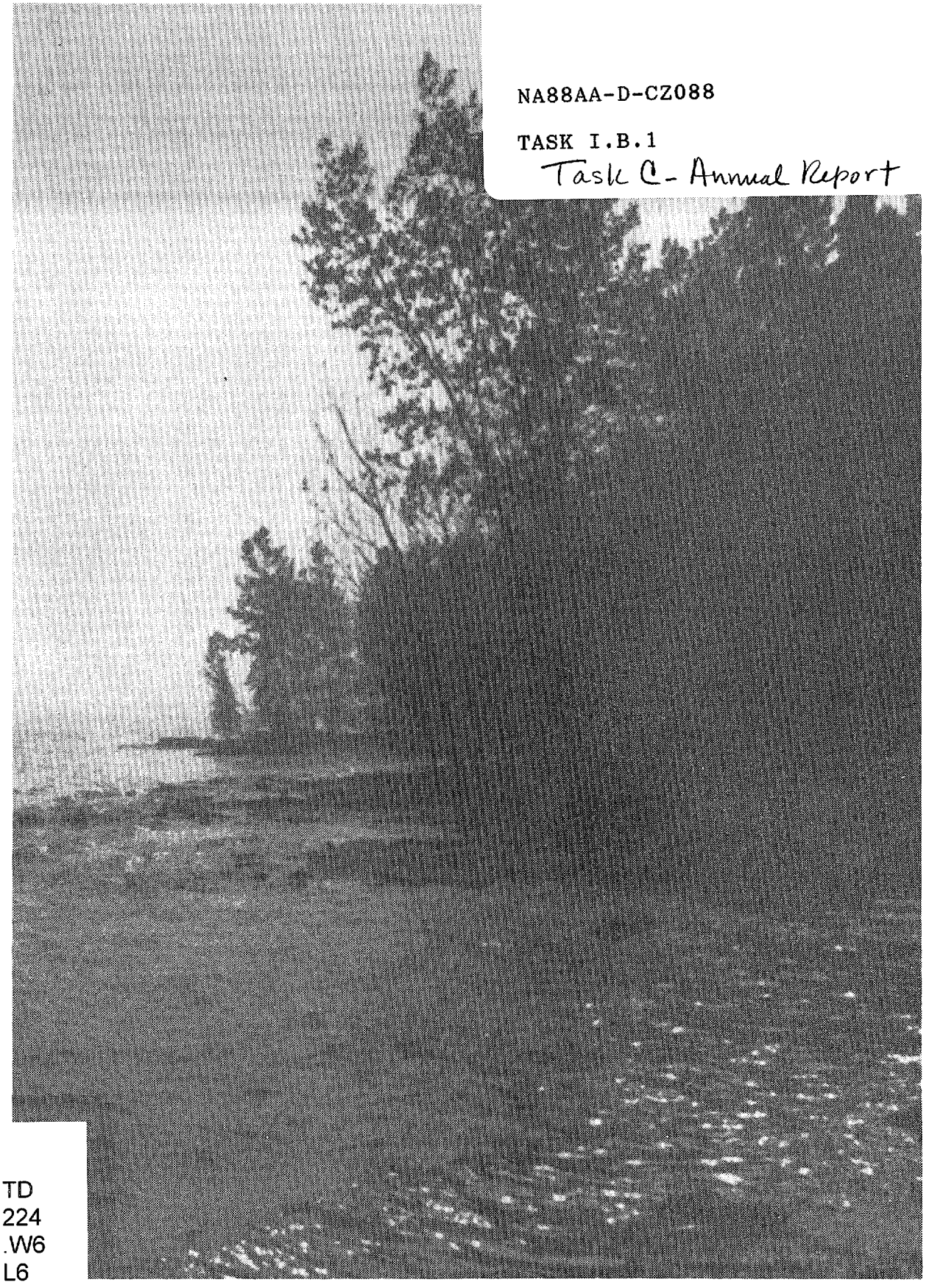
Lower Green Bay Remedial Action Plan



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First Annual Progress Report

EXECUTIVE OFFICE

THOMAS D. CUENE
COUNTY EXECUTIVE

Brown County

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Summer 1989

To the Citizens of Northeastern Wisconsin:

Our water resources, especially the Fox River and Lower Green Bay, have played an historically significant role in the development of Northeastern Wisconsin. Water opened the way for the exploration, settlement, and subsequent industrialization of the region. Whether used for drinking, transportation, industry, or recreation, water has been and continues to be an invaluable resource.

Several hundred years of the use and abuse of our abundant waters have led to serious problems within the Bay and Lower Fox River. These problems manifest themselves in the form of fish consumption advisories, contamination of wildlife, curtailment of swimming, degraded fish habitat, and interference with navigation. Man has contributed to these problems through the introduction of toxic chemicals and overloads of sediments and nutrients into the system.

Priority problems and a vision of the desired future state have been identified in the Lower Green Bay and Fox River Remedial Action Plan (RAP). The plan envisions a system which will provide a healthy bay environment, a balanced edible sport/commercial fishery, water-based recreational opportunities, good water quality, balanced shoreline use, productive wildlife and plant communities, and an economical transportation network that minimizes environmental impacts. When fully implemented, the RAP will remedy the problems caused by our past abuse.

Obviously, remediation of the many problems confronting our drainage basin will not be accomplished overnight. Considerable work yet needs to be undertaken to assure that remediation efforts are based upon the best scientific data available. Additionally, finding the resources necessary to fully finance plan implementation presents an awesome obstacle. The successful completion of the RAP will require years of effort.

While our task is immense, since its adoption in February, 1988, there has been steady progress toward implementation of the RAP. Our accomplishments for the first year of the plan are highlighted in this -- our first annual report.

Our local Implementation Committee and its advisory committees are to be commended. The active participation of our citizens, governments, industries, educational institutions, and special interest groups will assure our success. The citizens of Northeastern Wisconsin are indebted to all of our committee members for their dedicated efforts.

Congratulations to everyone on a successful first year. With your continued assistance we shall reclaim our waters.

Sincerely,

Thomas D. Cuene
Brown County Executive

TDC:kaa
Chair, Green Bay Remedial Action Plan Implementation Committee

Lower Green Bay Remedial Action Plan

First Annual Progress Report

September 1989

U.S. DEPARTMENT OF COMMERCE NOAA
COASTAL SERVICES CENTER
2234 SOUTH HOBSON AVENUE
CHARLESTON, SC 29405-2413

IN MEMORIAM:

This report is dedicated to the memory of William Fisk. Bill was active in the creation of the Remedial Action Plan through his dedicated service on the Citizen's Advisory Committee. He was a leader on the implementation Committee and the Public Education and Participation Committee of the Lower Fox River and Green Bay Remedial Action Plan (RAP) as well as numerous conservation groups. Bill was an extraordinary person who believed deeply in the conservation of natural resources and in the ability of the individual to make a difference. We will miss his corny puns, his wit and intelligence, his optimism and friendship.

Prepared by the
Center for Public Affairs
University of Wisconsin-Green Bay

JAN 21 1999

Financial assistance for this report was provided by the Wisconsin Coastal Management Program, Department of Administration, through the Coastal Zone Management Act of 1972 as amended, administered by the Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration.

The Wisconsin Coastal Management Program was established in 1978 to direct comprehensive attention to the state's 820 miles of Lake Michigan and Lake Superior coastline. The WCMP analyzes and develops state policy on a wide range of Great Lakes issues, coordinates the many government programs that affect the coast, and provides grants to stimulate better state and local coastal management. Its overall goal is to preserve, protect, and develop the resources of Wisconsin's coastal areas for this and succeeding generations.

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University of Wisconsin-Extension

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SUMMARY

This first annual report of the Implementation Committee reviews progress on the Lower Green Bay and Fox River Remedial Action Plan (RAP), a long-range strategic plan to rehabilitate the Lower Fox River and Bay ecosystem. The Implementation Committee was established by the Department of Natural Resources to advise the other government agencies and the public on implementation of the RAP. Over the past year, the Implementation Committee met regularly, sharing information, coordinating programs, seeking support for programs that furthered RAP implementation, and setting priorities for the coming year.

This report begins with an introduction to the RAP, describing its purpose, its development, and its recommendations. The introduction emphasizes the critical need for coordinated, multi-institutional management of the Lower Fox River and Green Bay ecosystem. The area remains seriously polluted, and the clean-up efforts of the past, although effective, have fallen short of restoring beneficial uses of the ecosystem. Past efforts have focused on conventional, organic, pollution from industries and sewage treatment plants. The focus now must turn to rural and urban nonpoint sources, runoff, toxic chemicals in the river sediments, fish and wildlife habitat protection, and public access to the shoreline.

The report reviews progress in each of the management areas of the RAP: Toxics and Point Source Management, Nonpoint Source Management, Fish and Wildlife, Shoreland Use and Recreation, Public Education and Participation, and Monitoring and Research. Highlights of progress in the first year of implementation include the following:

- New water quality standards limit the discharge of toxics into the watershed. Plans to upgrade wastewater treatment at the Green Bay Metropolitan Sewerage District and the city of Appleton will reduce toxic ammonia and chlorine discharges. A multi-million dollar, multi-year mass balance research project will measure the sources, movement, and rate of toxics in the Fox River and Green Bay.

- The East River Priority Watershed Project provides costsharing to landowners who use "best management practices" to reduce agricultural and urban nonpoint source pollution. The conservation Reserve Program provides compensation to farmers who retire erodable lands and use green strips along streams. Model ordinances have been drawn and proposed to local governments to control animal waste, construction erosion, and stormwater runoff.

- Wetlands preservation programs now protect portions of west shore wetlands for fish and wildlife habitat. A permanent barrier to sea lamprey migration up the Fox River is completed. Progress continues on programs to increase native predator fish and to protect endangered birds. Duck hunters planted wetland vegetation along the west shore.

- Boat launch and shoreline fishing facilities have been upgraded or planned to accommodate public use and recreation demands. Brown County continues planning for a sizable parkway along the east shore of the Fox River. Research is planned on the future of the Green Bay harbor.

- Newsletters, brochures, and reports have been prepared to increase

public education and participation. To complement written material, informational displays have been developed and a Speaker's Bureau formed. A Bay/River Clean-Up Day attracted over 200 people, providing an opportunity for direct public participation in the clean-up process.

- A monitoring plan was developed to track the effects of remedial actions. A workshop focusing on Green Bay research and monitoring attracted over 30 researchers and scholars. Several proposals were developed for toxics and nonpoint source pollution research and await funding decisions.

Six advisory committees to the Implementation Committee monitored and assisted progress in each of the management areas. Further, each of the advisory committees produced an implementation strategy with priorities and recommendations for action in the following year. Finally, the advisory committees served to coordinate the activities of the many individuals, firms, and agencies involved in the implementation process.

Through this pioneering process, much has been accomplished, and much has been learned, although much remains to be done. With the assistance of the DNR, the Implementation Committee is learning how to implement an ambitious resource management plan in a multi-jurisdictional environment. The advisory committees are learning how to pool information and draw upon the resources of participating agencies.

Obstacles, however, remain. All the committees are severely understaffed, and resources for implementation projects are inadequate. Also, a long-term implementation structure has yet to be formed. furthermore, little effort has been directed to the massive fundraising effort needed in the immediate year ahead if a successful abatement program is to occur.

However, in spite of the obstacles, some progress in the first year of implementation has occurred. The DNR has provided able leadership, and many agencies, firms, and individuals responded favorably. The Implementation Committee offers thanks to all involved. Further, the Implementation Committee offers a challenge -- to itself, to the DNR, and to the public -- to strengthen their resolve to implement the RAP, to overcome the short-term obstacles, and to restore the integrity of the Lower Fox River and Green Bay ecosystem.

WHAT IS THE GREEN BAY REMEDIAL ACTION PLAN?

The Lower Green Bay Remedial Action Plan (RAP) is a long-range plan to restore the environmental quality and public uses of the Lower Fox River and southern portions of Green Bay by the year 2000 and beyond. The RAP was produced by the Wisconsin Department of Natural Resources (DNR) and approved as a part of Wisconsin's Water Quality Management Plan in February, 1988.

Many individuals contributed to the RAP. These individuals, representing diverse perspectives and organizations, spent considerable time researching, discussing, negotiating, and writing to complete the plan. The RAP thus embodies a communitywide, multi-institutional effort at ecosystem rehabilitation unprecedented in Wisconsin.

In short, the RAP is a plan for rehabilitating a delicate natural environment within a complex social and political setting. The RAP takes an "ecosystem approach" to resource management. That is, the RAP addresses the natural environment, including the waters, wetlands, fish, birds, and wildlife in the Lower Green Bay area. The RAP also considers human uses of the area, including fishing, hunting, swimming, boating, transportation, development, and waste disposal. And, the RAP acknowledges the social environment within which the plan must be implemented.

The Green Bay RAP contains the basic components of all successful plans: The description of problems addressed, the specification of goals and objectives, and recommendations for action.

This annual report briefly describes the RAP and documents the actions taken in the initial year of plan implementation.

The purpose of this report is to inform citizens, governments, and agencies about RAP implementation and to stimulate their participation in a collective effort to restore the natural beauty, balance, and benefits of the Green Bay ecosystem.

WHAT LED TO THE RAP?

The Remedial Action Plan represents the most recent stage in a long-term effort to improve water quality and the natural environment in the Lower Green Bay area.

Water-quality problems were recognized as early as the late 1800s and early 1900s. Periodic closings of Bay Beach on Green Bay and complaints of dead fish in the southern bay in 1938 led to the first-ever study of water quality problems in the Bay. The 1938 study found levels of oxygen in the Bay below that necessary for the survival of many species of fish. Subsequent studies in the fifties, sixties, and early seventies found similar levels of oxygen depletion in the East and Fox rivers. Industrial pollution, agricultural runoff, and municipal sewage were identified as major contributors to the areas' water-quality problems.

State-level pollution control programs were initiated in the early twenties and strengthened throughout the fifties and sixties; however, effective attempts to control water pollution began with the Federal Water Pollution Control Act Amendments of 1972. These amendments remain the basis for Wisconsin's programs in water pollution control. The amendments, known as the Clean Water Act, sought to restore recreational uses of the nation's waterways by controlling municipal and industrial discharges and by financing construction of sewage treatment plants.

The Clean Water Act and Wisconsin's version of the Act established, among other things, a discharge regulation program which was very successful at controlling conventional pollution and at restoring dissolved oxygen levels in the Lower Fox River. In response to these pollution regulations, local governments and industries spent over $300 million on point source pollution control between 1975 and 1985. And, as a result, walleye and other sport fish can once again live in the river.

