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Lake Michigan
Integrated Fisheries Management Plan
2003-2013

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Bureau of Fisheries Management and Habitat Protection
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Lake Michigan Integrated Fisheries Management Plan
2003-2013

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OVERVIEW

Introduction

This Lake Michigan Integrated Fisheries Management Plan (Plan) will guide the management of sport and commercial fisheries in Wisconsin waters of Lake Michigan during the years 2003 through 2013. It was developed through a process designed to engage fisheries and law enforcement personnel working on Lake Michigan, the interested public, Department of Natural Resources (Department) staff in all related programs, and external partners. See the Appendix 1 for details of the Plan development process and Appendix 2 for a review of all comments received on an intermediate "Public Discussion Draft" of the Plan. The term "Integrated" in the title indicates our intention to develop a fisheries management program that complements and utilizes other Department programs and that recognizes the roles of the other state, federal, tribal, and private agencies and organizations -- our partners in the management of the Great Lakes and their fisheries. However, we do not attempt here to present a plan that encompasses all activities and programs related to Lake Michigan that are conducted by other Department programs or by our partners in Great Lakes fisheries management.

The Plan presents an ambitious agenda of work that will test our energies and resources over the next five biennial budgeting and planning cycles, and we realize that we may not achieve all of the proposed objectives or employ all of the proposed tactics. We considered presenting a streamlined Plan, but to do so would understate the challenges and needs of fisheries management on Lake Michigan. We realize that our scope for action may be limited by budgets and priorities established outside the Fisheries Management Program. The order of presentation of goals and objectives is not intended to reflect agency priorities.

Fisheries management programs on Lake Michigan, along with state and federal pollution prevention and habitat protection initiatives, have fashioned a silk purse of fishing opportunity from a sow's ear of ecosystem degradation. The Lake Michigan ecosystem was transformed in the 19th and 20th centuries by pollution, habitat degradation, the introduction of exotic species, and the unrestricted harvest of native species. Even today the presence of dozens of exotic species, together with irreversible losses of some near-shore wetland and tributary habitats, precludes the full restoration of the fish community that was present at the time of European settlement. But, strides have been made. With chemical and organic pollution limited and habitat degradation slowed, state, federal, and tribal fisheries agencies have been able to develop a successful inter-jurisdictional fisheries management program that provides exceptional opportunities for both sport and commercial fishers.

Today's sport and commercial fisheries on Lake Michigan rely on two ongoing management activities, the control of sea lamprey and the stocking of salmon and trout. Together, these activities have transformed an ecosystem devastated by the proliferation of sea lamprey and alewives, and created remarkable sport and commercial fishing opportunities. Sea lamprey control is carried out on Lake Michigan by the Great Lakes Fishery Commission through its agent, the U.S. Fish and Wildlife Service. The program still relies primarily on the use of the chemical lampricide, TFM, but also involves barrier dams, the trapping of migrating adults, and the release of sterile males. An active research program funded by the Commission has identified pheromones that may lead to dramatic improvements in control methods. Without the sea lamprey control program, commercial and sport fisheries would not exist as we know them, and lake trout restoration would not be considered a realistic possibility. The stocking of 13,000,000 chinook salmon, coho salmon, rainbow trout, and brown trout annually is conducted by the Departments of Natural Resources of Wisconsin, Illinois, Indiana, and Michigan. In addition the U.S. Fish and Wildlife Service stocks over 2,000,000 lake trout annually in a restoration program designed by the four states together with the Chippewa-Ottawa Resource Authority. Most of the Department's investment in Lake Michigan fisheries is directly related to the propagation and stocking of trout and salmon. These programs have stabilized the Lake Michigan fish community, and provided a context in which significant local initiatives, described below, are taking place related to yellow perch, lake sturgeon, Great Lakes spotted musky, smallmouth bass, walleye, and northern pike.

We are generally pleased with the condition of sport and commercial fishing in Lake Michigan. Sport fishing. After a troubling bout with bacterial kidney disease in the late 1980s, the chinook salmon fishery stabilized during the 1990's and harvests in the last two years have been exceptional. Today anglers and agency biologists understand the need to balance stocking of those predators against available forage abundance. The salmon and trout fishery is diverse, with steelhead, lake trout, brown trout, and coho salmon helping to sustain fishing on the open lake from early spring through late fall. We maintain a steelhead stocking program involving three strains that can provide stream fishing opportunities nine months of the year, although returns in recent years have been disappointing, probably mostly because of low flow rates in our tributaries. Yellow perch are temporarily in decline both in Lake Michigan and Green Bay, but we have made strides in assessing and predicting population fluctuations in order to guide the regulation of commercial and sport harvests. Excellent fishing for other cool water species, especially walleye and smallmouth bass, can be found in Green Bay, the Milwaukee River, and other river mouths and bays along the Lake Michigan shoreline. The Great Lakes spotted musky restoration program in Green Bay has been a success in its early stages. Commercial fishing. On the commercial fishing side, we have over the past 25 years moved toward a smaller and better regulated commercial fishery targeting five species – lake whitefish, yellow perch, round whitefish, rainbow smelt, and bloater chubs. Commercial fishing management is built on three principles – annual harvest limits, limited entry, and individual transferable quotas. *Harvest limits.* The harvest of each species is constrained by harvest limits established by the Department. In setting harvest limits we attempt to follow the "precautionary approach" recommended by the National Research Council's Committee on Ecosystem Management for Sustainable Marine Fisheries[1]. Attempting to maximize long-term harvests often leads to over exploitation, so our policy is to seek moderate harvest limits. *Limited entry.* There are now approximately 80 commercial fishing licenses on Lake Michigan, and the number cannot increase. This limited entry system helps stabilize the fishery by protecting the participants from unrestrained competition. *Individual transferable quotas.* The harvest limit for each species (except for portions of the bloater chub and smelt harvest limits that are open to so-called racehorse fisheries) is divided among license holders on a percentage basis. That is, each fisher is allotted a percentage of the harvest limit. When that percentage is multiplied by the harvest limit it yields the individual's quota expressed in pounds. An individual license holder's share may be transferred to another fisher either temporarily (for one fishing year) or permanently. This system assures each license holder that a portion of the total harvest is reserved for him or her, and eliminates the need for fishers to race to harvest the largest possible portion of the total allowable harvest. It also allows ambitious fishers to build more profitable businesses by accumulating larger shares of the total harvest.

Despite these successes, the future of fishing on Lake Michigan is uncertain because the ecosystem is constantly changing. The steady flow of new exotic species, most of which are introduced through the discharge of ballast by ocean-going vessels, complicates our work and places all predictions in doubt.

Authority and Guidance

The Department manages fisheries under authority of Sections 23.09 and 29.041 of the Wisconsin Statutes:

> *23.09: Conservation. (1) PURPOSES. The purpose of this section is to provide an adequate and flexible system for the protection, development, and use of forests, fish and game, lakes, streams, plant life, flowers, and other outdoor resources in this state. (2) DEPARTMENTAL RULES; SURVEYS; SERVICES; POWERS; LONG-RANGE PLANNING. The department may promulgate such rules, inaugurate such studies, investigations and surveys, and establish such services as it deems necessary to carry out the provisions and purposes of this section. The department shall establish long-range plans, projects, and priorities for conservation. . .*
>
> *29.041 Department to regulate hunting and fishing in interstate waters. The department may regulate hunting and fishing on and in all interstate boundary waters, and outlying waters.*

[1] National Research Council. 1999. Sustaining Marine Fisheries. National Academy Press, Washington, D.C.

