's algae blooms.

Researcher Richard Lillie says one change that has occurred is expansion of visible weed beds. Another, according to researcher Jack Mason, is that the number of bluegills, largemouth bass, and minnows appears to have increased significantly over the past 30 years, while smallmouth bass and walleyes apparently decreased. Mason bases his observations on comparisons between recent fish surveys and historical records.

Both biologists agree it's too early to know if the changes reflect a long-term trend or a short-term cycle. It's also too early to know whether the changes coincide with or contribute to observed declines in water clarity. "It's hard to know how these changes actually relate to each other at this time," Lillie says.

He thinks the late summer-early fall algal blooms indicate nutrients are more available during that period. Nutrient sources such as the park's sewerage system and lakeside cottages were investigated by DNR staff, but do not appear to be the cause, although the sewerage system has not been completely eliminated as a possible cause. Lillie theorizes that increased nutrients could be from internal factors, such as weed beds extracting nutrients from sediments.

The Department is seeking funding for an expanded monitoring and research effort to explore the cycling of nutrients within Devil's Lake. The study will help clarify interactions in the lake's ecosystem and sort out cause and effect relationships regarding the added nutrients.

Catch-and-release fishery doesn't release

Antigo — Results from a three-year experiment to encourage Wisconsin's first catch-and-release trout fishery in a lake or pond show most anglers who participated preferred to keep their trout rather than release them. "Only 7% of the anglers who caught trout released all of them," according to Bob Hunt, the research biologist who headed up the experiment at McGee Lake near Antigo during 1980-82.

McGee Lake's brook trout are larger than average for this region of the state, and Hunt had hoped the lake would attract anglers more interested in catching than in keeping the fish. Although trout grow exceptionally well in the lake, few survive the fishing season to take advantage of the excellent growth potential.

To encourage catch-and-release and increase the number of larger fish, a bag limit of two trout per day was established. However, most anglers kept the first two they caught and promptly stopped fishing. Despite the small bag limit, the harvest each season was greater than anticipated. Consequently, the number of trout surviving long enough to reach 15 inches or more increased only slightly.

Contrary to most catch-and-release fishery locations, anglers were allowed to use natural baits (except for minnows), which usually leads to higher hooking mortalities.

Hunt says a more restricted harvest and a prohibition on natural baits would be necessary to take advantage of the special conditions in McGee Lake that contribute to production of large brook trout.

Pouring concrete for the primary clarifier at the new $11.7-million Rib Mountain wastewater treatment plant. DNR contributed $7-million to the project. Photo by Jerry Neis

Clean lakes and streams

DANIEL F. MORAN, JR.,
Environmental Engineer

The water pollution cleanup by industry and municipalities in Wisconsin is something citizens can brag about. They've made it an ongoing, priority commitment for more than a dozen years, ever since 1969 when they overwhelmingly passed a referendum to spend $144-million helping communities build sewage treatment plants.

Since then, the commitment has solidified. There have been more millions for treatment facilities and a great deal of physical and mental hard work. This effort made Wisconsin one of the only states in the nation to meet the federal deadline on wastewater discharge limits July 1, 1983. It has given us streams that are safe again for people and fish.

Dollars to do the job came from a variety of sources.

Since 1972, the federal government has provided $763-million in cost-sharing grants. In 1978, the Wisconsin Fund was created by the state Legislature to pick up where federal support fell short. All told, DNR cost-sharing grants to local communities have totaled $441-million and local taxpayers have pitched in an additional 25 to 40% on the cost of every project. Total capital expenditure for communities' improved sewage treatment has reached about $1.6 billion. Wisconsin industry has also cooperated in a big way. In the past 10 years it has spent an estimated $250-million on water pollution abatement equipment.

The administrative mechanism for achieving our cleanup has been the Wisconsin Pollution Discharge Elimination System (WPDES) permit. Following passage of the federal Clean Water Act in 1972, Wisconsin set up a system that requires 1,500 industries and 698 communities to obtain a permit that limits the type and amount of pollutants they can discharge to state waters. Ninety-eight percent of community and industrial dischargers are meeting the limits of their WPDES permits, assuring compliance with state and federal clean water laws.

The Lower Fox River stands as a national example of positive, albeit hotly debated, cooperative effort. That single stream takes the waste from 13 pulp and paper mills and six communities between Lake Winnebago and Green

"To protect and enhance our . . . water: . . ." —DNR Mission Statement

Bay. In 1973, their combined pollutant discharge produced 215,000 pounds of biochemical oxygen demand (BOD) daily, resulting in dissolved oxygen levels too low to sustain fish life. To correct this, mathematical modeling by DNR determined that 84,000 pounds is the maximum allowable wasteload the river can naturally treat or assimilate on a typical summer day. Portions of this total were then allocated to various dischargers. The result was that daily BOD on the Fox dropped to 40,000 pounds. Water quality surged upward. And DNR's innovative system of allocating pollution permits to allow industrial growth while cleaning up the river received national acclaim.

Industrial Wastewater

Earth Day 1970	Earth Day 1985
Severe water pollution problems statewide, but inadequate means to control wastewater discharges	**Most streams meet water quality standards with Wisconsin Pollution Discharge Elimination System (WPDES) permits to regulate discharges**
Minimal, if any, wastewater treatment	**New treatment systems to meet wastewater discharge standards**
Municipal treatment systems unable to handle some industrial discharges	**Pretreatment for problem discharges to municipal treatment systems**
Stream dilution capacities overloaded by multiple dischargers	**Stream capacity modeling and wasteload allocation to regulate multiple dischargers**
Wastewater related fish kills	**Stable fisheries due to wastewater controls**

Municipal Waste

Earth Day 1970	Earth Day 1985
Severe water pollution problems statewide, but inadequate means to control wastewater discharges	**Most streams meet water quality standards with Wisconsin Pollution Discharge Elimination System (WPDES) permits to regulate dischargers**
Many older, overloaded facilities with only primary treatment	**Almost all facilities with secondary and advanced treatment to prevent overloads**
Treatment facilities not always well run	**Improved operations through training programs**
Municipal treatment systems unable to handle some industrial discharges	**Pretreatment for problem discharges to municipal treatment systems**
Stream dilution capacities overloaded by multiple dischargers	**Stream capacity modeling and wasteload allocation to regulate multiple dischargers**
Excessive clearwater entering sanitary sewer systems	**Clearwater infiltration reduced**

Ongoing concerns:
Limit toxics levels in wastewater discharges through WPDES regulatory permits.
Apply new standards to better regulate wastewater discharges and maintain water quality.
Continually update treatment systems to handle more diverse processes and to meet increasing capacity demands.
Improve sludge disposal.

There was a similar problem on the Wisconsin River between Rhinelander and the Petenwell Flowage where 29 major industrial and municipal polluters discharged wastewater. This stretch of the Wisconsin was so badly polluted in the early 1970s that many fish were unpalatable and extensive fish kills were common. Today, taste and odor problems still linger but the sport fishery is prospering again. DNR's wasteload allocation system along the Wisconsin has reduced BOD discharge from 500,000 pounds per day in 1973 to 23,000 pounds in 1983, which is lower than the 59,000 pounds allocated.

On the Flambeau in north central Wisconsin a paper mill in Park Falls had been discharging pollutants for 80 years, severely degrading water quality up to 50 miles downstream. Today, a new treatment system built in 1980 has reduced daily BOD from 23,168 pounds to 2,142, well below the 4,000 pounds per day wasteload allocation, and improved water quality will result in an improved fishery.

While the Fox, Wisconsin and Flambeau are the most dramatic evidence of Wisconsin's all-out push for clean water, the same thing happened in many places. The state has about 25,000 miles of streams. By 1972 only 700 miles didn't meet water quality standards. A decade later, 335 miles of polluted stream had been cleaned up.

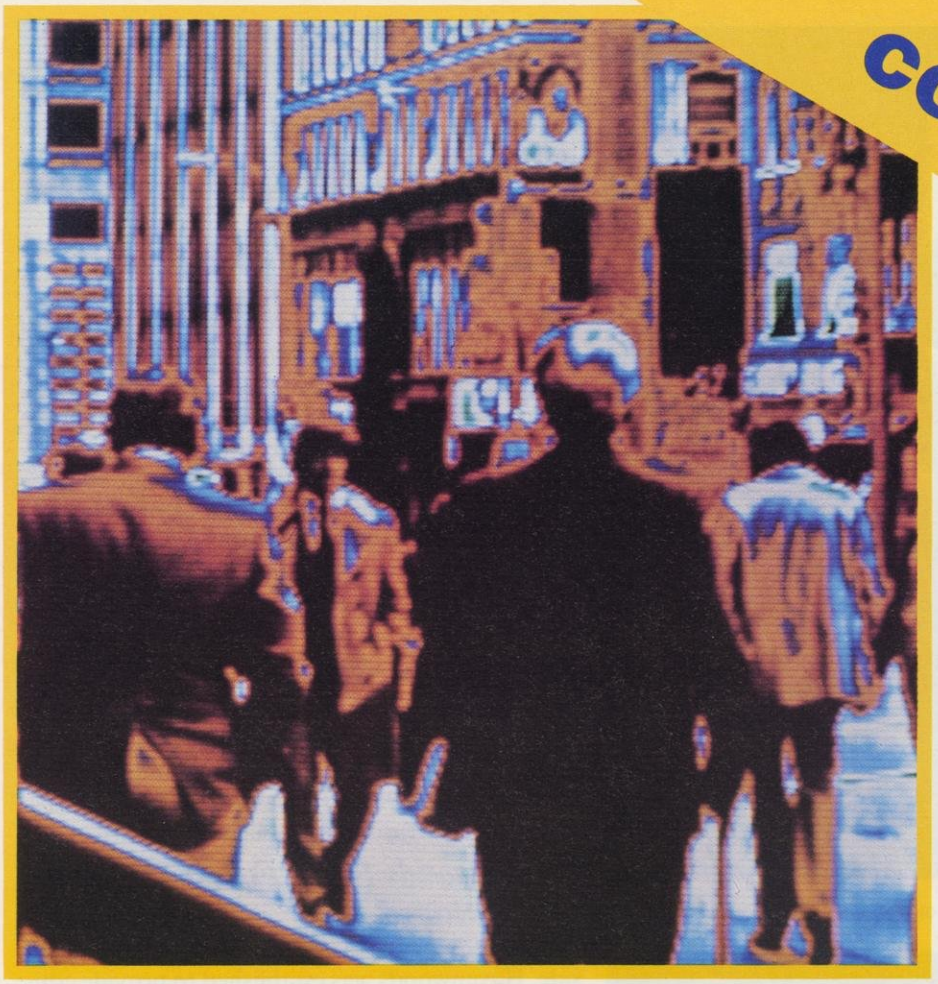
The value of clean water extends far beyond a high quality fishery or recreation. DNR Secretary C.D. "Buzz" Besadny stresses the economic benefits.