Although actions taken in the seventies improved oxygen levels in the Lower Fox River and in Green Bay, serious water quality problems remain. Runoff from farmland and urban streets continues to muddy the waters. Years of toxic deposition have poisoned the bottom sediments. Although fishing is once again fruitful below the De Pere Dam, the DNR advises that no one eat large fish such as walleyes caught there, due to toxic contamination, specifically PCBs. Further, the waters at Bay Beach remain unsafe for swimming due to high levels of suspended sediment and algae. Progress on ecosystem rehabilitation must continue before the waters are safe to swim in and the fish safe to eat.

Specifically, management strategies are now needed to address the nonpoint pollutants that muddy the water with algae and sediments and the toxic chemicals that lie in the bottom sediments. Although the Remedial Action Plan addresses a variety of pollution problems and control strategies, the principal focus of the RAP is to move beyond the limitations of previous conventional point source water pollution controls of the seventies and toward ecosystem management in the eighties and nineties.

WHY IS THE RAP NEEDED?

Nobody likes pollution. Pollution destroys the bay's nurturing wetlands, productive fishing grounds, urban beaches, and natural beauty.

Yet we all pollute. We dirty the water we take from the ground, lakes, and rivers. We foul the air with our fossil fuels. And we fill the earth with garbage. Our personal contribution may be negligible, but the contribution of all the watershed residents--roughly three-quarters of a million--can be devastating.

The process through which we destroy our environment has an alternative. The alternative is to find ways to discourage pollution, reduce waste, and pool our efforts toward environmental rehabilitation. The alternative is costly, but so is the environmental damage. And, just as we all contributed to the pollution problem, we must now all contribute to the solution.

But local governments, like individuals, cannot solve pollution problems alone. Pollution control by one local government is ineffective without similar control by neighboring local governments. Therefore, a commitment must be made to join the efforts of local, state and federal governments in a team effort to improve water quality for all.

The Lower Green Bay RAP seeks to combine the efforts of government, industries, and citizens to rehabilitate the ecosystem of the Lower Fox River and Green Bay. The RAP identifies water quality problems in the Bay and the necessary steps toward solving those problems. The RAP also describes how we must change our polluting behavior and proceed with environmental restoration. Most importantly, the RAP calls for a commitment on the part of many local governments, industries, and interest groups that they will no longer contribute to the causes of pollution, but will instead contribute to its solution.

HOW WAS THE RAP ESTABLISHED?

The Lower Green Bay Remedial Action Plan (RAP) was developed as a result of 1985 commitment by the United States and Canada to restore the beneficial uses of the Great Lakes. The 1987 Water Quality Agreement between the countries calls for an International Joint Commission (IJC), a binational commission created to oversee joint use of the Great Lakes, to identify critical "areas of concern" in the Great Lakes, and to review Remedial Action Plans to rehabilitate the environment of those critical areas.

The IJC identified 42 Areas of Concern. Five of these are totally or partially located in Wisconsin: the Menominee River, the Sheboygan Harbor, the Milwaukee Estuary, the Lower Fox River and southern Green Bay, and the St. Louis River at Duluth/Superior. The Remedial Action Plan for Green Bay was the first completed in Wisconsin. Plans for the other Areas of Concern are in progress.

Work on the Green Bay RAP began in 1985 under the direction of the Wisconsin Department of Natural Resources (DNR). Over 70 people contributed to the plan through a Citizen's Advisory Committee (CAC) and four Technical Advisory Committees (TACs).

The Citizen's Advisory Committee, whose role was to advise the DNR on construction of the plan, included representatives of local government, resource agencies, industry, environmental groups and citizens' groups, and water-quality agencies. The CAC identified citizen concerns, established a set of goals called "The Desired Future State," reviewed recommendations, and advised courses of action to restore the Lower Bay environment.

Technical Advisory Committees included Toxic Substances Management, Nutrient and Eutrophication Management, Biota and Habitat Management, and Institutional Management. They advised the CAC and the DNR on technical issues and produced technical reports including recommendations for plan objectives and remedial actions.

From these reports, the DNR produced a draft of the plan for review by the Citizen's Advisory Committee. After a series of public meetings and a hearing, the plan was finalized and signed into Wisconsin's Water Quality Management Plan by the Secretary of the DNR, C.D. Besadney, in February 1988.

Since then, the plan has been approved by Governor Thompson, reviewed by the International Joint Commission (IJC), and approved by the Environmental Protection Agency (EPA). The Green Bay Remedial Action plan is the first RAP approved on the Great Lakes.

WHAT DOES THE RAP SAY?

The RAP describes environmental problems in the area of concern, sets goals and objectives for resolving those problems, makes 120 specific recommendations necessary for reaching its goals and objectives, and describes the necessary steps for implementing the recommendations.

Environmental Problems

The environmental problems of the Lower Fox River and Green Bay are many, diverse, and intertwined. Toxic chemicals, including PCBs, dioxin, furans, metals, ammonia, herbicides, and pesticides enter the waters from point and nonpoint sources. Point sources include municipal and industrial waste discharges. Nonpoint sources include urban and rural land runoff, landfill seepage, and atmospheric fallout. Once these chemicals enter the water, they do not disappear. Some are persistent chemicals that take many years to break down.

Some toxics settle into the bottom sediments where they may be resuspended through wave action or ingested by aquatic organisms. Some toxics, such as PCBs, may pass through the food chain and bioaccumulate in fish and wildlife, where they are linked to cancers, reproductive problems, birth defects and death. The contamination of some fish in the Lower Bay is so great that the DNR has, since 1976, issued warnings regarding human consumption of walleyes, trout, salmon, white bass, white suckers, carp, and catfish.

Contaminated sediments also complicate navigational dredging and increase the cost of dredge spoil disposal.

In addition to toxic chemical pollution, the river and bay remain polluted by excess nutrients and sediments. One nutrient, phosphorus, stimulates algae growth in the water. Excess phosphorus leads to excess algae. About one-third of the phosphorus entering the Lower Bay comes from point sources such as industrial and municipal discharges while the remaining two-thirds enter from nonpoint sources such as urban runoff, agricultural erosion, and animal waste.

Excessive algae growth, call eutrophication, not only interferes with swimming by blocking sunlight from penetrating the water, but also prevents the growth of desirable underwater plants needed for fish habitat and waterfowl food. As these large amounts of algae die and decompose, oxygen is removed from the water, resulting in stresses on fish and other aquatic life.

Excess sediments washing into the Lower Bay also muddy the water, further contributing to unsafe swimming conditions and further blocking underwater plant growth. In addition, sediments cover and destroy spawning habitat as well as fill in shipping channels and harbor basins. The main sources of these sediments are upstream soil erosion from croplands, construction sites, barnyards, streambanks, and roadsides.

Toxics, nutrients, and sediments contribute to the destruction of the natural habitat of fish and wildlife. Further destruction of habitat is caused by wetland filling, eroding shorelines, and urban development. As habitat is destroyed, the ecosystem is upset. Native fish and bird populations decline. Non-native or exotic fish, such as the sea lamprey, the alewife, and carp invade the area, causing further problems for native sport and commercial fisheries.

As the quality of the environment deteriorates, the quality of life deteriorates. Swimming is prohibited, fisheries are restricted, and shoreland uses for hiking, biking, and picnicking is curtailed. The use of the river and bay becomes limited to pollution disposal and navigation.

Rehabilitating the environment, so that former uses once again become possible, requires social and institutional commitment and change. The public must become aware of the seriousness of water quality problems and must provide support for remedial actions. In addition, social institutions that disrupt the ecosystem must change to protect the environment.

In sum, the problems of the area include chemical, biological, and institutional disruptions. The RAP addresses each of these problems and, in the context of ecosystem management, addresses the interrelationships between each of the disruptions.

Desired Future State

The purpose of the RAP is to rehabilitate the Green Bay ecosystem and restore beneficial uses. But, what does rehabilitation mean? And what uses are to be restored? Rehabilitation requires a vision of what the ecosystem should look like. The RAP, therefore, describes the desired future state of the ecosystem as envisioned by the Citizen's Advisory Committee.

The "Desired Future State" of the Fox River/Lower Green Bay ecosystem includes the attainment, maintenance, and continued evaluation of the following:

1. A healthy bay environment providing for balanced and productive wildlife and plant communities including a well-balanced, sustainable, and edible sport and commercial fishery.

2. Water-based recreation opportunities including:

   a. Accessible local swimming beaches on the Bay; and

   b. Adequate boating areas and facilities.

3. Lower Fox River/Lower Green Bay water quality that protects human health and wildlife from effects of contaminants and provides for drinkable water after standard treatment.

4. Balanced public and private shoreline usage including park, agricultural, commercial, residential, and industrial lands,

5. An economical transportation network including both water and land-based systems which minimizes adverse environmental effects.

6. Point and nonpoint discharges and runoff consistent with the maintenance of the desired water quality future state.

Goals and Objectives

The desired state cannot be reached without taking action; and actions cannot cannot be taken without setting goals. Therefore, the RAP lists the following goals:

1. Enhance and protect multiple uses of the bay and river including restored swimming and an edible fishery.

   Existing uses to enhance and protect include fish and aquatic life, wildlife, endangered species, boating, swimming and other water sports, sport and commercial

fishing, hunting, agriculture, commercial navigation, industry, and aesthetic and scenic enjoyment.

2. Develop a blend of public and private shoreline uses that include adequate public access.

   These include parks for people to use and enjoy, accessible local swimming beaches on the Bay and adequate boating areas and facilities. They also include natural areas and environmental corridors to protect important wildlife and fishery habitat and commercial developments that build upon and enhance the value of downtown waterfronts. Other shoreline uses include residential, agricultural, industrial and aesthetic and scenic values.

3. Provide suitable and sufficient habitat to enhance and sustain wildlife of the bay and river.

   Wildlife includes spring and fall migrant diving and dabbling ducks, nesting common and Forster's terns and other colonial water birds, marsh nesting species, seasonally occurring hawks and eagles, resident dabbling ducks, resident aquatic fur bearers, resident and migrant shore birds and amphibians and reptiles.

4. Establish a self-sustaining, balanced, edible fish community.

   This includes increasing and/or maintaining sport and commercial species, in particular, walleye, yellow perch, northern pike, and muskellunge, plus other valued fish, such as channel catfish, white bass, lake sturgeon, smallmouth bass, and black crappie. This also includes encouraging forage species, such as emerald shiner, spottail shiner, trout-perch, and darters which are an integral part of the fish community.

5. Improve the water quality and trophic status (algae production) of the area of concern to relieve ecological stresses and support a full range of public uses by the year 2000.

   Specific improvements to achieve include: increased water clarity;increased submerged aquatic vegetation in photic zone; increased populations of desirable aquatic invertebrates, fish and waterfowl decreased algae blooms; reduced sedimentation to decrease the need for maintenance dredging and improve spawning habitat; increased fish production relative to algae production; reduced occurrences of low dissolved oxygen; reduced magnitude of system fluctuations; and water quality suitable for swimming.

6. Achieve and maintain water quality that provides an edible fishery, protects the ecosystem from the adverse effects of toxic substances on fish, aquatic life and wildlife utilizing the aquatic resources, and protects human health.

   Reduce the loading of toxic substances from all sources to the Lower Fox River and to Green Bay. To the maximum degree possible, concentrations of toxic substances in the water column and bottom sediments are reduced to levels where:

a. The most stringent state and/or federal fish and game consumption advisory levels are met;

b. Human health is protected from all water associated exposure;

c. Adverse affects on aquatic and terrestrial life are virtually eliminated; and

d. Other beneficial uses of the water are not impaired.

7. Develop a management strategy and organizational structure that will coordinate public and private efforts to improve and protect the natural resources

This should be done while protecting the public trust, providing for multiple uses, minimizing conflicts, recognizing the needs of the greater populace, while protecting the viability of minority views and improving the overall quality of life of citizens of the Green Bay area and northeastern Wisconsin.

Key Actions

The fundamental aspects of the Remedial Action Plan are contained in sixteen Key Actions and 120 associated recommendations. The Key Actions describe the overall remedial action needed, and the plan recommendations detail specific activities and steps to accomplish the Key Action. Each of the Key Actions is assigned a priority level. Following each Key Action, the plan identifies a target date, potential funding sources, and a lead agency to carry out actions.

The sixteen Key Actions are:

TO RESTORE, PROTECT AND ENHANCE THE ECOSYSTEM

(High Priority)

1. Reduce phosphorus inputs to the river and bay from nonpoint and point sources.

2. Reduce sediment and suspended solids input.

3. Eliminate toxicity of industrial, municipal, and other point source discharges.

4. Reduce availability of toxic chemicals from contaminated sediments.

5. Continue control of oxygen-demanding wastes from industrial and municipal discharges.

(Moderate Priority)

6. Protect wetlands, and manage habitat and wildlife.

7. Reduce/control populations of problem fish.

8. Increase populations of predator fish.

(Lower Priority)

9. Reduce sediment resuspension.

10. Reduce bacteria inputs from point and nonpoint sources.

11. Virtually eliminate toxicity caused by nonpoint and atmospheric sources.

TO IMPROVE PEOPLE'S USE OF THE ECOSYSTEM

(High Priority)

12. Create a coordinating council and institutional structure for plan implementation.

13. Increase public awareness of, participation in, and support for river and bay restoration efforts.

(Moderate Priority)

14. Enhance public and private shoreline uses.

(MONITORING AND RESEARCH)

15. Monitor to evaluate the effectiveness of remedial actions, track trends, and new problems.

16. Conduct research to better understand the ecosystem, its problems and how to remedy them.

Implementation

Successful implementation of the Lower Fox River and Green Bay Remedial Action Plan by the year 2000 will require considerable coordination of governments, agencies, private industries and citizens. To facilitate such coordination, several institutional arrangements--ranging from a coalition of agencies to an independent River Basin authority--are described within the RAP.

The approved RAP recommended the formation of a local Interim Implementation Committee to initiate plan implementation and consider the feasibility of a long-term Coordinating Council to assume oversight responsibilities in two to three years.