The Department also receives instruction from the Natural Resources Board through Chapter NR 1 of the Wisconsin Administrative Code:

> *NR 1.01 Management of fisheries and aquatic resources. (1) To meet its responsibilities established by statute, department programs shall be based on scientific management principles which emphasize the protection, perpetuation, development, and use of all desirable aquatic species. (2) The goal of fish management is to provide opportunities for the optimum use and enjoyment of Wisconsin's aquatic resources, both sport and commercial. A healthy and diverse environment is essential to meet this goal and shall be promoted through management programs. (3) Aquatic resources include both non-game and game species of fish, other aquatic animals and their habitats. Endangered and threatened species form a special group that will be managed according to ch. NR 27 and s. 29.604, Stats. (4) To assure its effectiveness, the management program shall be based upon a close working relationship among all functions of the department, other governmental agencies, federally recognized Indian tribes, and the public. The department will keep interested parties informed of policies, plans and management. To anticipate change and meet future demand, the department shall engage in long-range planning of management programs. (5) Financing the department's fish and aquatic resource management program through, in large part, user fees, particularly license fees and excise taxes on selected equipment purchased by sport and commercial fishers, is an established principle. Although user fees collected for a specific purpose are targeted at that purpose, they provide significant indirect benefits for a wide range of wildlife and users. When beneficiaries are a broader or different segment of the public, other funding sources will be sought. (6) Wisconsin law enunciates a trust doctrine which secures the right of all Wisconsin citizens to quality, non-polluted waters and holds that waters are the common property of all citizens. Fish management programs will vigorously uphold the doctrine that citizens have a right to use in common the waters of the state and these waters shall be maintained free of pollution. (7) With access to Wisconsin's lakes and streams a prerequisite for their use by the public, the acquisition and development of public access to waters should be accelerated, particularly in the more populous areas of the state. (8) Wild and wilderness lakes and streams are a special and limited resource providing unique settings for enjoyment of fishing and other outdoor activities. Additional efforts are required to designate lakes and streams for this status. Special management methods that increase fishing quality shall be encouraged on these waters. Such methods may include trophy fishing, regulated harvest, special seasons, and controlled entry. (9) Sport fishing shall be managed in such a way that all have an equal opportunity to safely enjoy the aquatic resources, regulated to the extent that: (a) Fish and other aquatic resources are protected and enhanced; (b) Fishing effort does not exceed the capabilities of the resource to sustain desirable, quality fish populations; (c) The social, biological and economic values associated with all sport fishing, competitive and non-competitive, are recognized; (d) A sense of responsibility for the resource is inherent in all who participate and enjoy fishing; (e) User conflicts are minimized; and (f) Aesthetic and cultural values associated with fishing are held in trust for future generations.*

> *NR 1.04 Great Lakes fisheries management. The board endorses a flexible management system for the protection, development, and utilization of the waters and fish populations of the Great Lakes for the maximum public benefit. (1) Management of the Great Lakes is of intrastate, interstate, federal and international interest; therefore, cooperation with management agencies shall be sought in developing management objectives and measures for fish stocks of common concern. (2) The Great Lakes fisheries are to be considered part of a diverse community. The department shall promote efforts to maintain and enhance the quality of this community and its environment. (3) Management of the fishery resources shall be based on a sound understanding of the dynamics of interacting fish stocks. The department shall conduct research and resource base inventories and collect harvest and utilization statistics on which to base sound management decisions. (4) The fishery resources of the Great Lakes, though renewable, experience dynamic changes and are limited. The resources will be managed in accordance with sound management principles to attain optimum sustainable utilization. Management measures may include but are not limited to seasons, bag and harvest limits, limitations on the type and amount of fishing gear, limitation as to participation in the fisheries and allocation of allowable harvest among various users and the establishment of restricted areas.*

The Department has made additional commitments through the *Joint Strategic Plan for Management of Great Lakes Fisheries* (SGLFMP)[2]. This basin-wide management agreement was developed with assistance from the Great Lakes Fishery Commission. Wisconsin is a signatory to SGLFMP along with the seven other Great Lakes states, the Chippewa-Ottawa Treaty Fishery Management Authority[3], the Great Lakes Indian Fish and Wildlife

[2] Great Lakes Fishery Commission. 1997. A Joint Strategic Plan for Management of Great Lakes Fisheries.
[3] COTFMA has been re-constituted as CORA, the Chippewa-Ottawa Resource Authority, which is expected to become a signatory to the Joint Strategic Plan.

Commission, the U.S. Fish and Wildlife Service, the U.S. Geological Survey, the Ontario Ministry of Natural Resources, and the Canada Department of Fisheries and Oceans. As a signatory, Wisconsin has agreed to a set of procedures for coordinating activities and resolving conflicts. Through SGLFMP, the Department accepts the following common goal for Great Lakes fishery agencies:

> *To secure fish communities, based on foundations of stable self-sustaining stocks supplemented by judicious plantings of hatchery-reared fish, and provide from these communities an optimum contribution of fish, fishing opportunities and associated benefits to meet needs identified by society for wholesome food, recreation, employment and income, and a healthy human environment.*

Pursuant to the Joint Strategic Plan, the Department works with the Michigan DNR, the Indiana DNR, the Illinois DNR, and the Chippewa-Ottawa Resource Authority to address issues of common concern on Lake Michigan. Lakewide fisheries management policies are developed by those five agencies through the Lake Michigan Committee. The LMC has adopted a set of Fish Community Objectives[4] to guide all five agencies in the management of Lake Michigan fisheries.

Finally, planning for work on Lake Michigan is conducted within the framework of *A Fisheries, Wildlife, and Habitat Management Plan for Wisconsin*[5], which describes how the Department will implement its mission and its strategic plan in the programs that work with fish, wildlife, and their habitants.

External Partners

Although the Department retains management authority within Wisconsin waters of the Great Lakes, fisheries management is conducted in partnership with others, as reflected in SGLFMP. We also rely on the advice, cooperation, and assistance of the citizens of Wisconsin. In addition, our partners include the three other states bordering Lake Michigan, the Chippewa-Ottawa Resource Authority, the U.S. Fish and Wildlife Service (Green Bay Fisheries Resources Office), the US Geological Survey (Great Lakes Science Center), and the Great Lakes Fishery Commission. Among the international agreements and federal statutes that define the roles of other governments and agencies are the following:

The Convention on Great Lakes Fisheries, between the United States and Canada, established the Great Lakes Fishery Commission in 1954 with two major responsibilities: 1) To develop coordinated programs of research in the Great Lakes and, on the basis of the findings, recommend measures which will permit the maximum sustained productivity of stocks of fish of common concern; and 2) To formulate and implement a program to eradicate or minimize sea lamprey populations in the Great Lakes.

The Great Lakes Water Quality Agreement of 1972, amended in 1987, between the United States and Canada sets out objectives, programs, powers and responsibilities to restore and maintain the chemical, biological, and physical integrity of the Great Lakes ecosystem. Programs currently being developed under authority of this agreement include Lakewide Management Plans (LaMPs) and Remedial Action Plans (RAPs), including surveillance and monitoring activities and development of ecosystem health indicators for the Great Lakes.

The Great Lakes Fish and Wildlife Restoration Act of 1990 enhances the role of the U.S. Fish and Wildlife Service in the Great Lakes by establishing Fishery Resource Offices "to provide assistance to the Great Lakes Fishery Commission, the States, Indian Tribes, and other interested entities . . . " and by requiring a "comprehensive study of the status, and the assessment, management, and restoration needs, of the fishery resources of the Great Lakes Basin."