"Protecting our waters through improved wastewater treatment has been more than just an environmental victory. I can't emphasize enough the economic benefits to Wisconsin. Our tourism, paper, food processing and dairy industries all depend on this resource. In addition to jobs in these industries, nearly $1.2-billion in state and federal grants have created other jobs in the building trades working on wastewater treatment plants."

Federal law requires waters of every state to be fishable and swimmable. Now that treatment plants are in place, in many cases, pollution from nonpoint sources like city streets and animal feedlots will have to be controlled to achieve that goal.

"The early returns are extremely encouraging," said Besadny. "And although I expect that improvement will continue, we are taking steps to assure that ground isn't lost because of problems created by nonpoint source pollution and the detection of an increasing number of toxic substances in surface waters."

To that end, DNR's "1984 Wisconsin Water Quality Report to Congress" makes 16 recommendations. Two of them ask the federal government to support research on toxic contaminants and to establish a nationwide program to control urban and rural nonpoint pollution. So far, Wisconsin is on its own in trying to solve these two serious problems, which are national in scope. The state could use some help from Washington.



Urban commitment

Just a hop, skip and a jump

AL STENSTRUP,
Superintendent,
Havenwoods Forest Preserve

The DNR is moving next door, or sometimes right into town as part of its effort to bring recreational opportunity close to home for urban residents. Although this new emphasis is statewide, it shows up best in southeast Wisconsin where many new or expanded programs are an hour's drive or less from the Milwaukee area.

In addition to that well known multi-use silk purse, the Bong Recreation Area, there are Harrington Beach and Pike Lake State Parks; the Northern and Southern Units of the Kettle Moraine; Havenwoods State Forest and Recreation Area; an Olympic ice rink; Lapham Peak and the new Drumlin Trail.

Add to these developed sites, stepped-up management for fishing and wildlife everywhere near urban centers and you realize that pretty much anything you want outdoors is truly just a hop, skip and jump away. Here are some details:

Harrington Beach State Park

Located only 30 miles north of Milwaukee, this park features an inland lake and a mile of Lake Michigan shoreline. Quarry Lake provides excellent fishing and Lake Michigan excellent picnicking and swimming.

Pike Lake State Park

Located just northwest of Milwaukee, Pike Lake offers swimming, boating, fishing, hiking, picnicking and cross country skiing. A 32-unit campground is open from early May to the end of October.

Kettle Moraine-Northern Unit

Established in 1936, this state forest is managed for multiple use including wood production, outdoor recreation, hunting, watershed protection and scenery. Mauthe Lake and Long Lake provide family camping, picnicking, swimming

"To provide . . . a full range of outdoor opportunities."
—DNR Mission Statement

DNR purposely planned parks to be within easy reach of millions of Wisconsin residents.

Havenwoods State Forest Preserve and Nature Center in Milwaukee is right in town, available by bus. Photo by Al Stenstrup

and boating. A variety of trails attract many visitors year-round to view the spectacular remnants of the last ice age. Special program facilities include the Greenbush Group Camp, Ice Age Interpretive Center and the Kettle Moraine indoor group camp. The Northern Unit is approximately 50 miles north of Milwaukee.

Kettle Moraine-Southern Unit

This 17,000-acre state forest is southwest of Milwaukee. It has many miles of hiking, jogging, cross country skiing, horseback riding and snowmobiling trails. Visitors can enjoy picnicking, camping, fishing, swimming, boating and hunting in a variety of areas. Special program facilities include the McMiller Shooting Range, Horsemen's Campground, Oak Ridge Demonstration Farm and Old World Wisconsin. A recently completed development is Paradise Springs, which features trails and programs for the physically handicapped.

Olympic Ice Rink

Located in Milwaukee and leased to the Olympic Ice Rink Operating Corporation, skating here is open to the public four times a week. The rink provides a showcase for Wisconsin residents to view future Olympians.

Havenwoods State Forest Preserve and Nature Center

Located on 237-acres on Milwaukee's north side, Havenwoods was established to provide educational programs as well as outdoor recreation. School, youth and adult environmental education programs are available along with about three miles of hiking and ski trails. A city bus will get you there.

Trails in the Kettle Moraine State Forest are under an hour's drive from most urban areas along Lake Michigan. Photo by Dean Tvedt▶

Lapham Peak and the Drumlin Trail

The Lapham Peak project, formerly a small 90-acre picnic area and observation tower, now encompasses 539 acres of wooded hills and valleys. Located within two miles of I-94 in Waukesha County, it will provide a variety of outdoor activities. A little over a mile away is the new Drumlin Trail which will extend 47 miles from Waukesha to Cottage Grove over an abandoned Chicago and Northwestern Railroad bed. It has a 100-foot right-of-way which bisects the Kettle Moraine countryside and passes through several small rural communities. It will be developed into a multi-use trail system and become part of an important bicycle route between Madison and Milwaukee.

Better lagoons

Years ago, DNR recognized runoff problems, low oxygen levels and a proliferation of rough fish in the Milwaukee County park lagoons. Consequent restoration and protection studies led to a US Environmental Protection Agency (EPA) grant of $300,000. The money will help pay for runoff and erosion controls, supplementary well water sources to get rid of chlorine in the ponds and construction of cascade aeration systems.

Five park lakes have been chosen for restoration between 1985 and 1989 --- Brown Deer, Washington, Humboldt, Mitchell and Jackson --- because they have problems typical of those in the county's other 31 lagoons. By improving these five, Milwaukee County and DNR will learn how to help the others.

Last spring, DNR and Milwaukee County parks stocked approximately 7,000 rainbow trout in the lagoons. That experiment delighted people. Enthusiastic anglers caught all the cold water trout before summer heat came. This fishing season, trout will be available again and hybrid bluegills will also be introduced as a warm water species. Plans call, not only for better quality fishing, but also expansion of stocking to more locations as lagoon revitalization continues to improve water quality.

Fish and wildlife

Best known of DNR's stepped-up fish and wildlife management projects near Wisconsin cities is the Lake Michigan trout and salmon stocking program, which has grown from 9,000 fish stocked in 1964 to over 6 ½-million in 1984. Big fish that used to be available only to those rich enough to afford a west coast trip, can now be literally caught out the back door by thousands of Wisconsin anglers.

In addition, a wide range of other DNR management action has made both hunting and fishing more easily accessible and better for nearly everybody in southeastern Wisconsin.

Fish managers and their crews have stocked trout and carried out stream improvement projects on Nichols Creek, Allentown Creek, the South Branch of Scuppernong Creek and several other close-to-home streams. Public access to lakes has been a priority. Carry-on sites have been created at Upper Genesee and Lower Nemahbin lakes and boat landings built at Okauchee, Potters and Wind lakes.

There are about 50 fish and wildlife areas in southeast Wisconsin primarily used during peak hunting and fishing seasons, but open to the public year-round. They offer exciting opportunities for bird watching, mushroom and berry picking, nature study and family adventure in areas that frequently have only few visitors.

There are also special hunts at Bong and Theresa Marsh.

For more information on the many hidden recreational opportunities right near home contact the DNR district office in Milwaukee at 2300 North Third Street, (Box 12436, Milwaukee, WI 53212, phone 414-562-2300) or stop in at the local field station. DNR is anxious to let you know where these many backyard recreational opportunities are and how to use them.

Last spring 7,000 rainbow trout were stocked in the Milwaukee park lagoons.
Photo by Neal O'Reilly

DNR programs have built hundreds of playgrounds and other park facilities in big and small towns all over Wisconsin. Photo by Dean Tvedt

Local recreation aids preserve urban and rural resources

DUANE HOFSTETTER,
LARRY FREIDIG
and TOM NIEBAUER,
Community Service Specialists

Anyone who's travelled through very many small communities in Wisconsin can't help but be struck by the profusion of local parks and high quality outdoor recreation facilities. Little hamlets with little budgets have somehow managed to buy land and build tennis courts, swimming pools, ball diamonds, beaches, trails, park shelters, boat launching ramps, toilets, campgrounds, golf courses, access roads, parking lots, hockey rinks, wells, playgrounds and more. Big city and county parks are also impressive. You probably enjoy some of these facilities in your community. When you do, give a little credit to

DNR as administrator of a lot of the cash that bought and built these fine facilities.

Among the programs that have funnelled money into local communities are the Land and Water Conservation Fund (LAWCON), the Outdoor Recreation Action Program (ORAP) and aids to help with fish and wildlife habitat and construction of shooting ranges. Besides these, a very large local network of snowmobile trails is partially financed through DNR and money is also available for off-road motorcycle facilities.

LAWCON

The Land and Water Conservation Fund program, LAWCON, started here in 1965 when Congress established a 25-year federal aid program for state and local land acquisition, planning and development.

Since then, more than $55-million in 50% LAWCON matching grants have been paid in Wisconsin for nearly 1,700 state and local outdoor recreation projects.