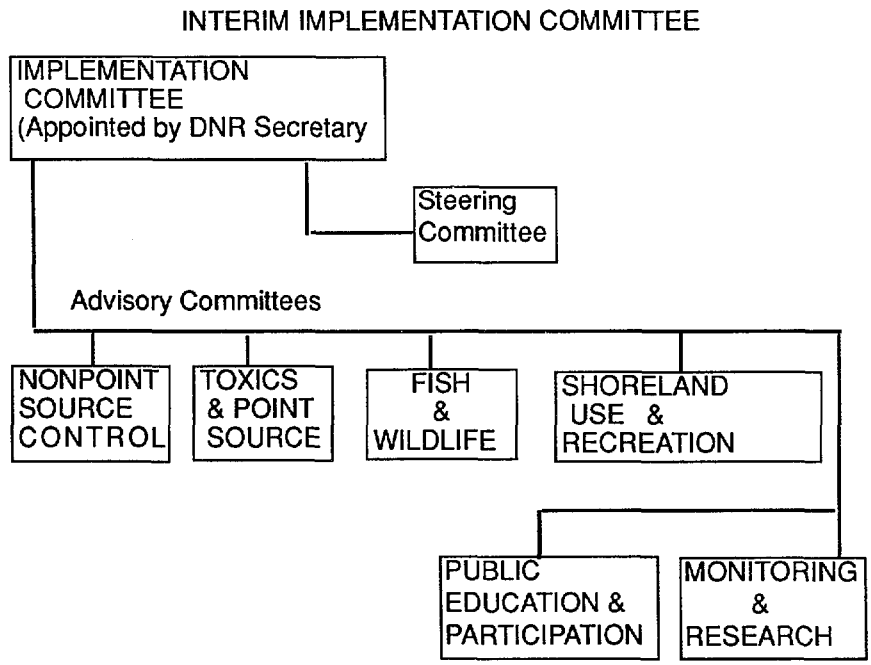
The Wisconsin Department of Natural Resources (DNR) formed the local implementation committee in March 1988. Committee members were asked to serve for an interim period of two years. Their role is to advise the DNR, governments and other agencies on plan implementation, to seek funding to initiate projects, and to pursue creation of a long-term implementation structure.

The Interim Implementation Committee is composed of representatives of local government, agencies, industry and citizen groups who are directed by a Steering Committee. Member of the Interim Implementation Committee as well as the Steering Committee are listed at the end of this report.

Six Advisory Committees assist the Implementation Committee on technical issues. The Advisory Committees include Toxics and Point Source Management, Nonpoint Source Management, Fish and Wildlife, Shoreland Use and Recreation, Public Education and Participation, and Monitoring and Research. Members of the Advisory Committees are also listed at the end of this report.

To date, implementation of the RAP has proceeded under the interim organizational structure illustrated here:

ORGANIZATIONAL STRUCTURE



REMEDIAL ACTION IN PROGRESS

The Implementation Committee. Much has happened since the signing of the RAP in February 1988. The Interim Implementation Committee first met on April 28, 1988. A list of the members and the organizations they represent is included on the back cover. The committee elected Tom Cuene, Brown County Executive, as Chair of the Committee and Winston Ostrow, attorney and Izaak Walton League member as vice-chairperson. Under Cuene's leadership, and with staff assistance from the DNR and the Fox Valley Water Quality Planning Agency, the committee has since met six times to assist the DNR with the plan implementation.

Members of the committee were appointed by the DNR and assigned these charges:

1. Advise the Department (and other agencies, units of government and private organizations) on RAP implementation including strategies, timing, sources of funds, available programs and coordination needs. Also, advise the Department on plan updaites or amendments as needed.

2. Promote cooperative efforts among governments, agencies and private organizations in managing the Lower Green Bay and Fox River ecosystem and in implementing the plan.

3. Foster conflict resolution.

4. Coordinate activities and information sharing to actively facilitate plan implementation.

5. Annually review implementation activities of organizations and individuals with implementation authority.

6. Provide an annual report to the Secretary of the DNR and the public on implementation progress, the state of the Bay and implementation needs for the coming three years. No sooner than two weeks to one month after the report is available for public review, a public hearing is to be held to receive comments from the public

7. Help organizations obtain technical assistance and funding for implementation projects.

8. Identify and investigate conventional and non-conventional problem-solving techniques for plan implementation.

9. Coordinate public information and education activities.

10. Provide opportunities for public participation in plan implementation.

11. Represent the interests of citizens, business, government,

agencies, and others whose cooperation will be needed to restore beneficial uses to the river and the bay.

In its first year, the Implementation Committee served four primary functions. First, it served as a clearinghouse for information about activities related to the Lower Fox River and Green Bay clean-up. Key local officials were briefed on RAP related issues. Following briefings, the Committee spent time discussing implementation issues such as DNR water quality rules, funding for municipal sewage treatment facilities and nonpoint source pollution control in the East River watershed. These discussions provided local officials with a common base of information for decision making.

With this information, the Implementation Committee served its second primary function: soliciting political support for legislation, funds, and projects that serve the objectives of the RAP. Their activity strengthened proposals for funding and/or actions by agencies both inside and outside the region. Examples include the Fox River Contaminated Sediment and Green Bay Mass Balance Studies, Wisconsin Coastal Management Program Grants for public education, a call for phosphorus standards, nutrient and pesticide research by UW-Extension, and creation of a Statewide In-Place Pollutant (contaminated sediment) Management Program.

The Implementation Committee also worked to influence the programs of local governments and agencies. Through their participation on the Implementation Committee, community leaders have become aware of the critical actions needed to implement the RAP; with this awareness, they have been able to lead their own and other organizations toward taking those steps. To expand this effort, the Implementation Committee recently formed "contact teams." These teams will solicit direct actions by lead agencies and governments toward implementing the RAP.

Finally, the Implementation Committee reviewed and approved the implementation plans of each of the six advisory committees and set priorities for the coming year. Through publication of this annual report, the Implementation Committee informs the public on progress of the RAP and identifies future priority actions needed to implement the RAP.

The Advisory Committees

Six advisory committees provide technical assistance to the Implementation Committee. The names of committee members are listed at the end of this report. Membership on the advisory committees includes local and statewide experts on many aspects of the natural and social environment in the area of concern. Staffing for the advisory committees was provided by the Department of Natural Resources, the Fox Valley Water Quality Planning Agency, Green Bay Metropolitan Sewerage District, the University of Wisconsin - Green Bay's Center for Public Affairs, and a citizen volunteer.

Members of the advisory committees were also appointed by the

DNR, and given this charge:

1. Review the RAP recommendations targeted to begin 1989-1990 and recommend implementation priorities based on the following criteria

2. Establish goals and objectives for implementation of priority RAP recommendations assigned to Advisory Committee.

3. Identify and evaluate developing or existing, conventional and non-conventional approaches that should be considered for effective RAP implementation.

4. Develop implementation strategies that include technical, social, economic, political and informational/educational considerations for implementation of identified priority actions. Identify potential sources of funding and refine cost estimates for implementation strategies.

5. Advise the Implementation Committee and the Department on possible impacts of implementation strategies.

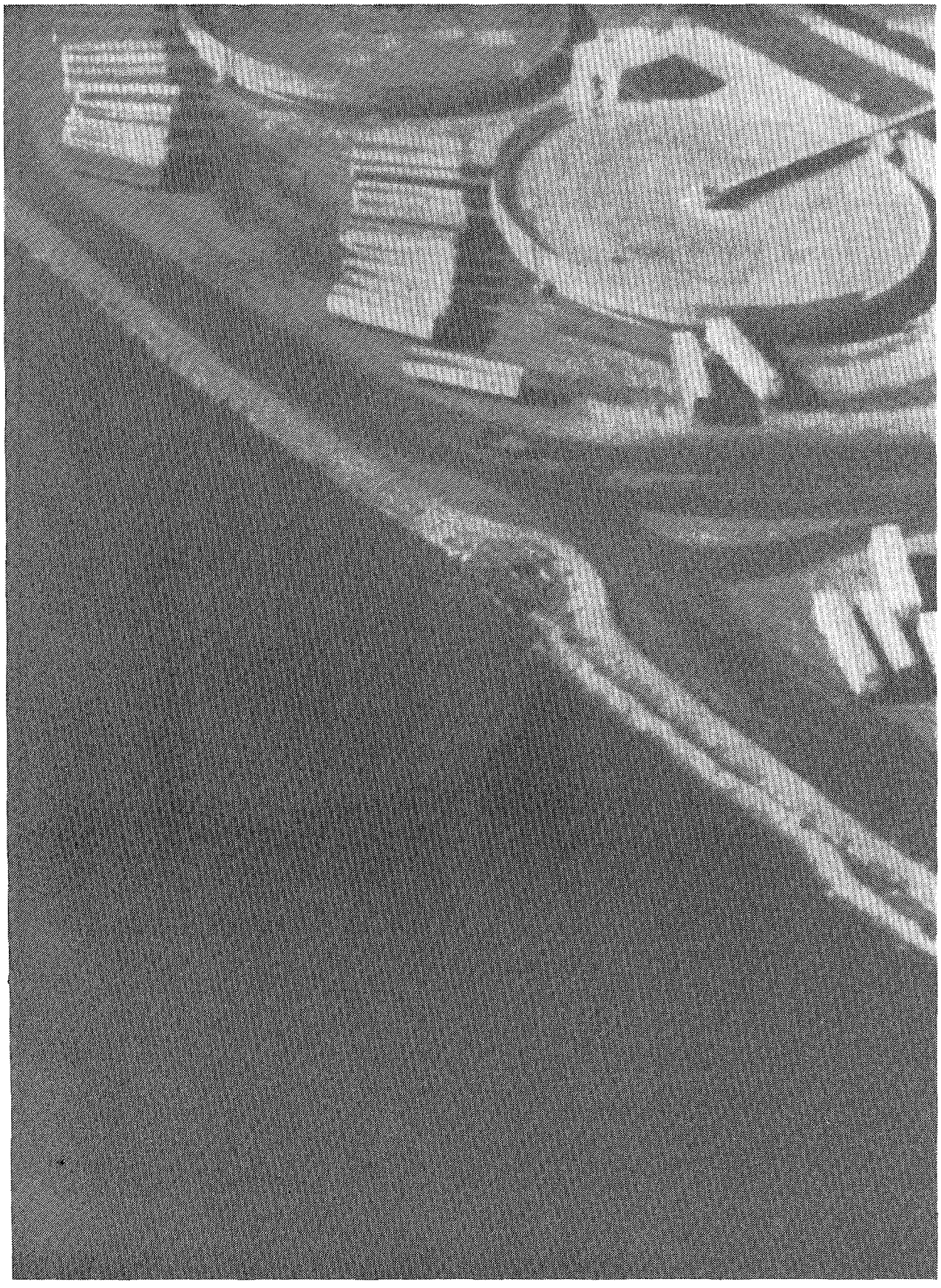
6. Prepare a short-term (1 - 3 years) and long-term (life of project) implementation plan describing the Advisory Committee's recommended implementation strategy, goals, and objectives.

7. Work with other Advisory Committees and the Implementation Committee to share information and coordinate activities. Serve in other technical capacities as directed by the Implementation Committee.

8. Prepare an annual report of implementation progress on key actions and recommendations assigned to the Advisory Committee.

9. Create opportunities for implementation or take advantage of other opportunities as they arise.

The Implementation Committee assigned each advisory committee a list of recommendations from the RAP specific to the expertise of each committee. The advisory committees then reviewed the status of each of the recommendations and developed detailed implementation strategies for priority recommendations.



TOXICS AND POINT SOURCE POLLUTANTS

The issues addressed by the Toxics and Point Source Management Advisory Committee are perhaps the most complex and problematic. Toxic chemicals lodged in the water, fish, and bottom sediments of the Bay and River are perhaps the main reason the IJC identified Green Bay as one of the 42 critical areas of concern. These same toxics will also be the most difficult problem to remediate.

Toxics of concern in the Lower Fox River and Green Bay include PCBs, dioxins, furans, chlorophenols, ammonia, resin and fatty acids, and heavy metals. These toxics, which originate from a variety of sources, have for many years washed through the watershed and settled into the bottom sediments of the river and bay.

Once in the sediments, toxics are extremely difficult to control. In the sediments, toxics may be resuspended in the water by dredging, wave action, and other natural activities. From there they find their way into the food chain, where some toxics, for example, PC's are bioaccumulated in fish, wildlife, and eventually humans. Some toxics are suspected to cause cancer or reproductive disorders and birth defects in fish, birds, and wildlife. Because of this bioaccumulation of PCBs in fish, advisories about the consumption of certain fish are issued warning the public about the risks of eating fish from the Lower Fox River and Green Bay.

Point source pollutants come from identifiable discharges into the water, such as factories and municipal sewage treatment plants. In addition to toxics, point source pollutants include conventional pollutants such as phosphorus, bacteria, suspended solids, and oxygen-demanding waste. In some ways point source pollutants are more easily controlled because they can be monitored and treated at the source when the source is easily identified. In other ways point source pollutants are more difficult to control. They result from basic economic activities, can be expensive to treat, and are difficult, if not impossible, to manage once they are discharged into the ecosystem.

Toxics and Point Source Key Actions

The RAP addresses toxics and point source pollutants through five Key Actions:

#1 Reduce phosphorus inputs to the river and bay from point and nonpoint sources.

#3 Eliminate toxicity of industrial, municipal and other point source discharges.

#4 Reduce availability of toxic chemicals from contaminated sediments.

#5 Continue control of oxygen-demanding wastes from industrial and municipal sources.

#10 Reduce bacteria inputs from point and nonpoint sources.

In short, these key actions call for the control of further toxic discharges into the river and bay, the reduction of existing toxics in the contaminated sediments, impacts, and for continued reduction in conventional point source pollutants.

Toxics and Point Source (TPS) Advisory Committee

The Toxics and Point-Source (TPS) Advisory Committee is composed of scientists and managers from public, private, and academic organizations and advises the Implementation Committee and Department of Natural Resources (DNR) on appropriate courses of action to implement toxic and point source recommendations.

H.J. Harris, Professor of Environmental Sciences at UW-Green Bay, chairs the committee. After spending considerable time in briefings with experts, the TPS Committee identified three top implementation priorities:

1. Contaminated sediment management.

2. Phosphorus point source control.

3. Dredge spoil management.

To begin contaminated sediment or "in-place pollution" control, the committee adopted a protocol for the assessment of contaminated sediments prepared by the IJC Water Quality Board. The protocol calls for minimizing the flow of new toxics into the sediments, identifying the existing quantity and distribution of toxic material in the sediments, and adopting the least-cost technology for removing the toxics from the sediments. Toward these ends, some committee members participated in the Mass Balance Study (described elsewhere in this report) and attended national conferences on toxic contaminants and in-place pollution to study management alternatives and prepare recommendations for future actions.