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[4] Eshenroder, R.L., M.E. Holey, T.K. Gorenflo, and R.D. Clark, Jr. 1995. Fish Community Objectives for Lake Michigan. Great Lakes Fish. Comm. Spec. Pub 95-3. 56 pp.
[5] http://www.dnr.state.wi.us/org/water/fhp/fish/management/fwhplan.htm

We cultivate partnerships with the public. Department biologists and technicians interact with the general public, fishing clubs, and commercial fishing groups. Fishing clubs and individual commercial fishers have actively supported Department activities in a variety of ways. Three statutorily defined groups, the Wisconsin Conservation Congress, the Lake Michigan Commercial Fishing Board, and the Lake Superior Commercial Fishing Board, provide advice to the Department regarding Lake Michigan Fisheries. Finally, we have established the Lake Michigan Fisheries Forum, composed of sport fishers, commercial fishers, scientists, and others to attempt to develop consensus recommendations reflecting the interests of all interested parties.

Base Program

Most of the fisheries work conducted on Lake Michigan is recurring work to maintain essential data bases, monitor trends in fish populations and in harvests, and propagate salmon and trout. Here the base program is summarized in terms of permanent staffing, fish propagation costs (including facility maintenance, rearing, and stocking), and base field work. That program consumes most of the available resources. Additional work can only be accomplished with limited available Department funding, through external grants, or by partners.

Staffing. The base program includes activities of permanent field biologists and hatchery personnel described in the following table. Funding for permanent salaries comes mostly from license revenues, with a smaller amount from salmon stamp revenues. Permanent staff conduct specific funded projects, but also have other

Permanent staff involved in the Lake Michigan fisheries program. Some positions are vacant, and one position may be eliminated as part of statewide staffing reductions. Asterisks denote individuals who whose time is only partly devoted to Lake Michigan fisheries work.

Region	Location	Staff
Central Office	Madison	Great Lakes Fisheries Specialist
	Madison	Fish Health Specialist*
	Madison	Fish Contaminant and Toxicology Program Coordinator*
Northeast Region	Peshtigo	Green Bay Fisheries Supervisor*, two biologists*, two technicians*.
	Green Bay	NER Fisheries Expert*, one biologist*, one technician*
	Sturgeon Bay	Lake Michigan NER Fisheries Supervisor*, one biologist, five technicians (one of which is to be filled as a boat captain and may be moved to SER as a boat captain), one commercial fisheries program assistant
	Mishicot	one biologist*, one technician*
	Wild Rose SFH	one supervisor*, three technicians*
	other NER hatcheries	one supervisor*, one technician*
	Besadny Anadromous Fisheries Facility	one technician
Southeast Region	Plymouth	one biologist
	Milwaukee	Lake Michigan SER Fisheries Supervisor, SER Fisheries Expert*, one biologist, three technicians
	Kettle Moraine SFH	one supervisor, four technicians
Northern Region	Bayfield SFH	one supervisor*, three technicians*
Southern Region	Lake Mills SFH	one supervisor*
	Nevin SFH	one supervisor*, one technician*

responsibilities, including meeting with sport and commercial fishing groups, responding to questions and concerns raised by the public, and providing assistance to research scientists conducting studies related to our program. The work of the staff listed here is complemented and supported by Department staff from a variety of programs including Law Enforcement, Watershed Management, and Legal Services.

Base fish production costs. Most of the cost of fisheries management in Lake Michigan is directly related to maintenance of fish production facilities and the propagation and stocking of salmon and trout. Each year approximately $1.2 million dollars is spent on this work. That cost is split roughly equally between license revenues and Salmon Stamp revenues. Further detail is provided in the biennial Salmon Stamp report[6].

Base fisheries management work. Every two years, biennial work plans are developed for field projects and related activities. Specific defined projects are selected for funding by fishing license revenues, Salmon Stamp revenues, or (occasionally) federal grants.

Base fisheries management projects. These projects form the core work of the Lake Michigan fisheries program for the term of the Plan. Funding will be withheld only if a) unavailable or b) needed for urgent short-term projects.

Project	Base-level annual funding, by source		
	Fish and Wildlife Account[7]	Salmon Stamp	other
Maintain two assessment boats, the Perca and the Barney Devine	$10,000	$10,000	
Steelhead broodstock management at Besadny Anadromous Fisheries Facility (BAFF)	0	$10,000	0
Brown trout broodstock management	0	0	0
Coho and chinook broodstock management at Strawberry Creek and BAFF	0	$20,000	0
Assess Green Bay yellow perch population	$23,000	0	0
Assess Green Bay walleye fishery	$5,000	0	0
Lake trout restoration and management	0	$20,000	0
Green Bay creel survey data collection	$32,000	0	0
Spotted muskellunge restoration in Green Bay	$7,000	0	0
Collection and analysis of commercial catch statistics	0	0	$13,000[8]
Determination of commercial harvest limits	$6,000	0	0
Yellow perch commercial catch monitoring	$9,000	0	0
Lake Michigan and Green Bay creel survey data analysis	0	$16,000	0
Salmon and trout brood stock management at the Root River Steelhead Facility	0	$25,000	0
Assess yellow perch population in Lake Michigan	$14,000	0	0
Cool-water fishes restoration in the Milwaukee River	$8,000	0	0
Lake Michigan creel survey data collection	0	$106,000	0
Assess yellow perch recruitment in Lake Michigan	$8,000	0	0
Salmon Stamp expenditure report and stamp printing	0	$6,000	0
TOTAL	$122,000	$213,000	$13,000

During the term of this Plan, most fisheries work not directly related to propagating salmon and trout will fall within the base projects listed here. These are the needed recurring activities that form the core of our program. Annual funding shown for these projects will cover limited-term employees and supplies needed for each project, but not salaries and office/travel/administrative costs that support the permanent staff.

[6] Wisconsin Department of Natural Resources. 2002. Expenditures of Great Lakes Salmon and Trout Stamp Revenues, 2000-2003. Administrative Report No. 51. Bureau of Fisheries Management and Habitat Protection.
[7] The Fish and Wildlife Account receives income from a variety of fees, including sport fishing license fees and commercial license fees.
[8] Federal funds available through the Inter-jurisdictional Fisheries Act

Short term projects. In addition to the base program described above, a few additional short-term projects may be conducted with budgeted Department funds and/or contributions from external partners. This plan includes many ideas for such projects. In the recent past, short term projects have included an effort to restore a near-shore rainbow trout fishery in Lake Michigan, habitat improvements in the Oconto River, and a comparison of coho salmon stocked as yearlings and fingerlings.

Summary

The Plan is presented in outline format, moving from broad goals to specific tactics. Within each of four goals, objectives are listed. For each objective, one or more problems are identified, and for each problem, one or more tactics are suggested. The tactics are too numerous to summarize here, but the following paragraphs capture the main features of the Plan.

Ecosystem. The first goal is a diverse, balanced, healthy ecosystem. The tactics pertain to habitat protection, native species restoration, and nuisance species prevention and control. Habitat issues for walleye, smallmouth bass, and northern pike are highlighted. We emphasize the effects of land use practices on aquatic habitats. Native species of concern include *Diporeia*, lake trout, walleye, lake sturgeon, Great Lakes spotted musky, and yellow perch. Several recommendations of the Lake Michigan Fisheries Forum pertaining to yellow perch restoration in Green Bay are adopted here. Our discussion of nuisance species includes one native species, the cormorant, as well as several non-native species. Inter-jurisdictional cooperation is essential to slowing the flow of exotic species into the Great Lakes.

Sport Fishing. The second goal is a diverse multi-species sport fishery. We highlight the importance of sustaining a salmon and trout stocking program (matched to the abundance of forage species) and of taking steps to enhance near-shore and tributary fishing opportunities. Our information needs are emphasized in discussions of the importance of sustaining creel surveys, sustaining fish health monitoring, further developing the inter-jurisdictional Lakewide Assessment Plan for key predators (lake trout, burbot, and chinook salmon), and improving lakewide forage assessments. Poor and erratic runs of coho salmon and steelhead continue to trouble us, so we propose to initiate a systematic approach to identifying controllable factors that influence returns of stocked fish to spawning weirs. The salmon and trout fishery in Lake Michigan depends on a crumbling statewide hatchery system, so we emphasize the need for substantial renovations, especially at the Wild Rose State Fish Hatchery.