Land acquisition near large population centers has always been LAWCON's highest priority, and DNR has worked with several urban centers to buy key recreation lands, especially water frontage.

In Green Bay, for example, the city has identified the Bairds Creek Parkway and the Wildlife Sanctuary as key resources. Located within the city, the parkway will eventually consist of hundreds of acres including a floodplain and the surrounding hills. Relatively untouched by human encroachment, this scenic area will cost an estimated $3-million, with a maximum of 50% of individual project costs coming from LAWCON. Same with the Wildlife Sanctuary, which also includes lake frontage on Green Bay.

Milwaukee has received $3,178,853 in matching LAWCON grants for land acquisition and improvement for 43 projects, including several for Oak Creek Parkway, Lincoln Park and Franklin Park.

In Dane County, LAWCON will help preserve over 3,200 acres of land along seven-mile Nine Springs Creek just south of Madison. Total acquisition costs will approach $1-million.

The City of Middleton, also in Dane County, will use LAWCON funds to help preserve 500 acres of marsh and upland along Pheasant Branch adjacent to Lake Mendota. Last year, Middleton received a $54,950 LAWCON grant.

Although LAWCON stresses wetlands and water frontage, it has also pioneered preservation of abandoned railroad grades for use as trails. The Sugar River Trail in Green County and Military Ridge Trail in Dane and Iowa counties are examples. Recently, the Cottage Grove (Dane County) to Waukesha trail was purchased partly with LAWCON money.

With the help of LAWCON, a new urban park named after former Senator and Governor Gaylord Nelson will be developed on Lake Mendota in Madison. Nelson was a founding father of Earth Day and now chairs The Wilderness Society. The 441-acre park was purchased in part with $1,030,000 in LAWCON funds.

ORAP

ORAP, which was originally designed to supplement funding for outdoor recreation and help clean up water pollution, used to have a special section that dealt with Local Park Aids. Its purpose was to preserve and develop "the outdoor recreation resources of the state to most completely and efficiently satisfy the outdoor recreation needs of its people." ORAP gave 50% matching grants to communities and Indian tribes for this purpose.

During the life of Local Park Aids, which were dropped in 1981, 971 projects were approved—60% in heavily populated southern and eastern Wisconsin. All in all, $12,175,000 were given for land acquisition and basic park development. That's why so many small Wisconsin communities have outdoor facilities that answer nearly every conceivable outdoor need.

County Fish and Game Aids

County Fish and Game Aids replaced bounty payments for coyote, fox and bobcat in 1965. Each year since, an amount equal to the average annual bounty payment has been allocated to counties for fish and wildlife habitat projects. The annual appropriation is $140,000, which is divided among the 72 counties based on size.

These 50% matching grants have helped pay for $4.8-million in fish and wildlife habitat development. The money has purchased land, managed aquatic vegetation, built fishing piers, developed spawning areas, constructed flowages and seeded trails.

Wildlife Habitat Aids

Another habitat aids program emphasizes forest wildlife. It gives 100% grants for work on the 28 county forests, with $125,000 set aside for this purpose annually. The money goes for creating wildlife openings, aspen regeneration, tree planting to improve winter deer yards, and creating hunter access trails.

Pitman-Robertson Fund

Between 1976 and 1982, a portion of the money which came to Wisconsin from the federal Aid to Wildlife Restoration Act (the Pitman-Robertson program) was designated for shooting ranges used in hunter safety training. Matching grants of 50% were paid to counties, cities and sports clubs for this purpose. The program was phased out in 1982 in favor of a more comprehensive one.

Snowmobile Trail Aids

Since 1971, DNR has administered a grant program to help counties acquire, develop and maintain a system of public snowmobile trails.

". . . the right of all . . . to use and enjoy these resources in their work and leisure."
—DNR Mission Statement

Wisconsin has nearly 10,000 miles of snowmobile trails, many of which were paid for with the $1.6-million distributed by DNR.

Today there are 9,900 miles of trails in 68 participating counties, one of the finest networks in the nation.

This success is due in large part to cooperation between snowmobilers, counties and private landowners. Of the total number of miles now in the system, only 560 are on state properties with much of the remainder on private lands.

The ultimate goal is a statewide network of 13,000 miles that will provide continuous riding on well-maintained, high quality trails.

Much of the grant money goes to maintenance, acquisition and insurance on existing trails rather than development of new ones. So far, DNR has distributed more than $1.6-million for this local aid program.

Motorcycle Recreation Program

And finally, DNR administers a local aid program for off-road motor vehicle facilities. In making grants, DNR stresses the importance of public involvement in establishing a successful program. In selecting a site, environmental impacts like noise, dust and erosion control are addressed and mitigating measures recommended.

Counties, cities, villages and towns can apply for motorcycle grants, which assist in buying land for trails and pay for development of motorcycle areas plus operation and maintenance costs. Since the program began in 1978, DNR has awarded $374,000 in grants.

Put together, all of these aid programs have made outdoor recreation available to everyone—in small villages, big cities and rural areas. They're amenities that characterize the quality of life in Wisconsin—the kind that will bring happiness to people for a long time to come.

Wisconsin Youth Conservation Corps:

Hands-on environmental education

AL STENSTRUP,
Superintendent,
Havenwoods
Forest Preserve

The Wisconsin Youth Conservation Corp (WYCC) offers important opportunities for state young people to work, learn and earn. More than 800 high school age students (15-19) participate in the WYCC each summer. Started as an all male program in 1962, it now operates four camps around the state for both sexes.

Students work on a wide variety of conservation projects including trout stream improvement, trail development, pine plantation improvement and wildlife population studies.

With environmental education one of the principle objectives, the WYCC provides a rare hands-on work experience to reinforce the lessons. During their five-week experience, students learn from resource managers, guest speakers and from each other.

Applications to attend are available from guidance counselors in schools and are due in early March. The number of students who apply usually far outnumbers openings available, which are filled by random computer selection.

This land is your land

J. WOLFRED TAYLOR,
Editor

The smorgasbord of outdoor activity that blossomed on the Richard Bong Recreation Area in Kenosha County over the past 20 years at first surprised everyone. But it has turned into a pattern that bodes well to shape future uses of other state properties, especially near population centers.

Bong, a half-done US Air Force base abandoned when missiles replaced bombers, sat idle and unpoliced for many years before it was acquired by DNR. Because there was plenty of unrestricted room on its 4,500 acres and nobody around to say nay, people began to use it as though it were all outdoors. Originally thought of only as a place to hunt, it was actually designated as a wildlife area. But soon field trials, horses, dogs, model aircraft, snowmobiles, motorcycles, balloons, ultra-light planes, picnickers, hikers, bird watchers and parachute jumpers were using the land. After the Legislature finally put DNR in charge, the multiple use tradition was accelerated and other activities like waterfowl hunting, fishing, swimming, hiking and camping were added. The diverse outdoor recreation needs arising from four-million people who live only an hour's drive away had stamped Bong's character.

Similar spontaneous activity has shaped the evolution of other properties, and DNR is taking a closer look at those near population centers which now sit idle part of the year.

For example, 2,200-acre Yellowstone Park in Lafayette County started as a fish and wildlife project but before long the public had turned it into a multiple use recreation area. Now it boasts a campground and swimming beach but its 450-acre lake, built to create a place to fish, is still a magnet for anglers — and surrounding wildlife lands continue to attract hunters. Like Bong, Yellowstone's multiple outdoor options draw visitors from all over Wisconsin, Illinois and Iowa.

They do at Browntown-Cadiz Springs in Green County, too. That lovely spot with its two artificial lakes also began existence as a fish and wildlife area, managed for trout, pike and various game. Since its transition to a recreation area, canoes, sailboats, picnic grounds and nature trails are all part of the scene — and with little effect on the original purpose.

Land sailing is one of a whole string of different outdoor activities started by visitors to the Bong Recreation Area. Photo by Bruce Chevis

These trends toward multiple use are unmistakable. As far back as 1977, the Legislature recognized them and gave DNR permission to convert properties to recreation areas providing a master plan is developed and public hearings held. DNR also has authority to establish use zones so that conflicting activities do not interfere with one another. Since the Natural Resources Board okays a master plan for use and development of every DNR property, each time a plan is offered multiple use is considered.

Recently the Buffalo River State Trail near Eau Claire was designated a recreation area to allow hunting and other activities. Buckhorn State Park in Juneau County with its big adjacent wildlife area is evolving in that direction. On many properties, provision has been made for extra uses even though formal changes in designation will probably never be made. Thus, deer hunting is allowed in many state parks and a spring turkey hunt is under consideration for a half-dozen parks in the turkey range. Canoe and rafting uses far outweigh angling on the Wolf River Fishery Area in Langlade County and non-anglers also dominate the McCann River Fishery Area in Marquette and Waushara counties. Crex Meadows Wildlife Area near Grantsburg has a nature center and an extensive interpretive program, while trails on the Sandhill Experimental Wildlife Area near Babcock are heavily used by hikers.

All in all, it looks as though the public pretty well determines the uses of its properties — and more and more year-round uses are evolving. DNR thinks that's as it should be. We're just going to make sure nothing bad happens because of overuse — and that outdoor recreation is offered to everyone at a convenient, nearby location.

Take a nice deep breath

Clean air is a priority in southeast Wisconsin

JEANNE SOLLEN,
Public Information Officer

Last April mandatory yearly automobile emission tests required under the Federal Clean Air Act began in Milwaukee, Racine, Kenosha, Waukesha, Washington and Ozaukee counties. It was something DNR had been pushing for a long time in the southeast. Each year, about 1,200,000 vehicles will undergo inspection with the goal of reducing carbon monoxide by 33,000 tons and volatile organic compounds by 4,000 tons.