To enable new discharge limits for phosphorus, the TPS Committee recommended and the Implementation Committee took action to seek the initiation of water quality standards for phosphorus in Wisconsin. The Toxics and Point Source Advisory Committee further recommended that the Implementation Committee ask municipal sewage treatment facilities to study their phosphorus removal capabilities and to reduce phosphorus discharges voluntarily until the new standards and discharge limits are developed.

Finally, the TPS Committee requested the Implementation Committee to seek a full-time staff person. The staff person would help the TPS Committee synthesize information from the

Green Bay Mass Balance Study and Fox River Sediment Transport Study and organize the information to develop a remedial plan for contaminated sediments

Recent Progress of the Toxics and Point Source (TPS) Committee

Although toxic management and point source pollution control involve long-term remedial actions, progress towards these ends was made during the first year of implementation. Several programs and studies were undertaken by a number of agencies. A few major projects are further described in this portion of the report:

New Toxic Discharge Control Rules. To minimize the discharge of new contaminants into the Lower Fox River and Green Bay, the DNR recently established new state administrative rules and water quality standards. Natural Resource rules NR 105 and 106 establish procedures for setting water quality standards and discharge limits that protect human health, fish and aquatic life, and domestic and wild animals from the effects of toxics in municipal and industrial wastewater. Natural Resources rule 207 updates the DNR's antidegredation policy and protects certain state waters from further degredation by toxics and other contaminants. These rules advance a critical element of the Lower Fox River and Green Bay RAP: controlling toxic inputs into the ecosystem.

The establishment of these complex, technical rules generated considerable controversy. For example, the rules do not impose congener-specific regulation of PCBs although research has shown that regulating PCBs by congeners may decrease treatment costs and increase environmental effectiveness. The RAP states:

> *Water quality standards for total PCBs should initially be developed. The standards could be revised when adequate information is available on a congener-specific approach. Congener-specific monitoring by industries and municipalities will be necessary prior to setting standards and effluent limits*

for PCB congeners. The Natural Resources rules regulate total PCBs as suggested in the RAP as an interim measure. New discharge permits are being revised to require toxicity testing and, in some cases, monitoring for PCB congeners.

Current research on toxics in the Lower Fox River and Green Bay will establish and test procedures for sampling and analyzing PCB congeners. Also, the U.S. Environmental Protection Agency (EPA) may propose, and the DNR supports, uniform water quality standards for toxics in the entire Great Lakes. These efforts will review PCB findings and provide information necessary for regulating PCB congeners.

The new rules also permit a controversial "zone of initial dilution." The RAP recommends elimination of acute toxicity to

aquatic life. The zones of dilution permit acute levels of toxicity in areas immediately adjacent to the outfall of discharges, but only where aquatic life is minimal due to physical limitations of the receiving water. The rules further specify that discharges must be sufficiently diluted before reaching the habitat of aquatic life. Chronic levels of toxicity may be present in the mixing zone, but not outside of this zone.

The toxic rules are currently being applied to all discharges as their existing permits expire. At the urging of the public, the rules are also being used to recalculate discharge limits for nine paper mill and municipal permits that were developed just prior to adoption of the new rules.

New Toxic Air Emission Rules. The DNR adopted new air emission rules, NR 406 and NR 407. These rules require industries to develop a compliance plan and to demonstrate that they do not exceed air quality standards beyond their property lines. They also require basic control technology be used for certain emissions.

In addition, the DNR, the EPA, and UW-Green Bay are monitoring air quality at a number of sites to estimate toxic deposition from the air into the area of concern. This information will be used in the Green Bay Mass Balance Study to determine the impacts of air emissions on the water quality of the bay. Currently, air quality rules do not address secondary impacts on water quality or the accumulation of persistent toxics in the ecosystem.

The Green Bay Mass Balance Study. The U.S. EPA, the DNR, the Wisconsin Sea Grant Institute, and other agencies have joined efforts on the Mass Balance study. The Green Bay Mass Balance study is a multi-million dollar project that will pioneer research on the fate of toxic materials in large aquatic ecosystems. The results of the study will become available over the next three years.

The study will provide key information about the flow of toxic materials, specifically PCBs, two heavy metals - lead and cadmium, and the pesticide, dieldrin into, within, and out of the Green Bay ecosystem. By monitoring and quantifying all sources of toxic materials--including point source discharges, air emissions, stormwater runoff, groundwater, etc.--scientists will gather information about how toxics enter the bay, what happens to the toxics while in the bay, and how and when toxics leave the bay, if in fact they do.

From this information scientists will develop a model of toxic flows throughout the ecosystem, which will hopefully lead to better management decisions for reducing and removing toxics.

The Implementation Committee helped to secure state funding to

complete this important study.

Lower Fox River Sediment Transport Study. In a project closely related to the Mass Balance Study, the DNR is conducting an assessment of the sources and movements of PCBs in the Lower Fox River. Through massive sediment sampling, the DNR and the U.S. Geological Survey are mapping sediments, quantifying the presence and sources of PCB's, and modeling the movement of PCB's in the Fox River from Little Lake Butte des Morts to the DePere Dam.

This information will provide critical inputs into the Mass Balance model and will lead to better management decisions on in-place contaminated sediment and point-source controls.

In-Place Pollutant Funding. When it became apparent that state funding to initiate an in-place pollutant (contaminated sediment) program was in jeopardy, the Implementation Committee took immediate action. One member, state representative Mary Lou Van Dreel, introduced legislation, and the Implementation Committee successfully lobbied state legislators to reinstate $240,000/year and two permanent, full-time positions in the state biennial budget.

In the first year of the program, the funds will also be used to help complete the state's portion of the Green Bay Mass Balance Study. The funds are needed to support contaminated sediment studies and to develop remedial programs for managing in-place pollutants.

To promote federal assistance, several Implementation Committee members and Toxics and Point Source Pollutants Advisory Committee members testified at a U.S. Senate Subcommittee hearing held in Green Bay by Senator Herbert Kohl. Members encouraged more federal support for RAP implementation and in-place pollutant clean-up.

New Facilities for the Green Bay Metropolitan Sewerage District. A facilities plan to improve the Green Bay Metropolitan Sewerage District treatment plant (GBMSD) was approved in 1989. The plan evaluated facility alternatives to meet two levels of treatment: permit-related treatment to meet new discharge limits for ammonia, chlorine, organic (oxygen demanding) waste, and enhanced treatment for phosphorus and possible toxics removal. Reductions in ammonia toxicity, phosphorus, and potential toxics are high priority recommendations of the RAP.

The first level of treatment is needed to eliminate ammonia toxicity in Lower Green Bay and the mouth of the Fox River. GBMSD receives high levels of ammonia from domestic and paper mill wastes. It had been discharging levels of ammonia that are toxic to fish and aquatic life. Chlorine used by the facility to disinfect the discharge is also a toxic chemical.

Further, chlorine can combine with other substances in the wastewater or river to create more toxic chemicals.

If GBMSD continues to use chlorine for disinfection, new permit limits require installation of dechlorination equipment to remove most chlorine prior to discharge. The new permit also places more stringent limits on the amount of oxygen-demanding organic waste that the plant can discharge during periods of low river flows and higher water temperatures.

GBMSD will meet these new permit requirements through Phase I of the facility upgrading. Significant reduction in ammonia toxicity is expected as the result of the project. Recent studies in the lower bay have shown that ammonia is the primary cause of toxicity in the sediments. Other types of toxic effects that are likely present are masked by the magnitude of the ammonia problem.

Phase II or further upgrading of the GBMSD facility may be needed in the future to achieve further reductions in phosphorus and potential toxic contaminants. Existing information does not indicate toxicity problems other than ammonia, but as new information becomes available, there may be a need to regulate other substances in the future. All sewage treatment plants discharge low concentrations of many kinds of chemicals, some toxic. There may be a need to reduce these low concentrations in the total load.

Phase II could be triggered by one or more of the following events:

* More stringent effluent limits for toxics or phosphorus;

* Failure to meet existing effluent limits;

* Increases in plant incoming flows and loads;

* Desire to comply with RAP recommendations, which are more stringent than existing permit guidelines and would not be eligible for any state or federal cost sharing.

Phase II improvements would be based on the particular need or triggering event, but could include further treatment of ammonia, an alternative type of disinfection, and advanced treatment for toxics and/or phosphorus.

New Facilities for Appleton Sewerage Treatment Plant. The city of Appleton completed facility plans to upgrade its wastewater treatment. The plans call for increased capacity to remove ammonia, nearly double the hydraulic capacity to prevent sewage bypassing during wet weather, new equipment to reduce chlorine discharges, and a new sludge treatment process that captures methane gas and heat for use in the plant.

Construction is expected to begin in 1990 and take several years to complete. The facility improvements are expected to reduce toxic ammonia and chlorine discharges to the Fox River. As with GBMSD, additional improvements may be necessary in the future if other toxic substances are found to be a problem.

Bayshore Sanitary District Plan. On April 24, 1989, the Green Bay Metropolitan Sewerage District annexed the Bayshore and Dyckesville Sanitary Districts providing service to the towns of Scott, Red River, and Dykesville. The annexation will provide sewage treatment to the districts and will solve local water quality problems due to failing septic systems along the east shore of the bay from Point au Sauble to the Door County line. Although the sanitary districts lie outside the area of concern, collection and treatment of sewage will help improve water quality in the lower bay, especially along the beaches of the east shore.

Oneida Tribe Activities. The Oneida Tribe completed a facilities plan to improve wastewater treatment and the water quality of Duck Creek. Following studies that showed that 50% of private septic holding tank systems were failing and that 35% are deteriorating, the Tribe decided to annex to De Pere Sewage Treatment plan.

In addition, the Oneidas cooperated with the EPA on a macroinvertebrate study of Duck Creek and are cooperating with the U.S. Geological Survey on PCB sampling for the Green Bay Mass Balance Study.

Industrial Land Runoff and Ground Water Management. Progress towards managing industrial land runoff and contaminated groundwater has begun. The DNR and the EPA are developing procedures for issuing discharge permits to industries that have separate stormwater discharges to surface waters. The permits will require evaluation of discharges and, if warranted, limits on toxic pollutants. In addition, the DNR developed regulations to control toxic substances from fly ash and dredge spoil disposal sites.

Finally, the DNR has inventoried and monitored leakages from several landfills, underground storage tanks, and industrial spill sites to determine if they are potential sources of contamination into the Fox River. Clean-up of past spills is underway for several sites near the Fox River. Funding is being sought to monitor two additional disposal sites suspected of being sources of PCBs. And more sites may need to be investigated and cleaned up.

Future Directions of Toxics and Point Source (TPS) Committee

Looking toward the future, the TPS Committee recommended that the Implementation Committee seek these actions:

- Encourage municipal and industrial dischargers to further evaluate phosphorus loads and treatment capabilities, and to make reductions as soon as possible.

- The DNR should initiate development of phosphorus water-quality standards and provide assurance that the standards are consistent with RAP objectives and trophic status models for Lower Green Bay.

- The DNR should establish a phosphorus wasteload allocation if necessary to achieve phosphorus reductions. Review point and nonpoint source loadings, establish point and nonpoint allocations by administrative rule, and incorporate effluent limits and compliance schedules into WPDES permits.

- The TPS Advisory Committee, DNR, and EPA should conduct investigations of contaminated sediment control options. After review of options available, the Implementation Committee should seek funding to conduct pilot studies to test remedial measures in the Fox River.

- The EPA, DNR, and local governments should establish federal, state and local programs to clean up contaminated sediments. The Implementation Committee should seek continued federal funding for Section 118 of the Clean Water Act, the Assessment and Remediation of Contaminated Sediments Program. Federal and state programs should adopt and use IJC sediment assessment protocol.

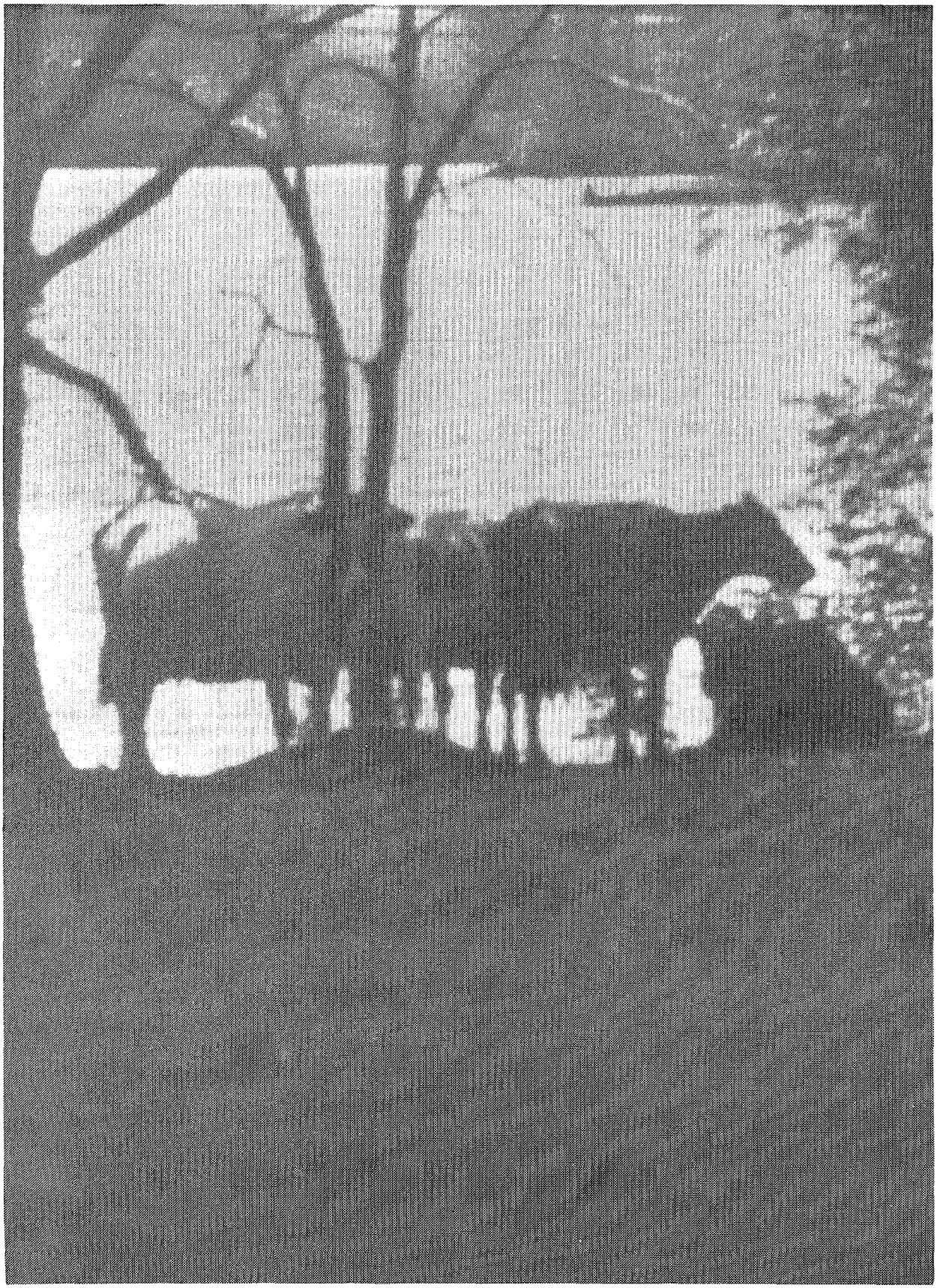
- The EPA and DNR should complete studies to determine the mass and availability of PCB's and other contaminants in the river system. The Implementation Committee should seek to provide a staff person for the TPS Committee to facilitate implementation of research findings.