Commercial Fishing. The third goal is a stable commercial fishery. Because the regulation of harvests is our primary tool for protecting and enhancing the five commercial species (yellow perch, bloater chubs, lake whitefish, rainbow smelt, and round whitefish) the Plan emphasizes improving population assessments and models. It also calls for automating the setting of harvest limits by linking them explicitly to objective measures of population abundance. A major objective of the new plan is to implement the recommendations of the Commercial Fishing Task Force.

Science-based Management. The final goal is science-based management of Lake Michigan fisheries. This goal addresses a number of issues related to our ability to implement this Plan. The tactics include supporting continuing education for field biologists, hatchery personnel, and wardens; exploiting external funding opportunities; working with counterparts in Michigan, Indiana, and Illinois; developing partnerships with other agencies and with sport and commercial fishing groups; communicating findings and policies to the public; and encouraging research by others that would help achieve our management goals.

GOAL I. A diverse, balanced, healthy ecosystem

This means an ecosystem that sustains desired sport and commercial fishing activity, but also contains as much of the natural variety of species and strains as possible and that is resistant to dramatic changes in species abundance. The ecosystem management tools available to fisheries management are limited, so we focus in this section of the Plan on enhancing fish habitat, protecting native fish species, and dealing with non-indigenous species.

Objective A. Protect, maintain, and enhance habitat for game and non-game fish species.

Although manipulation of fish populations is possible by a variety of techniques (e.g. fish stocking, regulation of harvest), ultimately an abundant, diverse, and stable fish community depends on the availability of suitable habitat for the desired species. By the broadest definition, suitable habitat includes those physical, chemical, and biological factors that are needed to satisfy the essential requirements of a species, allowing it to survive in an aquatic environment.

Human activity has altered fish habitats by filling or dredging wetlands and littoral areas, constructing solid piers, diverting and increasing runoff, decreasing base flow and changing drainage patterns in watersheds, releasing contaminants into the air and water, increasing nutrient loading, and releasing chemical pollutants. We must seek to protect undisturbed habitat, maintain functioning habitat, and, if possible, improve or create habitat beneficial to both game and non-game species.

Problem 1. Walleye, smallmouth bass, and northern pike spawning habitats are degraded or destroyed.

Urbanization and industrialization of the lower reaches of many major Lake Michigan tributaries have resulted in extensive filling of wetlands. Also, fills behind established bulkhead lines (bulkhead lines are legally established shorelines, see Problem 6, below) reduce shallow water habitat. Mitigating these losses with rock rip-rap appears to be one method of increasing walleye natural reproduction.

Ditches on the west shore of Green Bay are very important northern pike spawning and nursery areas and are used increasingly by adult walleyes with unknown success. These ditches vary substantially in their quality as spawning and nursery habitat. We can improve this habitat. Major west-shore tributaries also have substantial walleye spawning runs but appear to have limited reproductive success, for reasons that are poorly understood. Possible causes are interference by large sucker runs and/or de-watering of spawning areas because of hydro-electric operations or base-flow fluctuations. In addressing this problem we will work with Department programs for Law Enforcement and Water Regulations and Zoning.

Tactic a) Continue evaluating enhanced walleye spawning habitat in the Fox River.

Tactic b) Restore/enhance walleye spawning habitat in other areas of the Fox River and lower Green Bay.

Tactic c) Evaluate the feasibility of enhancing walleye and northern pike spawning habitat in the Menomonee and Milwaukee Rivers.

Tactic d) Determine factors limiting walleye reproduction in major Green Bay west-shore rivers, and develop strategies to improve reproduction.

Tactic e) Inventory northern pike spawning habitat in Green Bay.

Tactic f) Assess enhancement methods for northern pike spawning and nursery habitat.

Tactic g) Work with highway departments to enhance northern pike habitat in roadside ditches along the west shore of Green Bay.

Problem 2. Structures and lake-bed modifications degrade fish habitat.

Construction of private solid piers, especially along the Green Bay shore of Door County, and the dredging often associated with these structures have degraded and/or destroyed spawning and nursery habitat for smallmouth bass, forage fish, and invertebrates. Requests for such private structures have increased in part because public mooring facilities are limited in some areas.

Tactic a) Work with shore property owners to find alternatives to solid piers and dredging and develop a program for removal of deteriorating solid piers.

Tactic b) Encourage creation and expansion of facilities for public mooring of boats.

Tactic c) Support enforcement action on violations resulting in fish habitat degradation.

Problem 3. Land use practices can lead to non-point source pollution affecting fish in our tributaries and estuaries.

While most people are familiar with the dramatic effects of point source pollution (e.g., direct discharge of untreated waste water into a stream or lake and resultant fish mortality), non-point source pollution has been largely overlooked in the past because it is not as conspicuous in its effects. Non-point source pollution can be the result of industrial or manufacturing processes, but also develops from land use practices related to construction, road-ditch maintenance, agriculture, and other activities. Improper land use can result in increased sediment, nutrient, organic-chemical and heavy-metal loadings to streams, while creating abnormal flow rates. All have negative effects on aquatic communities by destroying habitat, increasing turbidity, lowering dissolved oxygen levels, disrupting food webs, decreasing diversity, raising stream temperatures, altering stream flow, and increasing the abundance of undesirable species.

The Department's Runoff Management Program[9] addresses these issues. The application of watershed best management practices can help fish populations[10], but single guidance document describing watershed best management practices from a fisheries perspective is not now available.

Federal participation in non-point pollution control efforts includes assistance in implementing Remedial Action Plans and development of a Lake Michigan Lakewide Management Plan (LaMP). Additionally, the Environmental Protection

[9] www.dnr.state.wi.us/org/water/wm/nps

[10] Wang, L., J. Lyons, P. Kanehl. 2002. Effects of watershed best management practices on habitat and fish in Wisconsin streams. Journal of the American Water Resources Association. 38(3): 663-680.

Agency and the National Oceanic and Atmospheric Administration work with Wisconsin to develop a Coastal Non-point Pollution Control Program. The Conservation Reserve Program (CRP) and Conservation Reserve Enhancement Program (CREP) administered by DATCP, Stewardship Streambank Protection programs administered by the Department, and the riparian buffers program administered by county soil and water conservation departments are available to help reduce agricultural-related non-point pollution of tributaries.

Tactic a) Support efforts to help educate the public about effects of land use practices on water quality.

Tactic b) Develop specific land acquisition and protection goals related to fisheries habitat needs, for implementation by the Stewardship Program.

Tactic c) Provide information to external agencies and to the Department's Runoff Management Program to support programs that protect water quality and provide a diversity of habitats for fish.

Tactic d) Encourage use of buffer strips by educating riparian landowners about programs like CRP and CREP.

Tactic e) Support Department Law Enforcement and environmental regulatory staff in enforcement actions for violation of laws relating to water pollution, storm water runoff and water and shoreline protection

Tactic f) Encourage highway departments to take steps to reduce sediment runoff resulting from roadside ditch maintenance.

Problem 4. Stream classifications may limit our ability to enhance natural reproduction by salmon and trout in tributary streams.