While drivers greeted the program with measured enthusiasm, DNR air specialists view it as offering one of the region's best hopes for reducing ozone and eventually bringing southeast region air quality up to standard. By next year this time, the beneficial effect of having cleaned up thousands of dirty tailpipes should be apparent in the air people breathe and in monitoring data.

The 1984 ozone season produced only three alert days for Milwaukee County and slightly more than that in Racine and Kenosha counties. Although the alert count fluctuates year to year and is greatly influenced by weather, the region seems unlikely to return to the high numbers of the 1970s when as many as 18 or 20 alerts might be called in a season.

In March, Wisconsin became the first state in the midwest to have its revised plans for controlling ozone and carbon monoxide approved by the Environmental Protection Agency. The plans will enable Wisconsin to meet federal standards for the two transportation-related pollutants by December 31, 1987.

Besides the usual inspections of industrial emitters, DNR was busy this year checking out asbestos removals. Under federal guidelines, people who use community buildings like schools, churches, hospitals and offices have to be informed if the buildings contain asbestos. Once considered a normal insulating or fireproofing material, asbestos now is seen as a potential cause of lung cancer and is being removed from the pipes, furnaces, walls and ceilings of many buildings. DNR makes sure the stripped asbestos is wetted, bagged, sealed and bound for acceptable burial.

A new program in 1985 will require that operating permits be obtained by existing or older sources of air pollution that did not previously need them. The new system is expected to enhance the department's knowledge of ambient air quality and refine its ability to manage the air resource.

Altogether, DNR now collects data from 110 permanent air monitoring sites throughout the state plus numerous temporary stations set up at suspected problem locations. These keep track of pollutants in the air you breathe to make sure amounts don't rise so high they'll harm health. Contaminants monitored include sulfur dioxide, nitrogen oxide, carbon monoxide, ozone, lead and suspended particulates.

Beginning this year, particulate monitoring will be expanded to include respirable particles. These are tiny particles that can evade the body's natural defenses and penetrate the respiratory system even to the lungs. The new program will continue alongside the present monitoring of larger particulates.

The first monitoring site for respirable particles is in Racine where equipment already is installed and should begin operating in April. Three additional sites are planned. The federal government still hasn't set standards, but the samplers will operate without standards at first to get an idea of "what's out there."

Legend:
*** = No monitoring data**
U = unhealthful
VU = very unhealthful

Number of unhealthful air quality days in Wisconsin cities

Cities	Year	Ozone		Sulfur Dioxide		Dust & Suspended Particles		Carbon Monoxide	
		U	VU	U	VU	U	VU	U	VU
Ashland	**1984**	*	*	*	*	**0**	**0**	*	*
	1983	*	*	*	*	**0**	**0**	*	*
Beloit	1984	0	0	0	0	0	0		
	1983	0	0	0	0	1	0		
Fond du Lac	**1984**	**1**	**0**	*	*	**0**	**0**		
	1983	*	*	*	*	**0**	**0**		
Fox Valley (Appleton-Neenah/ Menasha)	1984	0	0	0	0	0	0		
	1983	1	0	0	0	0	0		
Green Bay	**1984**	**0**	**0**	**3**	**0**	**0**	**0**		
	1983	**2**	**0**	**1**	**0**	**0**	**0**		
Kenosha	1984	4	0	*	*	0	0	*	*
	1983	5	1	*	*	1	0	*	*
La Crosse	**1984**	**0**	**0**	*	*	**0**	**0**		
	1983	**0**	**0**	*	*	**0**	**0**		
Madison	1984	0	0	0	0	0	0	1	0
	1983	0	0	0	0	0	0	0	0
Milwaukee	**1984**	**4**	**0**	**0**	**0**	**0**	**0**	**2**	**0**
	1983	**9**	**1**	**0**	**0**	**1**	**0**	**0**	**0**
Oshkosh	1984	0	0	*	*	0	0		
	1983	0	0	*	*	0	0		
Peshtigo	**1984**	*	*	**5**	**0**	**0**	**0**		
	1983	*	*	**4**	**2**	**0**	**0**		
Racine	1984	5	0	0	0	0	0	0	0
	1983	10	3	0	0	1	0	0	0
Superior	**1984**	*	*	*	*	**0**	**0**		
	1983	**0**	**0**	*	*	**1**	**0**		
Waukesha	1984	0	0	*	*	1	0	1	0
	1983	3	0	*	*	1	0	0	0
Wausau Area	**1984**	**0**	**0**	**2**	**0**	**0**	**0**		
	1983	**0**	**0**	**1**	**0**	**0**	**0**		

Air quality on all other days monitored was acceptable.
Ozone - monitored only between April 15 and October 15.

DNR's new District Headquarters at 2300 N. Dr. Martin Luther King, Jr. Drive in Milwaukee has stimulated other nearby construction and helped with jobs for neighborhood residents.

Southeast District supports neighborhood needs

JEANNE SOLLEN,
Public Information Officer

On the job training

Barbara Wells, former clerical supervisor for DNR's Southeast District, managed a work experience program that brings in young people from 16 to 25 years of age for paid, part-time office work at DNR's Milwaukee headquarters. The program began in the spring semester of 1984 with one student; it expanded to seven students during the fall semester.

These work-learn students come from high schools and alternative learning centers in Milwaukee. Those chosen have been primarily minority youth — black and Hispanic — but their selection was prompted by community location and personal reasons rather than ethnic background.

"We really feel committed to the idea that education is the most important thing you can give a child, and work experience is a very integral part of education," said Wells.

Strong efforts are made, she said, to give participants as well-rounded and meaningful a work experience as possible. "We give them exposure to different duties and office skills and to human relations," she said. "They are included in staff meetings. They learn how to prepare for work and are given support in learning new procedures."

Students have a chance to discuss the work experience with supervisors and are graded and counseled when necessary. In addition to a salary paid by the school system or by a federal program, students also get school credit.

Part of the Community

When it moved to the central city in September 1983, the DNR Southeast District leadership made a conscious decision to support its new neighborhood.

Under this decision, almost $70,000 worth of annual service and vending contracts for district headquarters have gone to community enterprises. They include security service, trash pickup, window cleaning, vehicle fleet repairs, and large-scale copying. Most contractors, but not all, represent minorities in this heavily minority area.

Another service provided the community is use of the headquarters building for outside group meetings. The large auditorium that fronts on North Third Street and a somewhat smaller, but very attractive, meeting room adjoining it are pleasant and convenient meeting places. A first come-first serve policy is followed on reserving meeting room space.

Groups that have met at the headquarters recently include one on housing, a teachers' group, the Department of Transportation, Wisconsin Black Media, the Association of Management and Professionals, the Wisconsin Association of Blacks in Criminal Justice, the Wisconsin Bureau of Community Corrections and Concerned Citizens for Quality Education for Black Children.

Farm and city water

R&R for the Milwaukee River

LLOYD EAGAN,
Water Quality Planner

DNR has started a major effort to rehabilitate the Milwaukee River and communities in the seven counties that make up the river basin will play vital roles. While the project will focus on nonpoint source pollution, DNR will also simultaneously work on upgrading fish and wildlife resources. Building on the Milwaukee River's many attributes, the department hopes to re-create a high quality resource right in the backyards of a large number of Wisconsin residents.

The Basin

The Milwaukee River drainage basin includes 84 lakes and 400 miles of stream that make up five watersheds spread over 800 square miles of Dodge, Fond du Lac, Milwaukee, Ozaukee, Sheboygan, Washington and Waukesha counties. The watersheds surround six streams: East and West Branch, North Branch, Cedar Creek, the Menomonee River and the Lower Milwaukee River. Basin water quality ranges from relatively

good in the Northern Unit of the Kettle Moraine to very poor at the degraded mouth of the Milwaukee River, with various levels in between.

Dairy and other agricultural uses are important upstream where small urban communities such as West Bend and Cedarburg are located. Industries are more common downstream where rapid development is taking place adjacent to the established greater Milwaukee area. Better water quality could support expanded recreation throughout the river system. All segments need a healthy river system as an important amenity that can attract businesses and industry. Projects like the Riverwalk in West Bend have demonstrated that upgrading a local stream makes good economic sense. In Milwaukee, the city and Gimbels department store are working cooperatively on a segment of Milwaukee Riverwalk which is scheduled for completion this spring. People are beginning to recognize the benefits a revitalized river can bring.

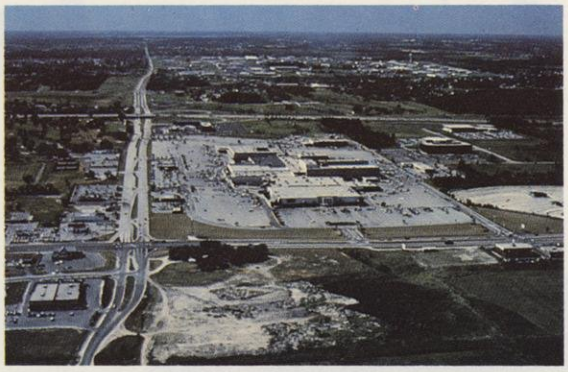
History of clean-up in the Milwaukee River

Over the past 10 years, under the auspices of DNR, significant pollution abatement has been achieved: seven new municipal wastewater treatment facilities have been built; four communities have upgraded their treatment and collection systems; and two treatment plants have been abandoned and connected to regional facilities. Currently, the Milwaukee Metropolitan Sewerage District (MMSD) is making extensive improvements that will cost about $1.6-billion and reestablish Milwaukee as a national example of sound public health and environmental protection. These improvements will expand capacity and decrease the hundreds of overflows from the city's separate and combined sewer systems.

While clean-up of point sources will greatly improve water quality, this effort alone is not adequate. Studies have found that rural and urban nonpoint source pollution account for nearly 100% of the sediment entering the Milwaukee River Harbor and Lake Michigan. Nonpoint pollution comes from diffuse sources like street runoff, erosion from farmlands, stream banks and construction sites and improper handling of animal waste. Nonpoint sources are the major contributors of sediment, phosphorus and oxygen demanding material entering the river. Without a major nonpoint source clean-up, improvements in water quality in the Milwaukee River basin will be limited. Municipal and industrial sewage treatment plants are simply not enough!