In summary, progress has been made on difficult problem areas of the RAP: point source pollution control and toxic substance management.

The TPS Committee has adopted a contaminated sediment management strategy and progress is being made on implementing that strategy. Specifically, research has begun on the extent and distribution of toxic substances in the system. New water quality standards have been set which

limit the discharge of additional toxic pollutants into the system. Dischargers are taking steps to limit toxic discharges and options are being considered about contaminated sediment management.

As the TPS Committee indicated, however, significant work remains. Further controls are needed on phosphorus, more study is needed on the problem of dredging in contaminated sediments, and nonpoint sources of toxics such as industrial stormwater, coal/chemical stockpile runoff, and landfills need to be evaluated.



NONPOINT SOURCE POLLUTANTS

Nonpoint source pollution presents continuing, unresolved problems in the Green Bay area of concern. Although nonpoint source pollutants are similar to point source pollutants in substance--that is, they deal with toxics, phosphorus, oxygen demanding waste, bacteria, and sediments--they differ in an obvious respect. Nonpoint sources of pollution include croplands, barnyards, city streets, parking lots, construction sites, and eroding streambanks throughout the Fox/Wolf River basins. And because nonpoint source pollution comes from these many diffuse locations, it is inherently more difficult to control.

Nonpoint Source Pollution Key Actions

The RAP addresses nonpoint source pollution in four Key Actions:

- #1 Reduce phosphorus inputs to the river and bay from nonpoint and point sources.
- #2 Reduce sediment and suspended solids inputs.
- #10 Reduce bacteria inputs from point and nonpoint sources.
- #1 Virtually eliminate toxicity caused by nonpoint and atmospheric sources.

Phosphorus and sediment loadings are the major nonpoint source pollutants, although some toxics enter the watershed from nonpoint sources. Of the total phosphorus load into the Lower Fox River and Green Bay, approximately two-thirds originates from nonpoint sources.

These loadings come primarily from urban and rural runoff. That is, phosphorus and sediments wash into the river and bay from urban and rural land following rains and snowmelts. Excess phosphorus loadings cause the waters to be highly enriched, which increases and speeds the process of eutrophication, resulting in the growth of too much algae. Too much algae and suspended sediments rob the water of oxygen when algae die, destroy spawning habitat, block sunlight to underwater plants and give the water its murky look and unpleasant smell. Excess algae are the main reason Bay Beach fails to meet water visibility standards for safe swimming. Sediment loads increase the need for dredging the ship channel.

Reducing phosphorus and sediments from nonpoint sources is necessary to reclaim the swimming, fishing, and scenic beauty of the river and bay.

Nonpoint source pollution control in the Lower Fox River and Green Bay requires better management of thousands of acres of urban and agricultural land. In the area of concern, land

management falls under the jurisdiction of more than one hundred local governments and agencies.

Nonpoint Source Pollutant (NPS) Management Advisory Committee

The Nonpoint Source Management (NPS) Advisory Committee is made up of land use and conservation experts from the area of concern and is chaired by Robert Beining, a local farmer. Under Mr. Beining's leadership, the Nonpoint Source Management Advisory Committee reviewed the nonpoint source recommendations in the RAP, prioritized the recommendations, and developed to the implementation a nonpoint source implementation strategy.

More specifically, the NPS Committee formed four work groups. One work group reviewed the RAP and other areawide water quality management plans to identify high, medium and low priorities for watershed management. The high priority watersheds selected by the committee include:

* Duck Creek
* East River (watershed project ongoing)
* Ashwaubenon - Apple - Dutchman's Creeks
* Lake Winnebago East
* East Branch Fond du Lac River
* Lake Winnebago West
* Spring Brook
* Big Lake Butte des Morts
* Dagget's Creek
* Arrowhead River

These priority rankings should now be used by the DNR, Department of Trade, Agriculture, and Consumer Protection, and local governments for referral into the state's Priority Watershed selection process.

Another work group set as its goal the adoption, implementation, and enforcement of uniform construction erosion, stormwater management, and animal waste management ordinances for all local governments in the Lower Fox River and Green Bay area of concern as well as the Fox/Wolf River Basin. Currently less than half the counties in the basin have some form of erosion control or animal waste ordinances. Additionally, the ordinances are neither uniform nor complete in coverage. The Nonpoint Source Pollution Management Advisory Committee targeted 1990 for counties to adopt construction erosion and animal waste control ordinances, and 1995 for stormwater management ordinances.

A third work group focused on agrichemical use and impacts. A proposal was written by the University of Wisconsin-Extension and the U.S. Soil Conservation Service to fund a nutrient management research and demonstration project. One objective of the project is to show farmers how to increase their crop yields while reducing their fertilizer applications. This proposal ties in with elements of the East River Priority Watershed Program in that the research and demonstration project would. be carried out in the East River Watershed

A fourth work group addressed reduction of phosphorus and sediment inputs to the river and bay by focusing specifically on strategies to create buffer strips along shorelines and decrease soil erosion in agricultural areas. The group proposed that buffer strips be established in the East River Watershed to demonstrate their effectiveness.

Recent Progress of Nonpoint Source Pollution Management Advisory Committee

A comprehensive approach to nonpoint source pollution management has yet to be implemented, but several nonpoint source pollution control projects are ongoing or began in the first year of RAP implementation:

The East River Priority Watershed Project. The East River Priority Watershed Project is part of Wisconsin's Nonpoint Source Pollution Abatement Program under the coordination of the Department of Natural Resources (DNR). The statewide program provides cost-sharing and technical assistance to local governments and landowners who adopt land management practices to reduce nonpoint source pollution. The East River Priority Watershed project covers approximately 218 square miles in Brown County and three square miles in Calumet County. Participating cities and villages include Green Bay, De Pere, Allouez, Ashwaubenon, and Wrightstown; participating towns include Bellevue, Brillion, De Pere, Eaton, Glenmore, Green Bay, Holland, Lawrence, Rockland, Scott, Wrightstown, and Humboldt.

The East River project is scheduled to run for ten years at a cost of over three million dollars. To date, county land conservationists have inventoried urban and rural sources of nonpoint pollution to target areas for management. But the success of the project will depend on the cooperation of homeowners, farmers, and local governments in the watershed.

The Conservation Reserve Program. The Conservation Reserve Program (CRP) is a federally funded program administered by the Agricultural Stabilization and Conservation Service of the U.S. Department of Agriculture. Under this program, land owners are compensated for retiring highly erodible cropland or cropland adjacent to waterways and wetlands. Once retired from the plow, land along waterways can serve as a buffer strip or vegetation filter for soil, nutrients, and chemicals before they reach nearby streams. These lands also

provide habitat for waterfowl and other wildlife.

The DNR contacted landowners in portions of the East River Watershed to encourage participation in the Conservation Reserve Program. The Implementation Committee endorsed a demonstration project to show how buffer strips can improve water quality.

The Winnebago Comprehensive Management Plan. The DNR, with the assistance of many Fox Valley governments, agencies, and interest groups, prepared a comprehensive management plan for Lake Winnebago similar to the RAP. This plan, which includes specific recommendations for reducing phosphorus and sediments into the upper Fox River, the Wolf River, and Winnebago Pool Lakes, will subsequently help reduce these nonpoint pollution loads into the Lower Fox River and Green Bay. The Lake Winnebago plan also calls for reclaiming and protecting wetlands to restore fish and waterfowl habitats.

Animal Waste Management Program. The Wisconsin Department of Agriculture, Trade, and Consumer Protection has begun work on a model animal waste ordinance. The model ordinance will provide guidelines to help farmers better manage animal wastes and to prevent waste loadings into nearby streams. Once completed, the Department will provide advice to counties and encourage them to adopt the ordinance.

Future Directions of Nonpoint Source Pollutant Management Advisory Committee

With these efforts currently underway, the Nonpoint Source Advisory Committee identified priority actions for the future. Most of the priority actions focused on agricultural practices and watershed management. The specific recommendations of the committee are as follows:

- The Implementation Committee should seek to maintain funding for county, state, and federal conservation programs.
- Include additional land in the Conservation Reserve Program through additional landowner sign-up periods.
- Encourage innovative and alternative ways to achieve nonpoint source management objectives. The Implementation Committee should seek federal nonpoint source funds through the Water Quality Act and state money through the stewardship program.
- Research is needed to assess possible impacts of pesticides and herbicide use and controls as necessary. UW-Extension should develop public education programs on nutrient/pesticide management, establish demonstration projects, and perform additional research.
- The DNR and Department of Agriculture, Trade, and

Consumer Protection (DATCP), and counties should implement comprehensive watershed management projects to reduce phosphorus, sediment, and other pollutants from nonpoint sources. They should select an additional nine to eleven Priority Watershed Projects based on the Nonpoint Source Pollution Advisory Committee's priority list, use Geographic Information System (GIS) models to evaluate nonpoint source problems, and seek legislation for state and federal nonpoint source funding.

- Counties should require use of shoreline buffer strips or green strips through shoreland zoning regulations, conservation easements, or comprehensive zoning.

- Counties, cities, villages, and towns should require and enforce construction erosion and stormwater runoff controls. The DNR should provide local governments with model ordinances and advice.

- Counties should adopt animal waste management ordinances and farmers should use best management practices. The Department of Agriculture, Trade, and Consumer Protection (DATCP) should provide model ordinances, advice, and state funding to county governments.

Managing nonpoint source pollution in the U.S. presents a special problem. Since most land use controls and land management ordinances are enforced at the local level, implementing nonpoint source pollution recommendations will require extensive cooperation by many local governments.

Ways must be found to encourage landowners to adopt a land ethic and voluntarily cooperate in available programs. Without voluntary cooperation, further regulatory actions will be necessary. The successful reduction of phosphorus and sediment loads into the Lower Fox River and Green Bay will depend on the actions of upstream governments. These upper parts of the watershed must become aware of their impact upon their neighbors in the lower bay and the Great Lakes. They must become more involved in RAP implementation.

FISH AND WILDLIFE

The fish and wildlife in the Green Bay area of concern are perhaps the region's greatest resource. The Fox River and Green Bay ecosystem was once home to a variety of fish, birds, and other wildlife. Today, due in large part to years of overfishing and pollution, fewer predator fish remain in the system. Those that remain are mostly too contamined for human consumption. In addition, several fish-eating bird populations are endangered, and many other forms of wildlife have lost their habitat along the shorelines. The Green Bay Remedial Action Plan recommends actions to restore the integrity of the ecosystem for fish and wildlife.

The wetlands that once fringed the lower bay are key to the survival of native fish, birds, and wildlife. Wetlands provide spawning beds for a variety of fish and habitat for wild animals and migratory birds. In addition, wetlands filter land runoff, removing nutrients and sediments, and buffer the shorelines from erosion. Protecting the remaining wetlands is thus vital to maintaining the habitat of native fish and wildlife in the Lower Fox River and Green Bay.

Maintaining the habitat alone, however, is insufficient. Years of environmental disruption have upset the balance of the ecosystem. At present the wters contain excessive populations of carp and other forage and rough fish. Foreign species, such as the sea lamprey and white perch have invaded the ecosystem, threatening commercial and sport fisheries. And the ecosystem has been purged of some sensitive native organisms, such as burrowing mayflies, clams, sturgeon, and bluegills. Restoring the natural balance of the ecosystem will thus require species management, preservation of habitats, and better water quality.

Fish and Wildlife Key Actions

The RAP addresses fish and wildlife in three Key Actions:

#6 Protect wetlands and manage habitat and wildlife.

#7 Reduce/control populations of problem fish.

#8 Increase populations of predator fish.

Fish and Wildlife Committee

The Fish and Wildlife Advisory Committee was formed to assist the Implementation Committee on these Key Actions. The committee includes representatives of federal, state, and local conservation groups and agencies, the University of Wisconsin, and concerned citizens. The committee is chaired by Janet Smith of the U.S. Fish and Wildlife Service.

Recent Progress of the Fish and Wildlife Committee

To restore and maintain the natural balance of fish and wildlife in the area of concern, the committee adopted a two-step approach: first, protect and restore habitat; then, re-establish the species balance of fish and wildlife. During the first year of implementation, these steps were taken toward these ends.

Wetlands Preservation. Twenty acres of wetlands near Longtail Point were purchased by the state and targeted for protection and management. Two parcels of West Shore wetlands were donated to the DNR as part of trhe West Shore Wetland Preservation Program. Two other parcels are being appraised for purchase in 1989. About one-half of the West Shore lands targeted for protection by a West Shore Master Plan have been acquired, but they mostly

represent lower priority habitats. Unfortunately, high priority wetlands still need protection.

To achieve this, all counties in the Fox/Wolf River Basin and all municipalities in the area of concern, except De Pere, have completed and approved wetlands maps and shoreline/wetlands zoning ordinances. As a result, no new developments have occurred on the West Shore wetlands since 1988. However, wetlands along the Lower Fox River and bay shore continue to be lost or degraded because local and state rules do not apply to wetlands behind municipal bulkhead lines.

Meanwhile, the DNR continued its review of shoreline modification and dredging permits, resulting in downscaling of development proposals to protect habitats and water quality. Further, the DNR incorporated additional habitat enhancement practices into the nonpoint source abatement program (NR120) so that these practices will be eligible for cost-sharing in Priority Watershed Projects, including the East River Project.