The Administrative Code classifies surface waters to reflect the aquatic communities they can support. Currently, waters are classified as "cold water", "warm water sport fish", "warm water forage fish", "limited forage fish" or "limited aquatic life", depending on what lives there. Those classifications in turn guide the Department in issuing WPDES permits for discharges of heated water and organic material. The most protective classification is "cold water", a designation that can be applied only to streams that support trout populations. Most Lake Michigan tributaries do not have this designation, although salmon and trout use the streams seasonally. The classifications are under review. One proposal is to create a new "seasonal use" classification to reflect the seasonal use of our streams by anadromous trout and salmon species. Some Lake Michigan tributaries have been degraded by past industrial, forestry, or agricultural practices cannot be classified "cold water" based on their present fish communities, but if adequately protected might in time be capable of earning that classification. Others may support very limited reproduction by trout and/or salmon, which might expand if water quality is adequately protected.

Tactic a) Work with Department staff in the Watershed Management program and with the interested public to achieve the most protective possible classifications of Lake Michigan tributaries.

Problem 5. Aquatic plant control may affect fish populations

Aquatic plant communities provide essential habitat for fish, but when found in high abundance aquatic plant communities composed of rooted macrophytes and algae are viewed as nuisances by some lake shore property owners. Under these

circumstances individuals or property owner associations will attempt to reduce aquatic plant abundance along their shorelines using a variety of control techniques. These control methods can be classified into three categories; physical, chemical and biological. The impacts that aquatic plant control has on fish communities vary with the type of fish community present and the extent of the control measures. Chemicals may directly affect fish, and plant control measures will affect fish habitat. Optimal amounts of vegetation are critical for successful breeding, rearing, and growth of fish throughout their life. However, optimal habitat and plant densities vary between fish species. Also, particular species of plants afford better habitat than do others.

In Wisconsin physical controls (pulling, bottom covers, dredging, raking) and chemical controls (herbicides) are generally used. Under new rules, only limited plant removal may be conducted without a permit. Permits for chemical treatment and physical removal of aquatic plants are handled by the Department's Aquatic Plant Management Program[11,12]. Through the Department's Sensitive Areas Designation Program, certain aquatic plant communities are afforded special protection.

Tactic a) Work with the Aquatic Plant Management Program, municipalities, and others involved in aquatic plant control efforts to assure compatibility of control methods with fisheries needs.

Tactic b) Provide information to support implementation of rules regarding aquatic plant control.

Tactic c) Provide information to support protection of important aquatic plant habitat through the Sensitive Areas designation program.

Problem 6. Dams and other waterway alterations limit the movement of fish in rivers and can degrade habitat.

Most major Lake Michigan tributaries have been dammed (if the Besadny Fisheries Facility on the Kewaunee River is counted as a dam, all tributaries have been dammed). These dams restrict both upstream and downstream movement of fish. The dams can benefit fisheries by preventing sea lamprey from reaching suitable spawning habitat and limiting upstream migrations of other detrimental species, but they can have major negative effects. They can restrict access of many native species to large areas of spawning and nursery habitat and divide populations into genetically isolated sub-populations. The native species affected can include smallmouth bass, walleye, musky, northern pike, lake whitefish, and lake sturgeon. Blockage of the upstream migration for anadromous fish also limits stream fishing opportunities. These issues are discussed in detail for the Menominee River in the Menominee River Fisheries Plan[13]. Hydroelectric dams are operated under licenses granted by the Federal Energy Regulatory Commission (FERC). When a license expires, FERC has the opportunity to deny re-licensing or to require the construction of fish ladders or other structures to allow safe passage of fish. Department biologists provide expert advice to FERC during the re-licensing process. Alterations of waterways for other purposes are regulated by the Department

[11] WDNR. Wisconsin's Aquatic Plant Management and Protection Program. Publication WR-448-96.
[12] See Administrative Code sections NR 107 and NR 109.
[13] Wisconsin Department of Natural Resources and Michigan Department of Natural Resources. 1992. Menominee River Fisheries Plan. 48 pp.

through the Bureau of Water Regulation and Zoning. Some old dams do not stop the upstream passage of anadromous fish, but angling for those fish is regulated by inland rules that include a closed winter season.

Tactic a) Continue to advise the Federal Energy Regulatory Commission during re-licensing of dams.

Tactic b) Encourage the removal of obsolete and other selected dams and look for methods for passing sturgeon and other migratory species around other dams.

Tactic c) Continue to advise Water Regulations and Zoning staff and local zoning agencies about fishery impacts from waterway alterations.

Tactic d) Restore instream habitat after dam removal.

Problem 7. Filling behind bulkhead lines and related shoreline development sometimes destroys fish habitat.

Valuable fish habitats, including some of the last remaining wetlands on Lake Michigan, lie behind bulkhead lines. Bulkhead lines are established by municipalities (township, city, or village) with approval by the Department. Currently, bulkhead lines must conform as nearly as possible to the existing shoreline. However, past approvals established lines that were significant distances from the natural shoreline. The law allows property owners to build structures or place fill in the waterway out to a bulkhead line without further permits from the Department, although it does not remove the responsibility to obtain federal permits.

Most municipalities do not have long range land usage plans to regulate the activities that may occur along a shoreline. In practice this means that once a bulkhead line is established a riparian land owner can conduct projects behind the line that would not be allowed if the bulkhead line did not exist. While one property owner may choose not to develop the shoreline, when ownership changes, the next may choose to fill out to the bulkhead line and in the process destroy valuable habitat.

Even in shoreline areas, especially in Green Bay, where there are no bulkhead lines established, private riparian land owners are placing structures and fill on public lakebed for private use. In the process fish habitat is being degraded or completely buried.

Tactic a) Work with local municipalities to remove bulkhead lines by ordinance where appropriate.

Tactic b) Determine the value of habitats landward of bulkhead lines and, where appropriate recommend protection measures.

Tactic c) Work closely with Water Regulation and Zoning staff and local zoning agencies to minimize any additional loss of near-shore habitat.

Tactic d) Support Department Law Enforcement and the Water Regulation and Zoning staff in enforcement actions for violations of water and shoreline protection laws.

Objective B. Protect and restore native species.

Human activities in the Lake Michigan basin, through water quality degradation, habitat modification, intentional and unintentional introduction of non-indigenous species, and sport

and commercial fishing, have had profound effects on native fish populations. The Lake Michigan system as a whole has been sufficiently altered that it is not feasible to completely restore the pre-settlement native fish community. However, rehabilitation of populations of some native species could promote diversity and stability within the ecosystem, while also, in some cases, providing additional sport or commercial opportunities.

Problem 1. Declining abundance of *Diporeia* in some areas on Lake Michigan threatens whitefish fisheries.

Scientists with the Great Lakes Environmental Research Laboratory (GLERL) are monitoring trends in the benthic amphipod *Diporeia*, a species that is an important part of the diet of whitefish and lake trout. The data show that in *Diporeia* have declined dramatically in large areas of Lake Michigan and other lakes, raising concerns for the long-term health of whitefish populations.

Tactic a) Participate in Great Lakes-wide discussions about the problem and provide in-kind support for appropriate studies.

Problem 2. We have not succeeded in reestablishing self-sustaining stocks of lake trout.

Wisconsin and neighboring states began a lakewide program to restore native lake trout in Lake Michigan almost 30 years ago. Through a joint state and federal program, tens of millions of juvenile lake trout stocked over the years have demonstrated good survival and growth. Stocking and protective measures have focused in areas thought to be suitable for reproduction, including the Midlake Reef Refuge where several year classes of sexually mature lake trout can be found during the spawning season, and where preliminary studies by Dr. John Janssen (University of Wisconsin – Milwaukee) have documented that eggs were deposited during the fall of 2001 and 2002. The Department has worked with commercial fishers and the U.S. Fish and Wildlife Service to stock millions of fertile lake trout eggs on Jacksonport Deep Reef. However, assessments so far have captured no confirmed survivors from that egg-stocking project. Aggregations of adult lake trout capable of producing viable eggs and sperm are also found inshore during the fall spawning season at locations along the coast from Door County south to the state border. Fertile eggs and fry have been collected from time to time in other parts of Lake Michigan. However, survival to adulthood of the offspring of stocked lake trout has not been documented in Wisconsin waters. Factors that might limit natural reproduction include contaminants, predation by alewives and other fish, and genetic adaptations.