The Wisconsin Legislature recognized the problem and passed a bill, signed by Governor Earl on May 5, 1984, which placed the five Milwaukee watersheds on the state's priority list. This makes them eligible for cleanup money from DNR's Wisconsin Fund Nonpoint

Pollutants and silt stain the harbor at the mouth of the Milwaukee River after a heavy rain. Photo by Roger Bannerman



Runoff from huge paved-over parking lots carries toxics and other material into streams.

The West Bend wastewater treatment facility has helped in cleanup of the Milwaukee River watershed. Federal construction assistance amounted to $12.3 million. Photo courtesy of Donohue and Associates

State and Federal Funds Spent on Water Pollution Control in Milwaukee River Basin Communities Outside of Milwaukee Sewage District Service Area

Community	State	Federal	Total
Campbellsport	-	$ 274,972.00	$ 274,972.00
Cedarburg	$ 79,500.00	15,000.00	94,500.00
Fredonia	1,244,858.00	115,875.00	1,360,733.00
Grafton	3,206,867.00	343,985.00	3,550,852.00
Jackson	206,112.00	3,715,186.00	3,921,298.00
Kewaskum	46,055.00	-	46,055.00
Newburg	-	36,600.00	36,600.00
Random Lake	-	1,642,924.00	1,642,924.00
Saukville	1,691,877.00	31,701.00	1,723,578.00
Waubeka	-	38,267.00	38,267.00
West Bend	-	13,023,137.00	13,023,137.00
Total	**$6,475,269.00**	**$19,237,647.00**	**$25,712,916.00**

Source Pollution Control Program. The law was needed because not one of the five Milwaukee River watersheds had ever been proposed by local leaders for nonpoint source management, a prerequisite under the DNR program. The law passed after DNR evaluated the water quality of the river and after a special task force formed by Milwaukee Mayor Maier spotlighted nonpoint source pollution as a major factor behind the stream's degradation. In addition to putting the five watersheds on the priority list, the new law also provides state funds for planning and inventory. Since its passage, DNR has committed a substantial amount of existing program resources to the project. The extra funding provided by the Legislature will allow the nonpoint cleanup to follow the same schedule that MMSD is following for the remaining point source cleanup. DNR anticipates that implementation of nonpoint source controls for watersheds in the Milwaukee River basin will begin in 1986.

Cleanup Plans

Detailed plans for the cleanup have already been prepared with assistance from the Southeastern Wisconsin Regional Planning Commission (SEWRPC). Representatives from each of the basin's seven counties have worked with DNR to reach a consensus on approach before proceeding.

The next step will be land management assessments to identify the most significant barnyards and feedlots, eroding croplands, eroding streambanks, construction sites and established urban areas contributing to the pollution problem. This process will be completed in 1986.

The assessments will be coupled with water quality information from past and present studies. Meantime, DNR will step up fishery and wildlife management efforts in the basin. Habitats will be evaluated and management needs to enhance these resources will be identified.

Projects to control nonpoint source pollution will be developed for each of the Milwaukee River basin's five watersheds. The projects will identify critical areas that need nonpoint source management and make cost estimates for installing practices. Fish and wildlife habitat work and restocking will be coordinated with installation of land management practices.

Area counties and municipalities will carry out the projects with assistance from various state and federal agencies. Local land conservation committees will work with rural landowners to control manure runoff and soil erosion. Urban nonpoint source pollution controls will include stormwater management and regular housekeeping such as cleaning of catch basins, street sweeping and leaf collection.

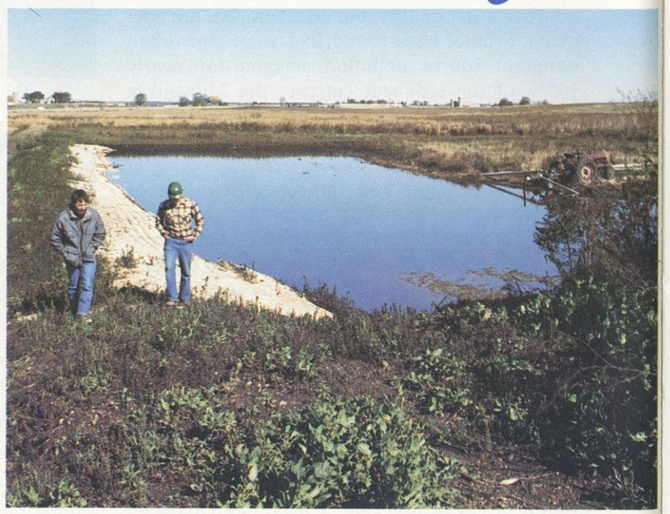
If everything goes according to schedule, nonpoint source controls on the Milwaukee River Basin should be in place by 1996.

"To protect and enhance our Natural Resources — our air, land and water: . . ." —DNR Mission Statement

DENNIS KUGLE, Wastewater Specialist

Groundwater and the food industry

Vegetable processing plants in Wisconsin that depend on groundwater pay $133-million per year in wages and use farm products worth more than $150-million. Photo by Dean Tvedt



Wastes from processing plants are disposed of in lagoons or by spray irrigation. Both are carefully regulated by DNR to prevent harm to surface and groundwater. Photo by Dean Tvedt

Not only do three-million people in the state drink it every day, a clean and plentiful supply of groundwater is also vital to Wisconsin's fruit and vegetable processors. Which means that DNR's responsibility for keeping groundwater pure is directly linked to a half billion dollar industry that provides a yearly average of 12,000 jobs. DNR takes this responsibility very seriously.

About 1 ½-gallons of water is needed for every single can of vegetables and Wisconsin is one of the nation's largest processors. We're first in peas, sweet corn, green and wax beans, beets and sauerkraut; second in cranberries; and important in frozen and dehydrated potatoes and tart cherries. Our water helps clean, blanch, move, pack and cool these products. It's also used in meat packing and dairies for sanitation purposes, but with fruits and vegetables approximately 65% is actually a part of the end product. If the industry were forced to pay for bringing surface water up to the health standards that come naturally from Wisconsin groundwater, it would be out of business. Because it isn't, its size and diversity in the state are impressive.

There are more than 70 individual fruit and vegetable processing plants here operated by at least 40 different companies. Thirty of these are headquartered in Wisconsin. Some of the bigger operators are the Larsen Company with nine plants, Oconomowoc Canning Company with six and the Friday Canning Company with eight. Del Monte, Green Giant and Seneca Foods also have processing plants here and numerous other small ones are owned by cooperatives or individuals.

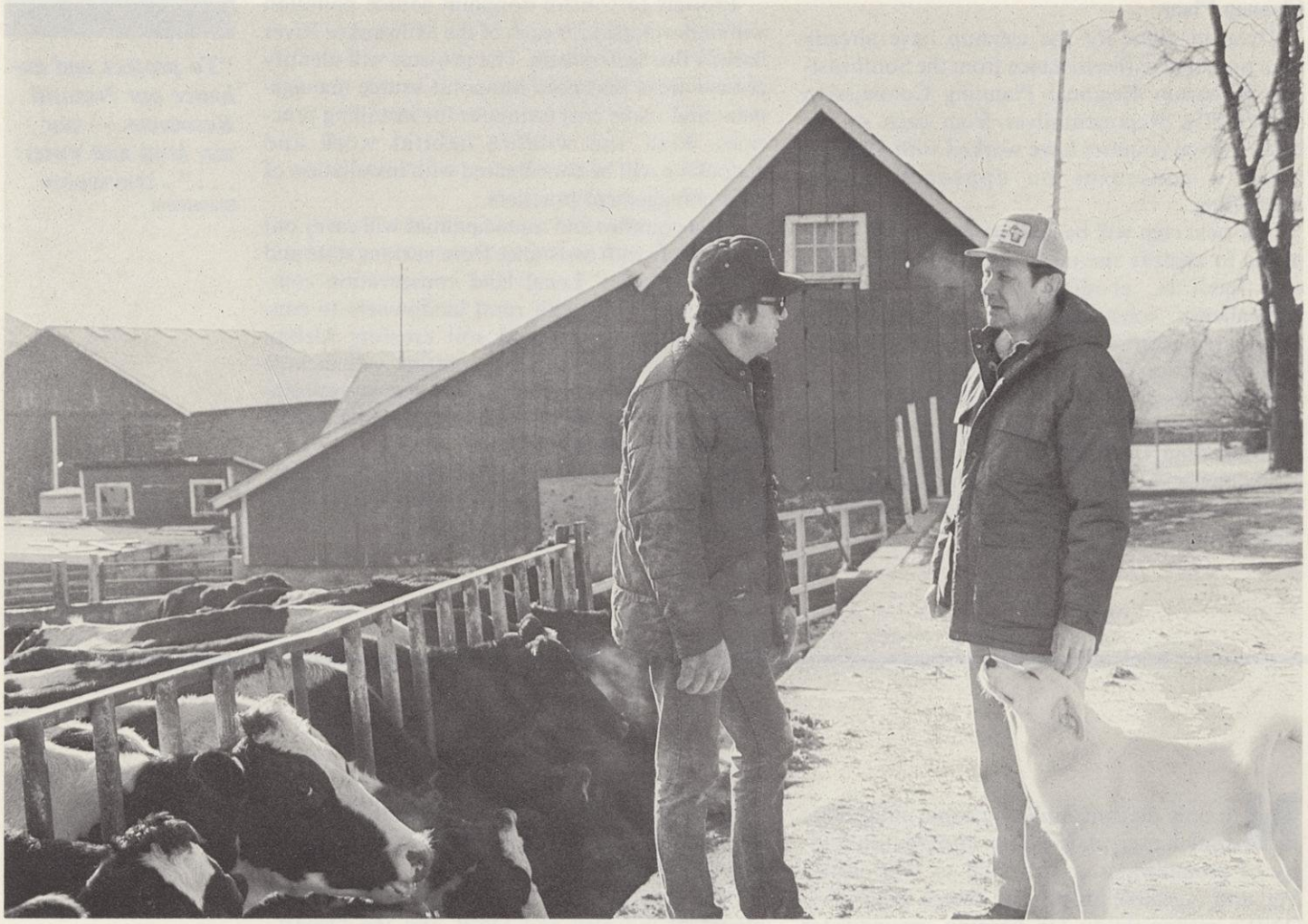
These plants pay wages in excess of $133-million per year and use farm products worth more than $150-million.