Wildlife Management. In a joint effort, scientists at UWGB, the DNR and the U.S. Fish and Wildlife Service are continuing studies of endangered terns on Renard Island to monitor population status and to determine the effects of toxics on bird reproduction. Vegetation on the island is periodically managed to promote endangered tern nesting.

Controlling Populations of Problem Fish. To prevent further invasion by the sea lamprey, the U.S. Army Corp of Engineers completed construction of a permanent barrier to lamprey migration at the Rapid Croche Lock and Dam on the Fox River. However, this controversial project also prevents boat traffic from passing through the lock. Nevertheless, the barrier is viewed as the only effective means to block the sea lamprey from entering the Lake Winnebago and Wolf River systems and from decimating their fisheries.

Meanwhile, the UW Sea Grant Institute is funding a study of the Green Bay perch fishery to evaluate alternative fish management policies. In a related project, the DNR is monitoring the recent invasion of the non-native white perch, which may compete with the more desirable, native yellow perch. Finally, the DNR developed plans to study the abundance and movement of carp. Because carp contain high levels of PCBs, carp harvesting has been considered as a means of both reducing the carp population and removing some PCBs. At present, the Implementation Committee is seeking funding for this high-priority study.

Increasing the Numbers of Predator Fish. Fish management programs that seek to increase the numbers of predator fish continue at the DNR and the U.S. Fish and Wildlife Service. Activities in these programs include monitoring and management of the walleye population; monitoring fish contamination and revising public consumption advisories; managing commercial and sport yellow perch fisheries; and establishing a stock of Great Lakes muskellunge.

To re-establish the once-native muskie, Great Lakes muskie eggs were obtained from Michigan and the hatched fish will be released in Lower Green Bay in Fall 1989. This represents the first attempt to re-establish the muskie, which naturally preys on carp.

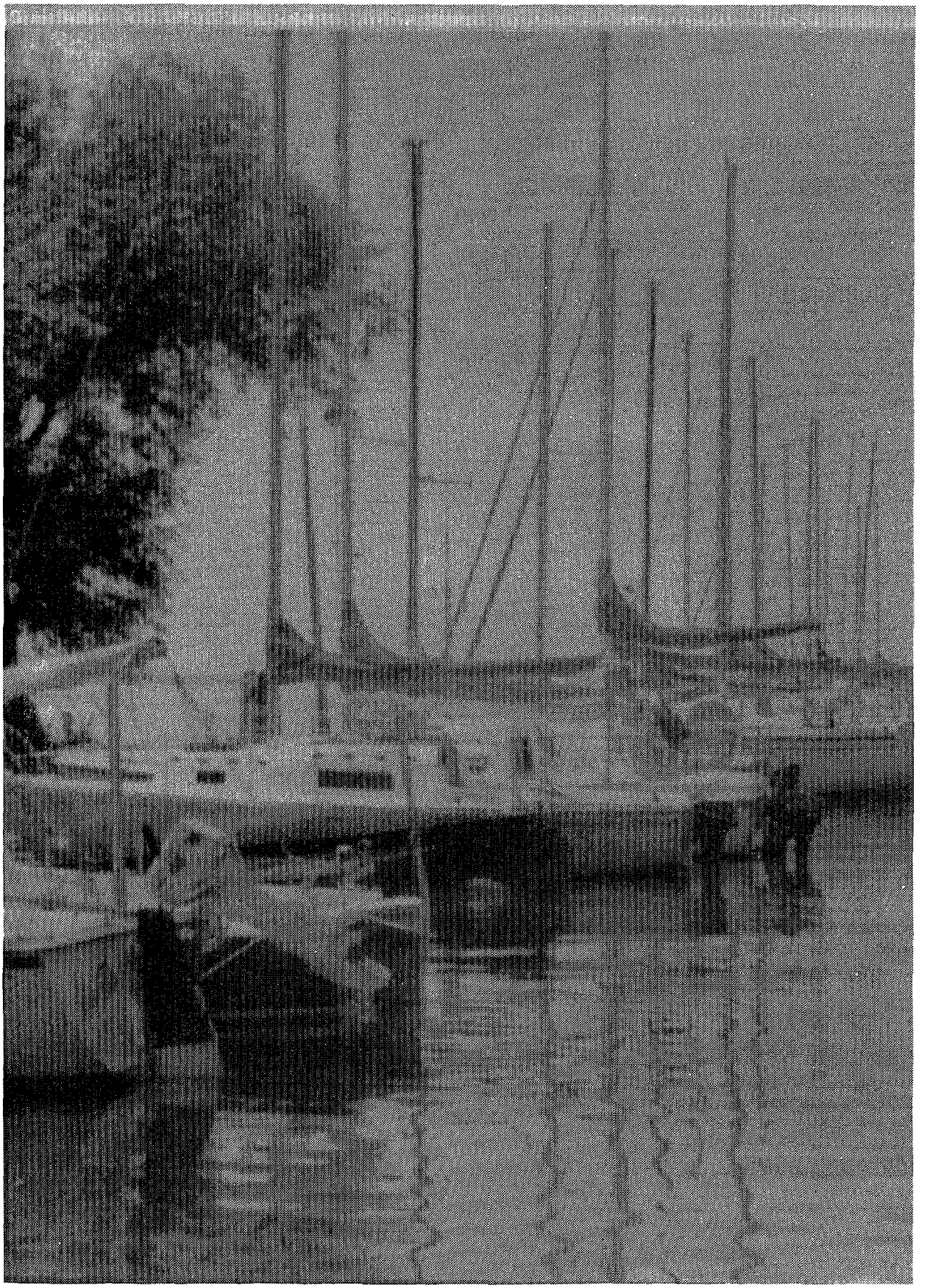
Future Directions of the Fish and Wildlife Advisory Committee

To continue progress on the restoration and preservation of fish and wildlife, the Committee recommended the following actions over the next three years.

- The Fish and Wildlife Advisory Committee will cooperate with Bay-Lake Region Planning Commission to identify and map remaining habitats and will establish goals for wetlands and habitat protection.
- Local, state, and federal agencies should strictly enforce existing laws to protect remaining wetlands and other habitat.
- The DNR should obtain funds for pilot projects to evaluate and manage carp populations.
- Landowners should use "best management practices" to protect fish and wildlife habitat in the East River Priority Watershed Project as a model for other shoreline landowners.
- Local governments should strengthen wetland zoning ordinances to include smaller (less than five acres) wetlands and should consider comprehensive zoning or other use restrictions to protect shoreline habitat.
- The DNR should initiate a program to evaluate and manage northern pike populations.
- The EPA should continue studies to determine causes of walleye and bird reproductive problems.
- The DNR should establish breeding sanctuaries and management programs for endangered tern populations.
- The Implementation Committee should work within the City of Green Bay to modify bulkhead lines as necessary to protect shore habitats and wetlands.
- The DNR should monitor waterfowl population trends.
- The DNR should continue efforts to re-introduce muskellunge to lower Green Bay as water quality improves.
- The DNR and Brown County should limit public entry to critical habitats of endangered birds during nesting seasons.
- The Wisconsin Department of Transportation and the City of Green Bay should improve Interstate Highway 43 wetland habitats that were intended to replace wetlands lost during highway construction.

The success of the Fish and Wildlife Committee depends upon many of the same critical factors facing the other committees: funding, cooperation, and public support. Moreover, the restoration of fish and wildlife communities depends upon successful implementation of other aspects of the RAP. That is, fish and wildlife cannot return until progress has been made in reducing point and nonpoint source pollution, controlling toxics, and increasing public awareness of the delicacy of wildlife habitat.

Until these other tasks are completed, the Fish and Wildlife Committee will seek to maintain and protect remaining habitats and assist nature when and where possible at restoring balance among species.



SHORELAND USE AND RECREATION

Shoreland use and recreation aspects of the RAP focus on people and their use of the ecosystem. The RAP is not an end in itself; rather, the RAP is a plan to restore the beneficial uses of the system to the people in Northeastern Wisconsin and beyond.

Green Bay has served people in the region for a long time. Throughout the years, the bay has served as a means of transportation, as a disposal site for municipal, industrial and agricultural waste, as a location for hunting, boating, fishing, swimming, and other recreational uses, and as a site for commercial and residential development. Quite obviously, the bay cannot be all things to all people. We have become increasingly aware that emphasizing one use of the bay may impair the ability of the bay to serve other uses.

Recent and rapid social change has altered our desired uses of the bay and its environment. Not long ago the ability of the Lower Fox River and Green Bay to provide inexpensive transportation and to assimilate manufacturing and municipal waste were paramount. Over the years, however, as the standard of living has risen and as the focus of the region's economy has changed, these uses have become relatively less valued.

Today, we value the recreational and aesthetic services of the river and bay and would like once again to fish in the watershed and safely eat the fish we catch; we would like to picnic in shoreline parks and enjoy the scenery along the waterway; and we would like to boat in the water and safely swim along the shores. The Green Bay Remedial Action Plan recognizes these desires.

Shoreland Use and Recreation Key Action

The RAP includes recommendations for shoreland use and recreation issues under one Key Action:

#14 Enhance public and private shoreline uses.

Specific recommendations include:

* Improve boat launch facilities.
* Improve marina and mooring facilities.
* Provide safe swimming beaches.
* Provide shoreline fishing facilities.
* Improve public accss to the water.
* Protect wetlands and wildlife habitat.
* Revitalize the urban waterfronts.
* Reduce shoreline erosion.
* Evaluate harbor and port alternatives.

Shoreland Use and Recreation Advisory Committee

The Shoreland Use and Recreation Committee was first established in February 1989 to seek implementation of these recommendations. The Committee is co-chaired by Robert Fisher of the Bay-Lake Regional Planning Commission and Dale Preston of the Green Bay Planning Department. The remainder of the Committee includes representatives of business, local recreation departments and organizations, UW-Green Bay, and the DNR. Its membership is perhaps the most diverse of all the advisory committees.

Recent Progress of the Shoreland Use and Recreation Advisory Committee

In spite, or perhaps because of its diversity, the Shoreland Use and Recreation Committee has been extremely active and productive. The committee targeted several work items for completion in 1989 or 1990. This work includes the preparation of a base map of the area of concern and land use overlay maps from which areas of conflicting use can be identified. The overlay maps will include, for example, existing wetlands, shoreland/wetland regulations, recreational lands, and community land use plans.

In addition, the committee--with assistance from Bay-Lake and Green Bay planning staffs--is preparing an inventory and analysis of public and private recreational uses and needs. By 1992, the committee plans to make specific recommendations concerning marina, harbor, fishing, and swimming sites.

Work to enhance shoreland uses and recreation over the past year also includes these activities.

Boat Launch Facilities. The City of De Pere is actively working with the DNR to acquire property on the east side of the Fox River for future development of a boat launch facility. Other facilities near the mouth of the Fox River, the Suamico River, and the De Pere Fairgrounds will be upgraded or expanded. Part of the funding for these improvements will come from boat-launch fees, which in some places went into effect in 1988 and may soon go into effect at other locations.

Public Access to Waterways. Many communities have taken action to ensure that existing public holdings of land adjacent to the river and bay remain public. Plans for new facilities are also underway. A park is planned in the Village of Howard along Duck Creek. The DNR provided funds to create a shoreline fishing area near Longtail Point. The City of De Pere is planning to expand and improve shoreline fishing facilities along the banks of the Fox River.

And the Implementation Committee has requested the Brown County Board to continue a 20-year plan to create a recreational trail between Green Bay and De Pere along the east side of the Fox River. When complete, this project will result in a 6.5 mile parkway for hiking, bicycling, jogging, and cross-country skiing. The abandonment of the Soo Line railroad tracks along the east side of the river provides a one-time opportunity to progress on this project.

Green Bay Harbor Area. The Bay-Lake Regional Planning Commission is leading development of a scope of study for a cost-benefit analysis of the Green Bay harbor. The study will address Pot economics and environmental impacts and will consider long-term dredge spoil disposal. At the request of the Toxics and Point Source Management Advisory Committee, the study will also consider alternative sites for the Port and the value to the community of reclaiming the urban waterfront for recreational uses.

Future Directions of the Shoreland Use and Recreation Advisory Committee

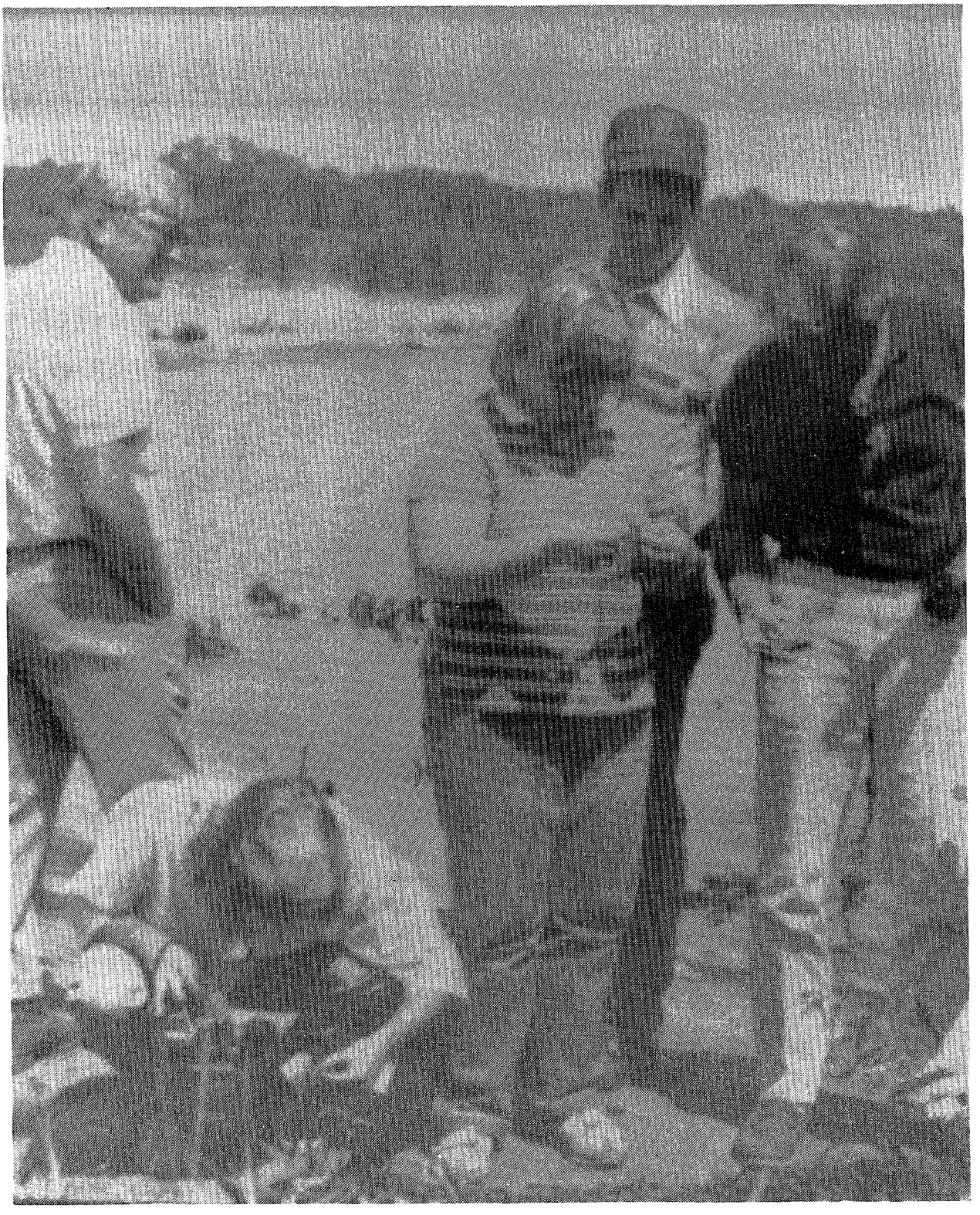
The Shoreland Use and Recreation Committee also selected priority actions for the next year and recommended the following to the Implementation Committee:

- Local governments should protect and develop recreational and environmental corridors, especially along the Lower Fox River and Green Bay shorelines.
- Area businesses, cities, and villages should revitalize waterfronts and enhance shorelines.
- Local governments should continue adoption and strictly enforce local wetland zoning.
- The DNR and U.S. Fish and Wildlife Service should further encourage private wetland preservation.
- The Bay-Lake Regional Planning Commission should seek continued progress on a 25-year dredge disposal plan and study of harbor alternatives.
- The Brown County Regional Planning Commission should complete a management plan for Renard Island.
- Regional planning agencies should collect and update soci-economic and demographic information on the region.
- The City of Green Bay should modify bulkhead lines as necessary to protect important habitat.
- Local governments should evaluate and upgrade boat launch facilities.
- The Implementation Committee and local governments should encourage development of marinas if environmentally and fiscally sound.
- The City of Green Bay should evaluate potential for swimming beaches on the lower bayshore.
- Local governments should develop shoreline fishing facilities.
- University researchers should measure public attitudes and perceptions of the Lower Fox River and Green Bay and the RAP.
- Planning agencies and researchers should measure public use of the river and bay.

The Shoreland Use and Recreation Committee has made considerable progress toward planning for increasing recreational use of the area of concern. The completion of the committee's work is a tribute to both the staffs of the participating organizations and to the foresight of drawing the leadership of the committee from agencies able and committed to completing the work.

Considerable strides have also been made toward enhancing public access to the shoreline of the Lower Fox River and Green Bay in several of the

surrounding communities. These projects reflect the willingness of local governments to pursue popular recreation opportunities, but local governments must demonstrate greater leadership to take action on more controversial issues such as dredging and wetland zoning.



PUBLIC EDUCATION AND PARTICIPATION

The RAP is a long-term plan that requires the cooperation of many different agencies, organizations, and individuals. The commitment of so many organizations for such a long period of time is possible only with substantial public support for the plan. Even if all the technical problems of toxic and conventional pollution abatement, fish and wildlife maintenance, and shoreline use were solved, remedial action would not take place without public involvement. Thus, generating and maintaining public support for the RAP is another critical element of the project.

At present the RAP is not widely known. Without public awareness and support, there will be insufficient pressure on public officials to divert resources toward implementing the plan. Further, implementation will require cooperation between many individuals and agencies. Therefore, the objectives of the Public Education and Participation Committee (PEP) include informing the public about the RAP and enlisting the active support of the public towards implementing plan recommendations.

Individuals make a difference. Individuals can do the following to help implement the RAP.

- Participate in river and bay clean-up projects.
- Attend public meetings and hearings and express their opinions.
- Let their support for the RAP be known to their elected representatives.
- Keep informed on the progress of RAP activities.
- Join or help form groups to work for RAP implementation.
- Use biodegradable products.
- Recycle or compost wastes.
- Dispose of chemical wastes according to label directions, and at sanctioned facilities; or participate in "clean sweep" programs. Don't dump chemicals down storm sewers or drains.

Land owners and local residents can do the following to help implement RAP:

- Keep leaves and grass clippings away from curbs and storm sewers where they can be washed into the river and bay.
- Preserve five feet of natural vegetation along stream banks to buffer shoreline erosion and filter land runoff.
- Dispose of pet wastes properly so they don't wash into storm sewers.

- Apply lawn and garden fertilizers, pesticides and herbicides carefully and sparingly or consider organic alternatives to chemical use.
- Use organic mulches and seed to cover bare soil and prevent erosion.
- Direct downspouts away from paved surfaces, allowing rainwater to soak into the ground.
- Reduce the use of pesticides, fertilizers, and household products containing toxics.

Public Education and Participation Key Action

Concern about the role of the public in implementing the RAP is expressed in Key Action #13.

Increase public awareness of, participation in, and support for river and bay restoration efforts.

Public Education and Participation (PEP) Committee

The Public Education and Participation Committee is chaired by William Elman, Executive Director of the Fox Valley Water Quality Planning Agency. Members of the committee represent the University of Wisconsin, environmental interest groups, educators, citizen volunteers, and the DNR.

Recent Progress of the Public Education and Participation Committee

The committee has had an active year developing educational materials and providing opportunities for public involvement in the RAP.

Books, Brochures, and Reports. With a grant from the Wisconsin Coastal Management Program, matched by the DNR and private funds, members of the Public Education and Participation Committee have been active producing booklets, brochures, and reports. The committee and DNR staff produced a Baybook that provides information about what citizens can do to reduce water pollution from their homes.

With funding from the DNR and the counties of Brown, Calumet, Fond du Lac, Outagamie, and Winnebago, the Fox Valley Water Quality Planning Agency produced a quarterly newsletter, entitled NEWSRAP, and four brochures on key aspects of the RAP.

In addition, the Institute for Land and Water Studies at UW-Green Bay is developing the first annual State of the Bay Report which will summarize technical information in general terms and track changes in the bay due to RAP implementation.

Finally, staff of the Center for Public Affairs at UW-Green Bay prepared this first annual progress report.

Visual Aids and Displays. Also with support from the Wisconsin Coastal Management Program and private contributions, the DNR is preparing outdoor interpretive displays to be located at the Neville Museum and at Bay Beach Park in Green Bay. The DNR additionally developed an educational display on the problems and management of contaminated sediments. Committee members are also working on a RAP logo to be used on all RAP related material.

Participatory Events and Educational Programs. The first River/Bay Clean-Up Day was held on April 29, 1989. Over 200 people, representing many organizations, participated in cleaning up litter along the river and bay.

A Speaker's Bureau was formed and presentations about the RAP were made to local civic groups, professional organizations, teachers, and local governments.

The Green Bay Area Chamber of Commerce held a "Leadership Green Bay" workshop at UW-Green Bay that focused on RAP implementation. Current and future community leaders examined ways to promote the RAP and to overcome obstacles to plan implementation.

Another one-day workshop on RAP progress, in which sessions will be led by the Advisory Committees, will be held at UW-Green Bay on September 9, 1989. Finally, a public informational hearing will be held on September 14, 1989, at the Brown County Library to review progress on the RAP and to receive public comments on RAP implementation. The workshop and hearing are sponsored by the Implementation Committee and the DNR through a grant from Wisconsin Coastal Management Program and hosted by the UWGB Center for Public Affairs.

Survey of Public Attitudes and Perceptions. To gain further information concerning public awareness about the RAP, the University of Wisconsin-Green Bay's Center for Public Affairs will soon conduct a survey of public attitudes and perceptions. This survey will measure the extent to which the public is informed about the RAP and water quality problems in general, and will help guide future public information programming.

Information Repositories. To make information about the RAP readily available to any citizen or interest group, the Public Education and Participation Committee has made all RAP information publicly available at these locations:

- Lake Michigan District Office of DNR
- Green Bay Area Office of DNR
- Brown County Central Library
- Bay Beach Wildlife Sanctuary

Copies of agendas and meeting minutes of all RAP committees are also available in these locations:

- Government Publications area of UWGB Learning Resources
- Appleton Public Library
- Oshkosh Public Library

Future Directions of the Public Education and Participation Advisory Committee

To continue public education and participation in the implementation process, the Public Education and Participation Committee identified the following priority actions for the coming year.

- Develop additional public information programs.
- Continue to provide opportunities for public participation and input on major decisions that affect the River and Bay.
- Make water quality information easily accessible and understandable.
- Develop additional educational programs.

Although the Public Education and Participation Committee accomplished much in its first year, the task ahead remains formidable. The Lower Green Bay RAP is recognized as a pioneering rehabilitation effort by scientists around the world; yet it remains relatively unknown by citizens at home. For successful implementation, this must change. Resources to implement the RAP must ultimately come from people, either directly through voluntary contributions and compliance or indirectly through taxes and fees. These resources will be provided only when people understand and support the RAP effort.

The Public Education and Participation Committee has made substantial progress toward generating the necessary public support. The progress of the committee reflects in part the influence of additional resources. Funding for many of the projects was made possible by a grant from the Wisconsin Coastal Management Program, with matching support from the DNR, several local firms and agencies, and the counties of Brown, Calumet, Fond du Lac, Outagamie, and Winnebago.

Similar funding arrangements for next year have been established for staffing committees, providing education and participation programs, and for conducting a study of the effectiveness of public information activities. Thus, public education and participation activities will continue in the near future, but the long-term future of these efforts depends on the continuation or substitution for Coastal Management funding.

MONITORING AND RESEARCH

Monitoring and research is an important element of any well-conceived plan. Research is necessary to understand how best to get things done, and monitoring is necessary to determine whether things, in fact, got done. Although monitoring and research are inherent in all parts of the plan, a separate committee to address monitoring and research needs was formed for two reasons. First, a committee was necessary to coordinate the monitoring and research recommendations throughout the plan, and second, to provide technical advise on research funding and research methods.

Monitoring and Research Committee

The Monitoring and Research Committee is chaired by Cliff Kraft, Green Bay Field Agent for University of Wisconsin Sea Grant Institute. The remainder of the committee includes resource managers and scientists, mostly natural scientists, who represent government, business, and universities. Most of the members are themselves active in research.

The purpose of the Monitoring and Research Committee is not to sponsor or conduct research; instead, research related to the RAP will be performed by the organizations the committee members represent. The purpose of the Committee is to:

#1 Prepare a monitoring plan for documenting changes in the area of concern due to RAP implementation;.

#2 Identify critical research needs for RAP implementation;

#3 Seek funds and resources to conduct monitoring and research; and

#4 Coordinate ongoing monitoring and research projects.

Recent Progress of Monitoring and Research Committee

The Monitoring and Research Committee completed two major tasks during the first year of implementation. On March 15 and 16, 1989, the committee sponsored a workshop for managers and scientists involved in data collection and research activities in the Area of Concern. The workshop included 30 presentations on topics of water quality, toxic contaminants, fisheries, biota, sediments, and the Mass Balance Study. The workshop provided a valuable opportunity to exchange information and plan future projects. The committee will sponsor the event annually.

The committee also forwarded to the Implementation Committee a long-range monitoring plan. The plan lists ecosystem characteristics to monitor, the monitoring area, sampling frequency, the status of the monitoring activity, a lead agency, and a priority ranking. The Implementation Committee has formed a task group to seek funding and a lead agency to implement the monitoring plan.

TAKING STOCK

A Review of Accomplishments

Considerable work began this past year toward implementing the Lower Green Bay Remedial Action Plan. A variety of state, local, and federal agencies, along with several environmental and industry groups, participated in the implementation process. Although this report included only major implementation projects, many smaller projects and voluntary actions contributed to implementation as well. They also deserve recognition. In all, more than 30 staff-years of effort were spent by government officials, industry representatives, environmental activists, and university scientists toward implementing the RAP. The Interim Implementation Committee commends all for their contributions.

Efforts were directed primarily at getting organized and initiating studies and projects. Several ongoing projects were completed, but much remains to be done. The committee recognizes that implementation will take time, massive resources, and sustained commitment. The process has just begun, but there is reason to be optimistic that plan goals can be reached by the year 2000.

To initiate implementation, the DNR established the Implementation Committee and six technical advisory committees. Each of the advisory committees submitted a progress report and implementation strategies for priority recommendations for the coming year. The Implementation Committee, meanwhile, sought funding and encouraged implementation of the RAP by agencies both inside and outside the Area of Concern.

Over the past year, the DNR established new water quality rules for toxics, while the Green Bay Metropolitan Sewerage District and the city of Appleton made plans to improve their wastewater treatment facilities. When completed, these improved facilities will significantly reduce ammonia toxicity in the river and bay. Plans to connect Oneida tribal lands and Bayshore and Dyckesville Sanitary Districts to existing sewage treatment plants will help solve long-standing water pollution problems from failing systems. In addition, a world-class study to model behavior of toxics in a large, aquatic ecosystem was initiated. The $11 million Green Bay Mass Balance Study and related DNR research on Fox River contaminated sediments will help to design future remedial strategies for in-place pollutants.

The Implementation Committee was instrumental in securing state funding for these studies and a new, in-place pollutant management program. Several committee members testified at a U.S. Senate Committee hearing held by Wisconsin Senator Herbert Kohl in Green Bay on the need for federal support for RAPs and in-place pollutants.

For next year, the Toxics and Point Source Advisory Committee recommended further study on remedial options for contaminated sediments and the development of new phosphorus water quality standards.

Limited progress was made on nonpoint source pollution problems. Federal, state, and local agriculture programs provided incentives for soil erosion and runoff control. The EPA passed rules for future restriction of some industrial stormwater discharges. Land inventories and plans were initiated for the East River Priority Watershed Project, and two major studies were also proposed to demonstrate nutrient and pesticide management practices in the East River

watershed. As a priority for the coming year, the Nonpoint Source Management Committee recommends identifying funding for additional priority watersheds projects and work by counties and local governments toward controlling construction erosion, stormwater runoff, and animal waste.