Tactic a) Continue to assess the performance of different lake trout strains in the Midlake Reef Refuge.

Tactic b) Cooperate with UW-Milwaukee investigators conducting early life history studies in the Midlake Reef Refuge addressing factors limiting natural reproduction.

Tactic c) Work with federal fisheries staff to implement a trawl assessment for fry and juvenile lake trout in the Midlake Refuge.

Tactic d) Work with other management agencies on Lake Michigan to complete revision of the Lake Michigan Lake Trout Management Plan.

Problem 3. Natural walleye recruitment does not sustain acceptable fisheries in some areas of Green Bay and in the Milwaukee River and Harbor.

Green Bay. The objective of walleye rehabilitation efforts in Green Bay and the Milwaukee River is to re-establish self-sustaining populations. We want to sustain walleye populations to provide one component of a diverse sport fish community that also includes northern pike, smallmouth bass, and yellow perch. To quickly establish high-density populations, intensive stocking of walleye was conducted in various areas of Green Bay in the early 1980s. Survival was good and within a few years high-density populations were achieved. During this period the fishing season for walleye remained open and, as abundance increased, exceptionally good catch rates created a nationally recognized sport fishery. Walleye stocking was discontinued in Green Bay in 1984. Natural reproduction has maintained the lower Green Bay population, but, because of insufficient natural reproduction, walleye abundance in other areas, including Sturgeon Bay declined. Stocking was resumed in Sturgeon Bay in 1994.

Tactic a) Conduct periodic investigations assessing natural reproduction.
Tactic b) Employ maintenance stocking in the Sturgeon Bay/Little Sturgeon Bay area and work with private groups, like the Green Bay Sports Fishing Club and Walleyes for Tomorrow, to supplement rearing capability.
Tactic c) Explore other areas of Green Bay for limited walleye fisheries.
Tactic d) Initiate a night creel survey.

Milwaukee River. In an effort to improve the near-shore fishery in the Lower Milwaukee River, fry and fingerlings of native species including walleye, northern pike and smallmouth bass were stocked since the mid 1980s. Fry stocking yielded only marginal results. In the mid 1990s, when the yellow perch population in Lake Michigan declined dramatically, the interest in improving populations of alternate near-shore species grew much stronger in the local fishing community. With the initial financial support from the Lakeridge and Lakeshore sportfishing clubs, the Department in 1995 embarked on a pilot project of raising and stocking 10,000 extended growth walleye annually in the lower Milwaukee River. A detailed plan of walleye population restoration in the lower Milwaukee River and harbor was developed in 1998[14]. The main objective of the program, as in Green Bay, was to re-establish self-sustaining populations. The plan also included marking each fish in order to identify the year of stocking and evaluate their performance of each year class. In addition, a radiotelemetry study was incorporated to examine movement patterns of adult walleye. The growth rate of the stocked walleye has been well above average compared to other walleye populations in the state. Anglers are now targeting walleye, with good seasonal catches documented. Catch-and-release has played a big part of the success of the program. We are conducting annual spring assessments to document if there is any natural spawning in the area. The stocking goal is to continue to stock 10,000 extended growth walleye fingerlings through 2004 and then re-evaluate our 1998 plan for further action.

Tactic e) Continue implementation of the lower Milwaukee River and estuary walleye restoration plan through 2004.
Tactic f) Continue to evaluate and monitor the impact of stocked walleyes on stocked chinook salmon smolts in the Milwaukee River (see Goal 2, Objective C, Problem 3).

[14] WDNR 1998. An assessment of the impact of stocked walleye on stocked salmon in the Milwaukee estuary. Unpublished report available from the Bureau of Fisheries Management and Habitat Protection. 17p.

Tactic g) Assess natural reproduction and estimate population size in the Milwaukee River.

Tactic h) Use extended growth walleye fingerlings, when available, for stocking in the Milwaukee River, following the current plan.

Tactic i) Continue to work with private groups to supplement rearing costs, deploy net pens, and meet other project needs.

Tactic j) Describe walleye movement patterns in the Milwaukee River using radio-telemetry technology.

Problem 4. Lake sturgeon populations are limited

Lake sturgeon are the largest and oldest fish species inhabiting the Great Lakes and historically were one of the most abundant fish species in Lake Michigan. They were particularly abundant in the relatively shallow and productive waters of Green Bay and utilized the many large tributaries of the bay for spawning, including the Fox, Oconto, Peshtigo, Menominee, Cedar, Ford, Escanaba, Whitefish and Sturgeon Rivers. However, through the last century their abundance has drastically declined.

Although commercial exploitation has been stopped and water quality has improved in many areas, we have not seen a strong rebound in the lake sturgeon population of Green Bay or elsewhere in the Great Lakes. Lake sturgeon are currently considered depleted throughout most of their native range. They are presently a species of special concern in Wisconsin, are listed as threatened in Michigan, and are considered a Federal species of concern by Region 3 of the U.S. Fish and Wildlife Service. In 2003 the Lake Michigan Committee established a Lake Sturgeon Task Force to develop a lakewide lake sturgeon restoration plan.

The largest concentration of lake sturgeon in Lake Michigan is in Green Bay. Of the four tributaries to Green Bay that are known to support lake sturgeon, the Menominee River supports the largest population. In addition to the Menominee River, the Peshtigo, Oconto, and Fox rivers also support lake sturgeon populations below the first dam, and these fish have free access to Green Bay. While the number of lake sturgeon using these once highly-polluted rivers has increased with the improved water quality of recent years, numbers are still relatively small. In spite of limited spawning habitat in these rivers there is some natural reproduction. Two Lake Michigan tributaries, the Manitowoc and Milwaukee Rivers do not now support remnant sturgeon populations, but offer suitable habitat for sturgeon reproduction. The stocking of early life stages of sturgeon was initiated in those rivers in May of 2003.

The goals of lake sturgeon management in Green Bay and Lake Michigan are to 1) enhance existing naturally reproducing populations, 2) reestablish self sustaining naturally reproducing lake sturgeon populations throughout their historic range and, 3) develop harvestable surpluses through natural reproduction and provide appropriate opportunities for sport harvest. These goals are consistent with and derived from sturgeon management plans developed in Wisconsin and elsewhere[15,16].

[15] Thuemler, T.F., E.A. Baker, and R.F. Elliott. 1999. Draft lake sturgeon plan for the Green Bay basin. Wisconsin DNR, Michigan DNR, and USFWS.

[16] Wisconsin Department of Natural Resources. 2000. Wisconsin's Lake Sturgeon Management Plan. Bureau of Fisheries Management and Habitat Protection. Madison, WI. 12 pp.

Tactic a) Implement Green Bay, statewide, and lakewide sturgeon management plans.

Tactic b) Initiate lake sturgeon rehabilitation efforts in suitable Lake Michigan and Green Bay tributaries, including habitat enhancement and stocking.

Tactic c) Coordinate sturgeon rehabilitation work with federal, state and university partners.

Problem 5. Great Lakes spotted musky are not fully restored in Green Bay

Great Lakes strain spotted musky once inhabited Green Bay and Lake Michigan. Records indicate 3,000 pounds were harvested in 1884. There appear to have been remnant populations at least into the 1930s. Re-establishment of a musky population would complement other top predators, add stability to the fish community, and provide additional fishing opportunities. The restoration program involves establishing one or more brood lakes where artificially-propagated offspring from well-established populations (we have used the population in Lake St. Clair) can be stocked, grow to maturity, and provide offspring for rearing and stocking in Green Bay. Long Lake, Waushara County, has been used as the brood lake for the program so far, but one or more new brood lakes are needed.