Pure groundwater is the life blood of this important industry and DNR and the Department of Health and Social Services have the job of making sure it stays that way. This is done through a permit system which regulates waste disposal and prevents ground or surface water contamination.

Where spray irrigation of wastewater onto land is used — the most common means of disposal at food processing plants — permits regulate the daily volume of water that can be applied and describe which land it can be applied to.

Where discharge is made directly to surface water from lagoons, permits limit the daily volume and organic strength of the discharge water, and specify into which stream it may flow and its organic content.

Groundwater monitoring wells are located around the perimeter of almost all of the spray irrigation systems. These monitoring wells are periodically tested to insure that the underlying groundwater is not being adversely affected. Because it is so important to their products, the majority of the fruit and vegetable processing companies understand and accept the need to protect the groundwater below their disposal systems. They like the luxury of being able to use processing water that requires no further treatment. DNR is proud of the job it is doing to make sure this continues.



DNR Secretary C. D. "Buzz" Besadny discusses manure handling with a Wisconsin farmer.
Photo by Jean Meyer

Animal waste:

Farmers, DNR and local agencies cooperate to put it where it'll do the most good

GORDON STEVENSON,
Animal Waste Control Specialist

Manure improves soil and is a valuable agricultural resource, but when allowed to enter lakes, streams or groundwater, it can kill sport fish, transform sparkling lakes into turbid puddles and contaminate drinking water supplies. Such things have happened. To handle the threat, last year DNR implemented an animal waste control program with active participation by both the Department of Agriculture, Trade and Consumer Protection and County Land Conservation Departments. These county departments are successors to the Soil and Water Conservation Districts and assist farmers and other land users in

planning and applying conservation and management practices.

As of December 21, 1984, 185 animal waste complaints had been received through this new DNR program and 125 sites inspected. Significant water pollution problems were found at 13 and 37 others were deemed potential polluters.

Some examples:

Wastewater from an overflowing manure pit reached the Little Eau Pleine River, threatening aquatic organisms and boosting algae and plant growth.

During heavy rain, a buildup of manure solids in a road ditch flowed into Peabody Creek, a Class I brook trout stream in Polk County.

Groundwater was contaminated by animal waste seeping through a storage pit dug below the water table.

At Spirit Lake, runoff from a barnyard combined with runoff from a manure pile, flowed through a drainage way to a small pond, then through a ditch and into the lake.

In all these cases, the farmers' actions prevented further damage. The department expects to make 60 to 100 investigations of this kind annually. The program does not handle odor problems or complaints and is not designed to do so.

Under the system, livestock operations are divided into two groups: those with 1,000 or more animal units and those with fewer than 1,000. An animal unit is one full grown beef animal or the equivalent in other livestock.

The larger operations will be required to apply for a discharge permit, which will be granted when evidence is presented that significant pollutants are not being discharged. An estimated 50 operations will be affected and DNR is currently in the process of identifying them.

None of the smaller feedlots will be affected unless onsite investigation reveals significant discharge of pollutants into state waters. If it does, the farmer will be given a reasonable and realistic schedule for correcting the operation as well as information on planning and funding the required improvements.

A typical case involving a small feedlot would work like this:

A citizen complains to a DNR district office that a cattle feedlot is near the bank of a favorite trout stream. A department wastewater specialist then notifies a conservationist from either the Department of Agriculture, Trade and Consumer Protection or the County Land Conservation Department and arrangements are made with the farmer to inspect the feedlot. The wastewater specialist evaluates the trout stream above and below the feedlot and the conservationist takes a look at animal waste handling practices.

Analysis is done of investigation findings. If it reveals no significant pollutants, the wastewater specialist then sends a letter expressing thanks for the cooperation and informing the farmer that DNR requires no changes. But the farmer is encouraged to consider adopting several measures suggested by the conservationist since there is potential for animal waste runoff reaching the stream during heavy rain.

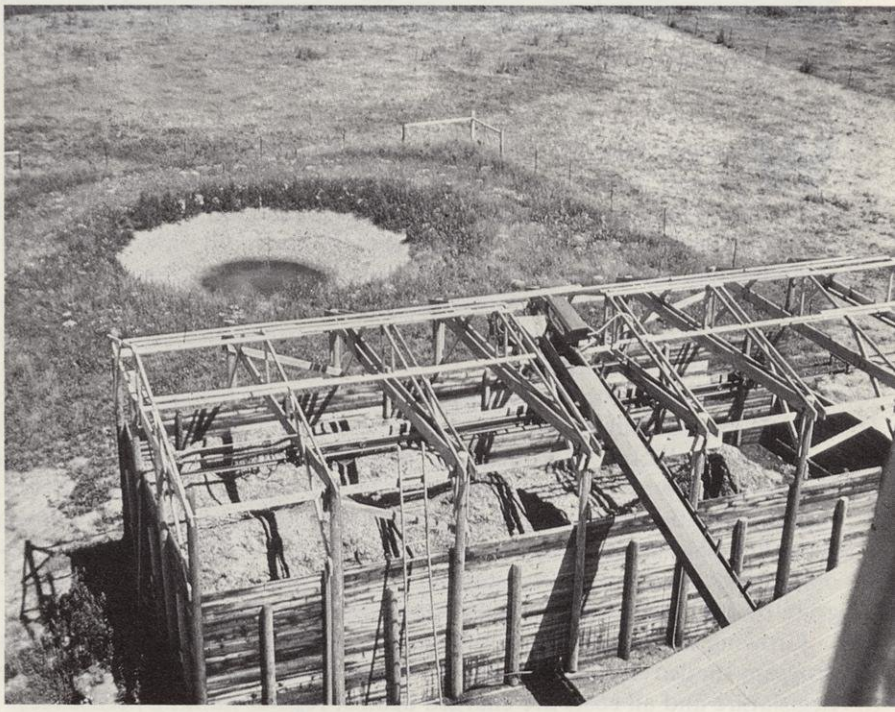
If tests reveal pollutants, changes must be made.

Improvements in animal waste handling practices may include landscaping to prevent runoff, repair of leaky storage pits to keep waste from seeping into groundwater, or construction of new storage facilities.

Cost-sharing funds and grants to help pay for the changes are available through the Wisconsin Farmers Fund, through DNR's nonpoint pollution control program in selected watersheds and through the US Agricultural Stabilization and Conservation Service.

To date, the program is a success due mostly to cooperative efforts by state and county agencies, each doing what they do best. It will give Wisconsin cleaner water, save a resource and help the farmer — objectives that make good business sense as well as good environmental sense.

"To provide a clean environment . . ."
—DNR Mission Statement



Solid manure storage like this with a leachate collection pond nearby can prevent pollutants from washing into streams. Rodenberg photo

Much to the chagrin of farmers, deer nibble hungrily on ears of corn. Photo by Scott Craven

Deer can destroy evergreens. Photo by Scott Craven

Wildlife damage:

Hunter $$ help reduce it

FRANK HABERLAND,
Forest Wildlife Specialist

Wisconsin farmers, orchardists, nursery stock and Christmas tree growers, beekeepers and the general public agree that certain species — for example cockroaches, rats, sawflies and mice — are traditional rivals of humanity in nature's competition. We don't put up with them! No compunction about dosing them with malathian or warfarin! But recreational and aesthetic values temper our opinions. Damage done by bear, deer and geese are a special case and present special social problems. Killing them as pests is frowned on.

For many years, the Wisconsin solution was to pay for the damages these animals caused. But in 1980 the Legislature ended such payments as too costly and inefficient. A committee, appointed by the Legislature, and a Hunter-Landowner Council, appointed by the Natural Resources Board, then studied the problem and concluded that any new damage program should emphasize abatement ahead of paying claims. The council also recommended deer population control, administration of any damage program by the counties and a $1 hunting license surcharge to pay for it.