As the quality of the water has improved, efforts to enhance fish and wildlife communities increased. The U.S. Army Corps of Engineers constructed a barrier on the Fox River to prevent invasion by sea lampreys, and the DNR initiated or continued programs to increase and manage the stock of native predator fish. Study continued on the health of endangered bird populations. Local governments enforced wetland ordinances to protect wetlands and wildlife habitat. Next year, the Fish and Wildlife Committee plans to increase efforts to preserve remaining habitat and to continue research and management of carp, muskies, northern pike, and endangered Forster, common and caspian terns.

Opportunities for shoreland use and recreation have grown. Local communities made plans for new boat-launch facilities, and existing facilities have been expanded. The Brown County Planning Department continued work on a major parkway along the Fox River for all to enjoy. Finally, the Bay-Lake Regional Planning Commission began studies on the Port of Green Bay and the future of the Downtown Green Bay Waterfront. A base map of the Area of Concern was prepared to facilitate resource mapping in the next year. The Shoreland Use and Recreation Committee plans to use the maps to improve management of wetlands, shorelands, and recreational lands.

To keep the public informed and active, several important public education and participation projects were initiated, including The State of the Bay Report, RAP brochures and newsletters, a speaker's bureau, an annual public workshop, an annual public hearing, and this annual progress report. In addition, study will soon begin on public perceptions and how and where to improve public education and participation programming. In the upcoming year, the Public Education and Participation Committee plans to continue current activities and to make educational materials, such as interpretive displays and RAP literature even more accessible.

The Monitoring and Research Committee prepared a plan to monitor ecosystem change in the Area of Concern. The committee also hosted a research workshop to highlight and coordinate any ongoing projects and plans to host the workshop again next year. The committee also plans to develop a long-range research agenda.

Finally, the DNR continues to consider new approaches to enhance the effectiveness of the Implementation Committee. At present, a Coordinating Council--as prescribed in the RAP--appears unlikely; but an alternative structural arrangement will be evaluated in the coming year. A more permanent implementation structure is to be recommended by the Interim Implementation Committee by the end of the year. This new organization will carry implementation through to the year 2000 and possibly beyond.

LOOKING FORWARD

Obstacles to Overcome

Although the history of environmental action in the Green Bay area is long, actions previous to the RAP were not nearly as comprehensive or ambitious. Further, the Green Bay RAP is the pioneer of similar efforts just beginning in other areas of concern around the Great Lakes. Pioneering efforts always encounter obstacles.

Some obstacles are scientific: How to remove toxics from the sediments? How to predict the outcome of remedial actions? How to measure minute quantities of toxic substances? How to restore balance among species of fish and wildlife? These represent challenging obstacles to overcome. Because none of these problems, however, are specific to Green Bay, research will continue here and elsewhere, and committee members will relay the results for use in implementation. In time, most technical questions can be answered.

As the technical obstacles are overcome, the obstacles become financial: Who will pay to implement the plan? Implementation of the RAP requires two types of costs: administrative costs and direct costs. Administrative costs include staff and resources for all the committees. At present, administrative resources are very limited. Much of the work products of the advisory committees were produced by committee members or by the staff of represented agencies. The staffs and leaders of these agencies deserve recognition for their contributions. But unless agencies are compensated for their contributions, it may not be long before recognition gives way to the demands of better funded projects.

Direct costs include the massive costs of actual implementation. Estimates of the total costs of implementation range from 68 to 640 million dollars. The higher figure largely represents the potential cost of removing contaminated sediments. Nonpoint source management alone will cost $50-130 million.

In these times of federal deficits, it is unlikely the federal government will provide sufficient resources. Further, state and local governments have limited financial resources. Thus, it will take the combined financial support of all levels of government to complete implementation of the RAP. Public education projects funded by The Coastal Management Program, the Green Bay Mass Balance Study, the East River Priority Watershed Project, and other RAP-related projects are good examples of intergovernmental financial cooperation. But each of these programs includes formal guidelines that specify work products and allocate funds. The RAP effort will soon need similar financial controls and incentives.

Another major obstacle is political: Who will implement the RAP? Thus far, the DNR has provided the leadership necessary to sustain the RAP. But the DNR cannot implement the RAP alone; its powers, though substantial, are too limited for ecosystem management. Therefore, federal, state and local governments, and countless private citizens and firms, must assist the DNR in implementation.

For this reason the DNR appointed the Interim Implementation Committee and its advisory committees from diverse interest groups. But new management approaches--e.g., ecosystem management--require new management instruments. The old instruments, repackaged in sets of committees, are adequate for sharing information, pooling the efforts of local agencies, and

requesting support from outside agencies. But the same instruments are inadequate for implementing new management techniques, for mandating ecosystem management, and for providing new resources. A new model for implementing ecosystem management is needed.

Taking the Next Steps

The fact that progress was made in each of the management areas is evidence that implementation has gotten a solid start. Progress was not uniform in either rate or character. Some of the committees were led by scientists and consequently focused on research; others were led by planners, who focused on planning; still others were led by resource managers, who focused on management.

But more important, programs were monitored, programs were coordinated, and programs were initiated. And most important: things got done. However, to ensure continued success of the implementation effort, as the luster of a new program fades, bold steps must now be taken. The magnitude of the nonpoint source pollution problem will require substantial cost-share funds, new regulations, and understanding by upstream governments and landowners that they contribute to water quality problems in Lower Green Bay. Solution of the toxics problem requires major new programs for control of contaminated sediment clean-up and strict enforcement of toxic control regulations.

Lack of staff and resources limited the progress of all the committees, although only the Toxics and Point Source Committees explicitly requested staff. Committees were able to draw upon the experienced staff and resources of participating agencies. This has proven a major strength of the RAP's multi-institutional approach.

The next step is to build on this strength by contacting lead agencies and soliciting their commitment to implementing assigned actions. Just as the ecosystem interconnects humans with the environment, ecosystem management must interconnect agencies and their missions.

The environmental quality of the Lower Fox River and Green Bay ecosystem has improved tremendously in the past decade. As a result, fish are returning to the waters, wildlife are returning to the wetlands, and people are returning to the shorelines. As we approach the next decade, our resolve must not waiver. We must replace institutions that disrupt the ecosystem with institutions that foster sustainability. And we must provide those institutions with resources to do the job well. In the past, we took bold steps to rescue the ecosystem from near collapse; we must now take bold steps to return the ecosystem to sustainable, balanced life, for us, and for the generations to follow.

Steering Committee of the Implementation Committee

Chair: Thomas Cuene
County Executive, Brown County
Harold J. Day
Green Bay Metropolitan Sewerage Commission
William Fisk
Izaak Walton League
Charles Higgs
DNR
Rebecca Leighton
Lake Michigan Federation
Winston Ostrow
Attorney
Bruce Robertson
James River Corporation
Janet Smith
U.S. Fish and Wildlife Service

IMPLEMENTATION COMMITTEE

Robert J. Beining
Citizen
Ron Bruch
DNR
George Nau Burridge
Citizen
H.B. Conlon
Chair, Associated Banc Corp.
Robert Cowles
State Senator
Robert Fisher
Executive Director, Bay-Lake Regional Planning Commission
Keith Foye
Agricultural Resource Management
Department of Agriculture, Trade, and Consumer Protection
Susan Garot
Public Affairs Director
Green Bay Area Chamber of Commerce
Frank Granberg
Friends of the Fox
Samuel Halloin
Mayor, City of Green Bay
Vicky Harris
RAP Implementation Coordinator, DNR
Carol Holden
DNR (Staff)
Peggy McGaffrey
Fox River Sierra Group
Loretta Metoxen
Council Member, Oneida Tribe of Wisconsin
Joan Mills
Green Bay League of Women Voters
Dan Olson
Regional Director, Ducks Unlimited
David Outcalt
Chancellor, University of Wisconsin - Green Bay
John Schreiter
County Executive - Outagamie County
Robert A. Shade, Sr.
Shade Information Systems, Inc.
Wilma Springer
Chair, Calumet County Board
Eric Stearn
Attorney
Paul Stevenson
County Executive - Winnebago County
Kenneth Theine
Executive Director, East Central Wisconsin Regional
Planning Commission
William Thomasma
Izaak Walton League
Mary Lou Van Dreel
State Representative

TOXICS AND POINT SOURCE MANAGEMENT ADVISORY COMMITTEE

Chair: Dr. H. J. Harris
Institute for Land and Water Studies
University of Wisconsin - Green Bay
Paul Baumgart
Clean Water Action Council
Dr. Kenneth Carlson
Fox River Paper Company
Tim Doelger
Department of Natural Resources
Dr. Jeff Foran
National Wildlife Federation, Ann Arbor, Michigan
Vicky Harris
RAP Implementation Coordinator, DNR
Al Johnson
Port Director, Green Bay, Wisconsin
Gary Kincaid
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Rebecca Leighton
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Robert Miller
Director of Public Works, Appleton, Wisconsin
Dr. John Olson
Department of Health and Social Services
Madison, Wisconsin
Cathy Rather
Oneida Indians of Wisconsin
Bruce Robertson
James River Corporation
Don Schneider
Fort Howard Paper Company
Janet Smith
U.S. Fish and Wildlife Service
Dr. Ken Stromborg
U.S. Fish and Wildlife Service
Paul Thormodsgard
Green Bay Metropolitan Sewerage District

NONPOINT SOURCE MANAGEMENT ADVISORY COMMITTEE

Chair: Robert J. Beining
Farmer, Greenleaf, Wisconsin
Rick Adamski
Farmer, Seymour, Wisconsin
Steve Bennet
University of Wisconsin - Extension
Ron Bruch
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Frank Dadam
City Engineering Department, Green Bay, Wisconsin
Larry Decker
Soil Conservation Service
Mike Foy
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Department of Agriculture, Trade, and Consumer Protection
Laura Herman
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Bill Hafs
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Greg Keil
East Central Regional Planning Commission
Dr. Thomas McIntosh
University of Wisconsin - Green Bay
Cathy Rather
Oneida Tribe of Wisconsin
Pete Van Airsdalea
Winnebago County Land and Water Conservation Department
Pat Vaile
Brown County Planning Commission

FISH AND WILDLIFE ADVISORY COMMITTEE

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Department of Biology
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Donald Halron
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Vicky Harris
RAP Implementation Coordinator, DNR
William Hnilicka
Brown County Zoning Administration

Terry Lychwick
DNR
Dr. Robert Howe
University of Wisconsin - Green Bay
Cliff Kraft
UW Sea Grant
Richard Koch
DNR
Michael McFarlane
Barkhausen Preserve
James Maricque
Commercial Fisherman
Keith Otis
DNR
Jim Raber
DNR
Ronald Spry
U.S. Fish and Wildlife Service
Dr. Edward Weidner
Director of Cofrin Arboretum

SHORELAND USE AND RECREATION ADVISORY COMMITTEE

Co-Chairs: Robert Fisher
Bay-Lake Regional Planning Commission
Dale Preston
Brown County Planning Department
Dr. Ron Baba
University of Wisconsin - Green Bay
George Burridge
Green Bay, Wisconsin
Terry Dickinson
Commodore, Green Bay Yacht Club
Susan Garot
Green Bay Area Chamber of Commerce
Betsy and Phil Hendrickson
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Menasha, Wisconsin
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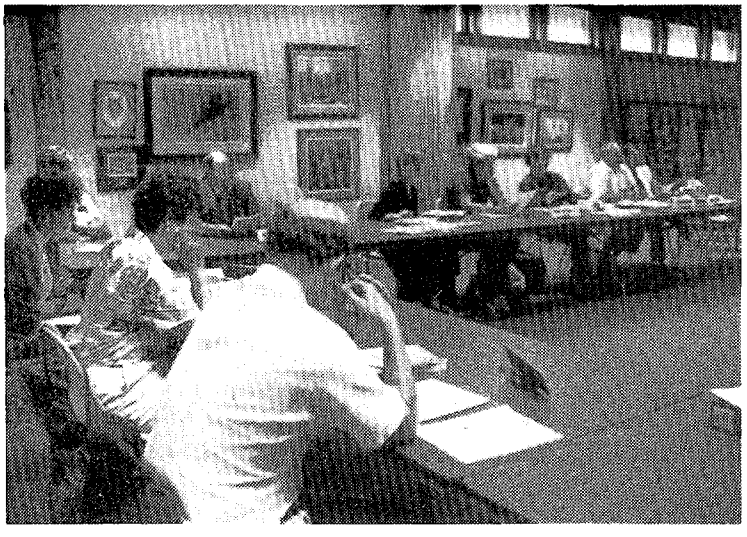
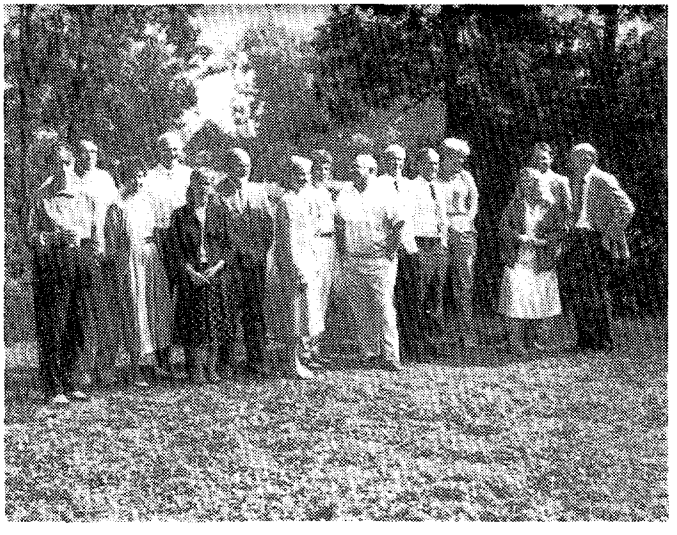


(Front to Back), Eric Stearn, Mary Lou Van Dreel, Joan Mills, Harlan Kiesow, William Thomasma, Rebecca Leighton, Peggy McGaffey, Ilona Ridgeway, Frank Granberg, and Dave Nennig.



l.tor., Ilona Ridgeway, Tom Cuene, Joan Mills, Bruce Robertson, Rebecca Leighton, William Thomasma, Victoria Harris, Mary Lou Van Dreel, Frank Granberg, Dave Hildreth, Rob Cowles, Peggy McGaffey, Janet Smith, Dave Nennig, and J. Jack Day.