Tactic a) Import eggs from Lake St. Clair broodstock, or elsewhere.

Tactic b) Work with inland lake groups to establish brood lakes.

Problem 6. Yellow perch recruitment has declined in Green Bay and Lake Michigan.

Green Bay. Yellow perch abundance in Green Bay declined 90% between 1988 and 2000. The estimated total biomass of yellow perch in Green Bay dropped from nearly 10,000,000 pounds in 1988 to less than 1,000,000 pounds in 2000. Estimated natural reproduction has been very low since 1991, except for 1998. In the summer of 2001 and 2002 the 1998 year class comprised most of the sport and commercial harvest. Because of the high level of concern over the diminishing yellow perch population in Green Bay the commercial harvest limit was lowered from 200,000 pounds to 20,000 pounds in 2001, and the daily sportfishing bag limit was lowered from 25 to 10. These regulation changes will stay in effect until 2004 when the rule will have to be reassessed.

Annual assessment of the perch population is critical in understanding the perch population in Green Bay and to run population models. These models require that data be collected in a standardized manner over many years to function properly. Several different sampling strategies are used to monitor the reproduction and recruitment of yellow perch in the Green Bay fishery and to collect data for the model. Fyke nets are used in April to capture spawning adult perch. A high speed Miller sampler is used to collect pelagic young-of-year perch from May through June. Long-term trends in perch populations are monitored with index station shoreline seining for YOY perch from June through July, and by index station trawling for YOY and adult perch in August.

In addition, a creel survey is conducted to estimate sport harvest of yellow perch from both Green Bay and Lake Michigan. The data collected are used in the calculations of harvest limits and seasons.

The Lake Michigan Fisheries Forum conducted three public workshops in 2002 to explore strategies to address the Green Bay yellow perch problem[17]. Among the questions raised and discussed in the workshops was whether predation by walleye, northern pike, and/or muskies might affect the yellow perch population. The following table summarizes the Forum's recommendations and the actions approved by the Lake Michigan Fisheries Team:

Topic	LMFF recommendation	Action
Yellow Perch	• Assessments – Update Perch Population Model. Evaluate sampling methods. Evaluate spatial coverage. • Data review -- Review and consolidate existing assessment data. Create summaries addressing hypotheses developed by the GB Fisheries Research Group (see below).	The LMFT will tackle these recommendations through a cooperative agreement with the Green Bay Fisheries Resources Office of the USFWS.
White Perch	• Allow increased commercial harvest of white perch • Evaluate effectiveness of lampara seine to harvest white perch.	The LMFT established a committee to explore these recommendations.
Research	• Determine the level of predation on yellow perch by white perch, cormorants, walleye, northern pike, and burbot (in priority order). • Measure the abundance of significant predators and determine their impact on perch. • Create multi-agency research group to develop hypotheses and research agenda to address yellow perch issues in Green Bay. • Develop an assessment plan to evaluate the success of management actions taken to benefit Green Bay yellow perch	The research proposed here is beyond the means of available funding, and should be guided by the recommendations of the proposed Green Bay Fisheries Research Group. The LMFT has taken steps to initiate the GB Fisheries Research Group.

Tactic a) Continue assessments and develop a better index of YOY abundance

Tactic b) Pursue Lake Michigan Fisheries Forum recommendations for Green Bay yellow perch management.

Tactic c) Continue to support cooperative research through the Yellow Perch Task Group of the Lake Michigan Technical Committee.

Tactic d) Encourage research into the affects on yellow perch of stocked predators.

Lake Michigan. Yellow perch are an important component of the Lake Michigan fishery and fish community. Beginning early 1990s, yellow perch population density in Lake Michigan declined dramatically and the age structure shifted toward older fish because of an almost complete lack of recruitment. These trends were reflected in assessment data and in commercial and sport harvests.

[17] Moy, P.B., M.E. Holey, and T.P. Mickelson. 2002. "Green Bay yellow perch workshop results and recommendations: A completion report of the Lake Michigan Fisheries Forum". (available from Bureau of Fisheries Management and Habitat Protection, WDNR).

The Yellow Perch Task Group of the Lake Michigan Technical Committee was formed in March 1994 (Francis *et al*. 1996[18]) by the Lake Michigan Committee in response to this dramatic decline in yellow perch numbers in Lake Michigan. The Task Group is composed of fisheries managers and researchers from four states and tribal authorities bordering the lake, as well as invited experts from within and outside the Great Lakes basin.

In December 1994, the Lake Michigan Yellow Perch Conference convened at Kenosha, Wisconsin, by the Lake Michigan Committee with help from the Great Lakes Sportfishing Council, attracted 152 non-agency participants representing 47 sport-fishing organizations and 21 commercial companies. As a result of discussions held in this conference, the Lake Michigan Committee directed the Yellow Perch Task Group to develop a multi-agency research program to identify the likely cause(s) for the lack of perch recruitment[19]**.** Subsequent funding from Sea Grant and others has supported an aggressive research program. Funding provided through the Great Lakes Fish and Wildlife Restoration Act is supporting the development of a statistical catch at age population model covering all of southern Lake Michigan. In addition to supporting the coordinated research effort, management agencies around the lake modified commercial and sport regulations to limit harvests.

Tactic e) Continue young-of-the-year (YOY) beach seining assessments and investigate and develop an alternate index of YOY abundance.

Tactic f) Continue to conduct winter graded mesh assessment and spawning assessment annually to monitor yellow perch population status in Lake Michigan.

Tactic g) Continue to support cooperative research through the Yellow Perch Task Group.

Tactic h) Develop criteria for changing harvest limits, in cooperation with Michigan, Indian, and Illinois Departments of Natural Resources.

Tactic i) Continue to support and develop a southern Lake Michigan yellow perch population model.

Problem 7. Alewives, at high population levels, may affect native species.

High alewife population levels may have had a negative impact on many native fish populations, including deepwater sculpins, bloater chubs, and yellow perch. Their mode of impact may have included direct predation on early life stages of other species as well as competition for food. A salmon or trout diet made up primarily of alewives is associated with Early Mortality Syndrome, a condition marked by thiamine deficiency in newly-hatched fish. Although alewife population levels are currently relatively low, if left unchecked they could well return to previous high levels. To date the most effective alewife control mechanism found has been the stocking of Pacific salmon. If possible, we would like to sustain alewives at abundances sufficient to support the salmon and trout populations but low enough to allow rehabilitation of native species.

[18] Francis, J.T., S.R. Robillard, and J.E. Marsden. 1996. Yellow perch management in Lake Michigan: a multi-jurisdictional challenge. Fisheries 21(2):18-20.

[19] Makauskas, D. and D. Clapp. 2001. Status of yellow perch in Lake Michigan and Yellow Perch Task Group progress report. 21p.

Tactic a) Continue judicious (see discussion under Goal 2, Objective A, Problem 2) stocking of salmon and trout.

Tactic b) Continue to participate with other agencies in lakewide acoustical forage assessments.

Problem 8. We are unsure of the impact of stocked predators on the Green Bay food web.

Public comments to drafts of this plan included a number of questions about the impact of stocking on the native fish community.

Tactic a) Encourage research into the impacts of stocked fish, including walleye, musky, Pacific salmon, rainbow trout and brown trout, on the Green Bay food web.