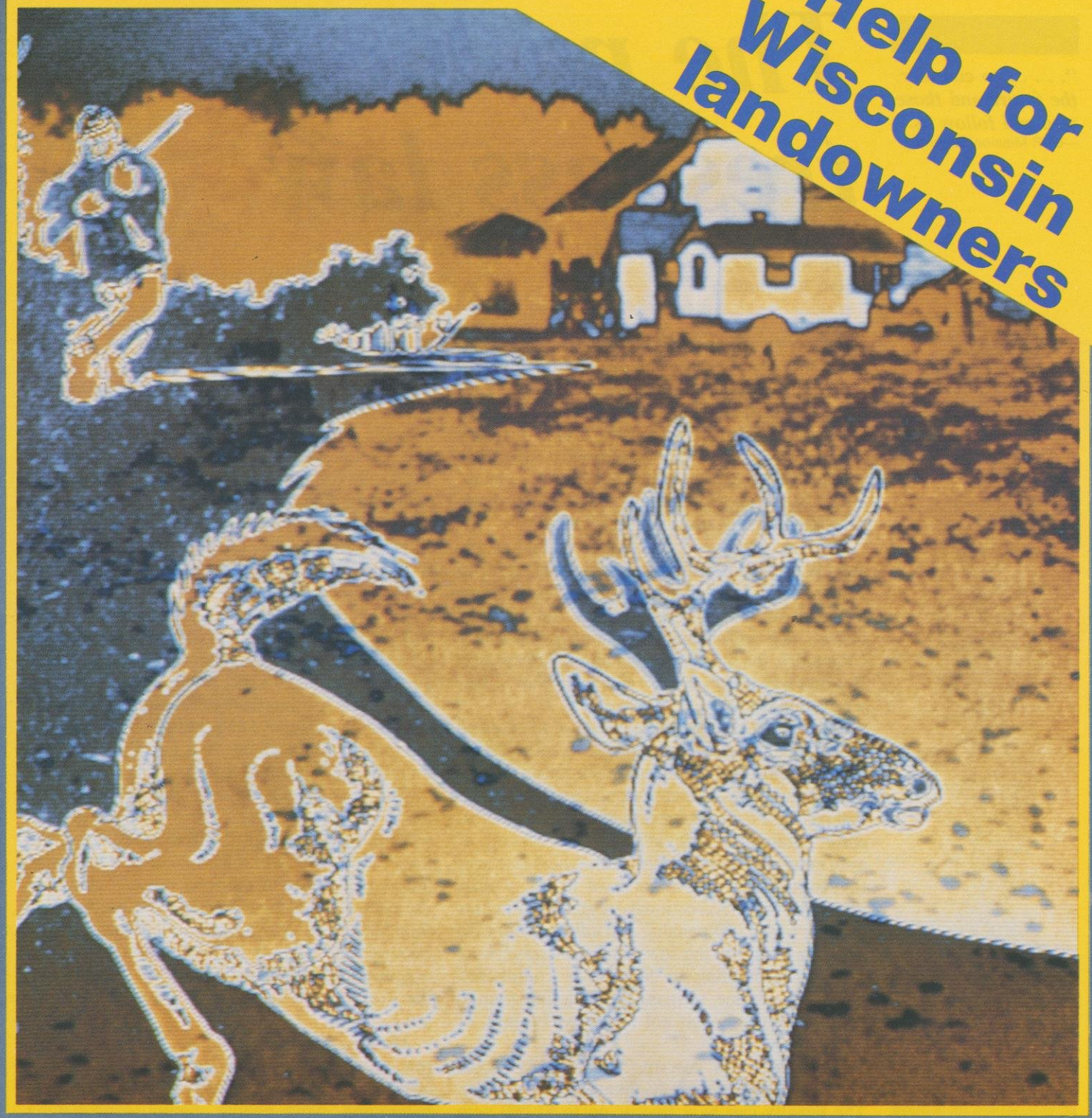
Growing out of this was a new wildlife damage abatement and claims program funded at $569,500. However, the $1 surcharge did not pass the Legislature and all costs are charged against regular hunting license fees.

Counties administer the program, if they choose to participate in it.

Available funds are spent first for county administration; then to cover the costs of abatement materials and finally for reimbursement of wildlife damages. Eighteen counties enrolled in the program last year. The abatement materials included a variety of scare devices, repellants and fences to keep bear, deer and geese from damaging farm crops, livestock, apiaries, orchards, nurseries and plantations. But funding is inadequate to even satisfy the abatement demands so there will be no payment of damage claims. Built-in incentives encourage claimants to allow more hunter access and thereby reduce certain persistent problem populations.

This year even more counties are planning to participate. And DNR is again asking the Legislature for the $1 hunting license surcharge. This would yield approximately $1-million annually and put the program on a sound financial basis.

Help for Wisconsin landowners



". . . . . to consider the future and those who will follow us."
—DNR Mission Statement

The no-hassle trespass law

DAVE KUNELIUS,
Public Information Officer

Over the years DNR has tried a procession of programs to ease the understandably cautious, but often hostile, attitude of private landowners toward allowing the public on their lands. DNR is interested because public property cannot begin to satisfy the ever-upward-spiraling demand of Wisconsin residents for outdoor recreation. Now, two changes in the law may help. They deal with trespass and liability.

Trespass is a word that for both landowners and Wisconsin outdoor recreationists used to conjure up all sorts of nasty implications. It meant a hassle for everyone involved — the property owner, law enforcement personnel, insurance companies, the judicial system and the trespasser. But that was before the law changed. Now, a better avenue is open.

Starting October 1, 1984, the act of trespassing (going on another's land or property without permission) was decriminalized in Wisconsin. Under the old law, those convicted wound up with a criminal record. For trespassers, that could mean difficulty obtaining loans, getting employment, or even entering the military service. And because of this, convictions were often hard to get. Courts often dismissed recreational trespass complaints because of the stiff penalty; and enforcement officials, knowing of the low conviction rate, were slow in responding to landowner complaints. Under the old law, trespass carried a fine of up to $500 or imprisonment not to exceed 30 days, or both.

Under the new law, trespass remains illegal, but was changed from a criminal to a civil offense. The penalty can be a fine of up to $1,000 with offenders issued a ticket similar to a traffic citation.

The citation states the maximum fine and the date, time and place of court appearance. As with a traffic citation, a deposit paid by the accused may be retained if he or she fails to appear in court. A plea may be entered on the scheduled court date. Failure to appear, or make a deposit results in a summons or arrest warrant.

DNR conservation wardens are not authorized to enforce the new law. This is the responsibility of local police officials.

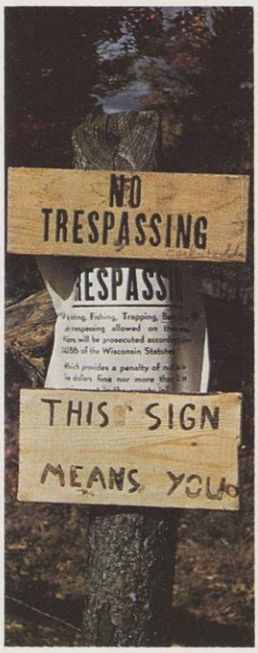
Under the change, the property owners' control is reinforced. They can either post their property, or if they elect to open it to limited access (by permission only) that access becomes more enforceable without the hassles of the judicial and enforcement system. The penalty is more costly to the individual trespasser, but not as ominous as establishing a criminal record.

The new law also lessens the liability of the landowner. In the past, rural property owners sometimes had as many problems with invited visitors as they had with uninvited ones. The change limits the liability of property owners who allow use of their land for recreation and are paid less than $500 for it. Most outdoor activities done for exercise, relaxation or pleasure are included, but organized team sports, sponsored by the owner of the property where the activity takes place are not.

Hunting, fishing, trapping, camping, picnicking, cave exploring, nature study, bicycling, horseback riding, birdwatching, motorcycling, ballooning, hang gliding, hiking, tobogganing, sledding, sleigh riding, snowmobiling, skiing, skating, water sports, sightseeing, rock climbing, cutting and removing wood, climbing observation towers, animal training, or harvesting the products of nature — all exempt the landowner from liability.

Both law changes, on trespass and liability, were recommended by a special Hunter-Landowner Committee of the Natural Resources Board and by a committee of the state Legislature. Eventually they should result in opening a good deal more private land to public recreation.

DNR photo



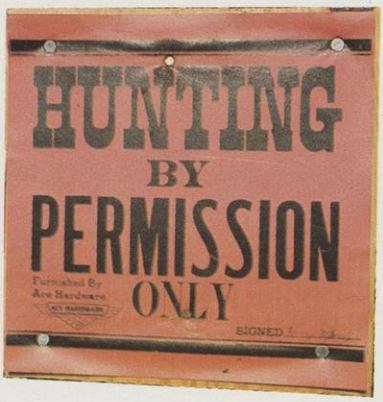
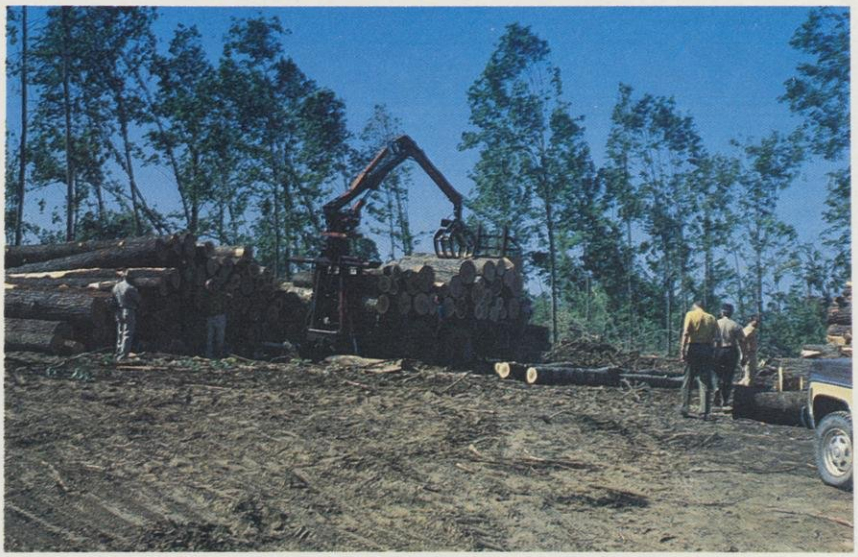


Photo by Dean Tvedt

DNR takes care of forests:

They mean money and jobs to Wisconsin



DNR management of forests in Wisconsin helps insure continued growth of an industry which last year employed 78,000 people and had a $1-billion payroll.

The forest industry in Wisconsin directly employs 75,800 people and pays them in excess of $1-billion per year. Its expansion in the last five years alone added 2,900 jobs and this expansion is expected to continue.

Because of a surplus of certain tree species here, the nation is looking to Wisconsin and other upper midwest states as major suppliers of forest products for the future.

Wisconsin ranks number one in the nation in papermaking; third in value-added by the manufacture of forest products; third in capital expenditures in the industry; and fourth in annual payroll.

To help nurture this industry, Wisconsin has had a forestry program for 74 years. DNR foresters manage 422,000 acres of state forest land, and help manage 2 ¾-million acres of county forests. They provide technical assistance to over 9,000 private landowners and fight numerous fires annually.

DNR fire protection consists of an extensive network of fully equipped ranger stations that have mutual aid agreements with local fire departments. Continual high quality training keeps personnel in constant readiness with fire prevention an important component of the program. Last year, DNR fire control limited damage to only 4,477 acres.

Privately-owned woodlands comprise 60% (8.7-million acres) of Wisconsin's forest and DNR works especially hard to make sure these lands remain a healthy economic asset. The annual timber harvest from them is worth more than $375-million. Their continued careful management is obviously essential.

Three state nurseries distribute about 18-million trees annually for public and private reforestation. Other DNR aid includes planning, pest control and marketing and utilization assistance.

Every county has a DNR forester available to assist local landowners with planning woodland improvements, tree planting and timber harvest. They cooperate with UW-Extention foresters to provide forestry education materials and programs and work with town governments, regional committees and national agencies to coordinate diverse efforts that help maintain Wisconsin forests. They also administer over 1.8-million acres entered under the Woodland Tax and Forest Crop laws which provide tax incentives to encourage timber growth.

The local DNR forester's primary task is to interest private woodland owners in management of their lands. After preliminary examination of a stand, the forester may recommend improvement practices and thinning or harvest of mature timber. Much of the wood culled during woodlot improvement now fuels the growing firewood market. Last year, DNR foresters helped landowners market more than 44-million board feet and 304,000 cords of timber, while ensuring that good management continued in their woods.

DNR also encourages landowners to consult private foresters for services beyond those available from DNR. Last year, 393 formal referrals were made. In addition, more than 11,000 acres of forest plantation were established and timber stand improvement was recommended on 9,300 acres.

Overall, foresters recommended a wide range of activities to improve 328,000 acres of privately-owned woodlands in the state.

This kind of DNR support to the forest industry makes jobs and products available and provides a base for outdoor recreation. Keeping the industry strong is a continuing DNR commitment.

TERRY MACE, Utilization and Marketing Specialist

JERRY LAPIDAKIS, Private Forestry Specialist

A record 28½ pound turkey (left) was bagged last spring east of Genoa by Michael Frank of Omro. The other bird, taken by Frank Kasuboski, also of Omro, weighed 19-¾ pounds.
Photo by Dave Weitz

Wisconsin's wild turkey season

DAVE WEITZ,
Public Information
Officer

It was Michael Frank's first wild turkey hunt, and he didn't expect to bag a new Wisconsin record. But at 6:15 a.m., April 19, he took a 28-½ pound tom and earned his place in the Wisconsin hunting recordbook. It all really happened because the public had some input into how to run a turkey hunt.

Romance is a nice name for a town. It rests between oak-covered coulee ridges in Vernon County not far from the Mississippi River. It's a quiet place usually. But annually in mid-April there's a new excitement everytime a hunter like Frank, who lives in Omro, comes to the Romance Bar to register a wild turkey. Frank had never hunted turkeys before but he and Dan Kasuboski, also of Omro, had decided to try it. They drew permits, and five weeks before the season had visited Vernon County to get to know local landowners and scout the area. Ron Nicklaus, DNR's Mississippi River wildlife manager, registered and weighed Frank's big gobbler and it was almost as much a thrill for Nicklaus as for Frank.

That's because Nicklaus had worked since 1974 to help bring the birds back to Wisconsin. It was done through a program that involved exchanging wild turkeys from Missouri for Wisconsin ruffed grouse and then stocking the turkeys in southwest Wisconsin where they had once been abundant. By 1980, it was clear that the experiment was a success. The turkeys had taken hold and were rapidly becoming a huntable population.

Biologists were uncertain about how to establish a season. The biological framework was simple to define but social considerations had to be weighed too. The birds existed mostly on private land and many of the southwest Wisconsin landowners were fiercely protective of the newly-established turkeys.

So, in 1980, Nicklaus met with District Wildlife Staff Specialist Terry Valen and myself at Black River Falls to outline a public participation program that would let the people affected by the season have a say-so in how it was organized.

"It is vital to go openly to the public before any decision is made," Nicklaus says. "The main thing is,don't have the decision made before you do it.

"It's extremely important, and I can't emphasize it enough," he says, "that the public's perception is that their input has some value in the decision-making process. It's not something that we take into account after a decision has been made but rather something that we use as the basis for making the decisions. There's a really big difference there. The whole difference between an informational meeting and a public participation meeting lies right in that basic definition."

Nicklaus took special steps to insure that as a DNR representative, he would be credible. He enlisted the aid of a local feed dealer and a local banker, both people he'd worked with in the past. They agreed to moderate forums. DNR took care of the meeting announcements.

Biologically, Nicklaus knew what had to be done in planning the season. He had established a framework to protect the turkeys. What he needed from the people were ideas about how to organize and conduct the season in a way they could support. The first series of public meetings was held in convenient locations where participants could drive easily to the workshops and forums. There was a lot of discussion and Nicklaus wrote down basic concepts as he went through the meetings. At the end of each session he presented a summary and asked if it was accurate.

After the sessions were over, three basic concepts emerged:

- ✓ Let's have a hunting season.
- ✓ Let's give landowners some consideration.
- ✓ Let's limit hunter numbers.

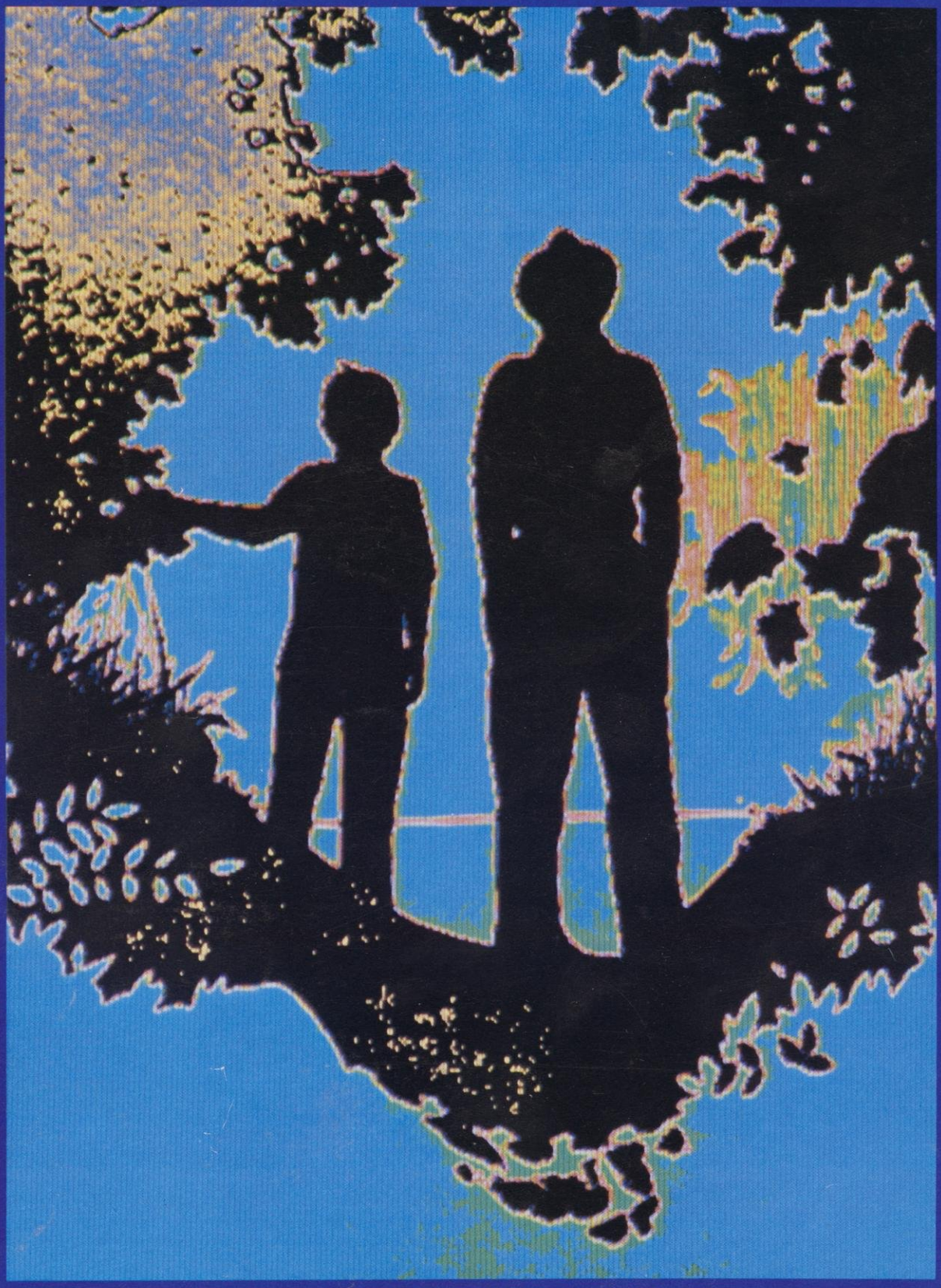
Those were the basic things that came out of the meetings and it meant that wildlife managers and local residents were in agreement.

"That's the value of the public participation process," says Nicklaus. "We took the raw material the people gave us and used it to develop a season."

Next step was to invite everyone who had expressed an interest to attend a second round of meetings and examine a draft copy of the proposed hunting season.

Nicklaus led this session and asked for help in fine-tuning the proposals. "We had a fair number of comments and changed a few things. A couple of them turned out to be significant."

This public participation effort took time, and it cost money. But it also developed a wild turkey season that's popular not only among Wisconsin hunters but with the landowners of southwest Wisconsin as well. That puts the hunt on a sound footing, and with public support its future is probably assured.



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