Objective C. Develop and evaluate strategies that deal with nuisance species (native and exotic)

Many of the species present in Lake Michigan are non-indigenous. Most were the unintentional result of human activities while some were intentionally stocked. New invasions continue. Some of these non-indigenous species, such as sea lamprey, alewives, and zebra mussels have had undesirable impacts on the ecosystem. Prevention of further invasions is the best protection for the lake ecosystem. Although sea lamprey have been reduced through a federally coordinated program and alewives have been reduced through the stocking of salmon and trout, very few effective control methods are available once non-indigenous species are established.

Problem 1. A number of resident species, native and exotic, are of immediate concern (cormorants, white perch, round gobies, zebra mussels), although their impacts are not well understood.

Cormorant populations have increased and their impact on fish populations is poorly documented and understood. Historically, cormorant populations on the Great Lakes have fluctuated dramatically. Current Great Lakes populations are believed to be the result of range expansion from the Great Plains population. Not documented to be nesting on the Great Lakes until they first appeared on the west end of Lake Superior in 1913, cormorants expanded east across the Great Lakes and by 1945 were nesting on the St. Lawrence River below Lake Ontario. After colonization of the Great Lakes cormorant populations crashed throughout the basin as a result of nesting failures linked to toxic chemicals (primarily DDT/DDE and PCBs). With the advent of restrictions on the production and use of the toxic chemicals, cormorant populations increased exponentially across the Great Lakes basin. Cormorant diets are made up almost exclusively of fish, with each bird eating about one pound of fish per day.

Cormorants are protected and managed by the USFWS under the authority of the Migratory Bird Treaty Act. To address the increasing level of public concern regarding cormorants, the USFWS is in the process of developing a national management plan for cormorants. The Department has participated at all stages of this process and has submitted comments in response to the general scoping meetings and public hearings for the draft EIS. The USFWS is now in the process of preparing the final EIS and national cormorant management plan.

White perch were first found in Green Bay trawl surveys in 1993, and since that time the species has become well established in southern Green Bay waters. White perch is an exotic species that most likely entered the Green Bay system from Lake Erie. White perch are becoming an increasing problem for both commercial and sport fishers. Commercial fishers can spend hours picking white perch out of their yellow perch gill net sets and sport harvesters are catching them in greater numbers. The white perch is a highly desirable species on the east coast and in Ohio and Ontario, Canada, with both active sport and commercial harvests. Until recently, high PCB concentrations in white perch from Green Bay limited commercial exploitation. The recent finding that, in 2001 and 2002, PCB concentrations were in most cases low enough to meet Food and Drug Administration standards for sale in commercial markets, may lead to increased commercial sales. Very little is known about the impacts that white perch are having on other native species in the Green Bay system. Many people believe that white perch are the cause of the yellow perch decline in Green Bay, but that conclusion is not supported by the available data.

Through the efforts of the Great Lakes Fishery Commission sea lamprey have been effectively controlled in Lake Michigan. The Department collects data on lamprey wounding of lake trout and other species from its own fisheries assessments and from reports submitted by charter captains. Those data contribute to a broader program of monitoring lamprey abundance. There has been an apparent increase in lamprey attacks in recent years, but a planned TFM treatment of the Manistique River may resolve that problem.

Tactic a) Encourage USFWS to adopt a management plan which would include regional population management of cormorants.

Tactic b) Once a final EIS and national cormorant management plan has been developed and published, work within established guidelines to manage cormorant populations of concern.

Tactic c) Cooperate with a UWM study of the impacts of gobies on smallmouth bass in Sturgeon Bay.

Tactic d) Support Green Bay Fisheries Research Group recommendations on white perch.

Tactic e) Continue to support sea lamprey control efforts by providing survey data and advocating continued federal support.

Tactic f) Implement a program to increase public awareness of the risks associated with aquatic invasive species.

Problem 2. New exotic species continue to arrive via ballast water and others may be introduced from the Mississippi drainage through the Chicago Sanitary and Ship Canal.

About 160 species of exotic fish, crustaceans, molluscs, algae, and micro-organisms have been introduced into the Great Lakes in the ballast of ocean going vessels since the opening of the St. Lawrence Seaway. These include zebra mussels, spiny water fleas, and gobies. It has been estimated that almost 800,000 tons of untreated ballast water are legally discharged into the Great Lakes each year. This ongoing biological pollution is one of the most significant long-term threats to Great Lakes sport and commercial fisheries and the ecosystems that support them. The primary obstacles

to solving the problem are fragmented legal authority to regulate the discharge and the lack of effective ballast treatment technologies[20].

Presently four species of Asian carp are making their way up the Illinois River toward the Chicago Sanitary and Ship Canal, which will give them access to Lake Michigan. An electricity barrier has been installed in the canal to inhibit movement of fish both upstream and down stream, and recently a backup generator was installed. Discussions are underway about finding a way to fund and install a second electricity barrier, or to find another solution to the problem.

Tactic a) Support the creation of a single bi-national (U.S. and Canada) legal authority to establish ballast water discharge standards that are enforceable.

Tactic b) Support efforts to block the passage of exotic species into Lake Michigan via the Chicago Sanitary and Ship Canal.

Problem 3. Exotic species move from the Great Lakes to inland waters.

Exotic species in the Great Lakes spread into inland waters with deleterious effects on inland ecosystems and game fish populations. Examples are zebra mussels which are now found in inland waters including the Lake Winnebago system and Cedar Lake (Manitowoc County). With the mobility of modern society and boaters and sport fishers traveling between bodies of water, there is increased possibility of unintentional introduction of these non-indigenous species into inland waters.

Tactic a) Educate boaters and fishers using the waters of Lake Michigan, Bay of Green Bay and tributary streams on proper cleaning /disinfecting of boats, trailers and live wells to prevent transfer of exotics to inland waters.

Tactic b) Support new rules restricting the transportation of live suckers from Lake Michigan tributary streams.

Tactic c) Explore development of appropriate rules limiting the transport of live fish by anglers.

Tactic d) Coordinate outreach activities with Sea Grant and the new state invasive species program.

[20] Horns, W.H. 2002. Let's put someone in charge of this – a proposal to create a Great Lakes Ballast Water Commission. J. Great Lakes Res. 28(2):117-118.

GOAL II. A diverse multi-species sport fishery within the productive capacity of the lake

This goal expresses our desire for varied sport fishing opportunities in Lake Michigan, but it also acknowledges the dependence of the sport fishery on the productive capacity of the ecosystem. The diverse sport fishery will include brook, brown, rainbow and lake trout, coho and chinook salmon, walleye, smallmouth bass, northern pike, and yellow perch. It will include fishing opportunities in tributaries, from shore and piers, and on the open lake.

Objective A. Sustain a salmon and trout species mix within ecosystem capacity, that supports sport harvests within target ranges.

Sport harvest targets are listed below for the six salmon and trout species currently stocked in Lake Michigan. Harvests of salmon and trout during the last ten years were usually within acceptable ranges. The chinook salmon fishery has recovered from the low levels experienced during the early 1990s, and the lake trout harvest has remained within limitations required by the current Lakewide Management Plan for Lake Trout Rehabilitation in Lake Michigan[21]. The ten-year range was used to define targets for the next five years. This mix of six salmon and trout species provides variety in anglers' catch and fishing opportunities throughout the fishing season.

We will continue to sustain this fishery through a stocking program similar to that employed in recent years. The distribution of stocked salmon and trout other than lake trout along the Wisconsin shoreline has been determined primarily in consideration of catch data, previous stocking patterns, and the distribution of fishery access facilities (i.e., ramps, moorings, piers, shoreline, and streams)[22].

Estimated annual sport harvest of salmon and trout from Wisconsin waters of Lake Michigan during 1992 through 2001 and target ranges for the next five years.

	1992– 2001 harvest average	target range	
		Low	high
brook trout & splake	1,867	1,000	5,000
brown trout	43,141	25,000	65,000
rainbow trout	92,797	70,000	120,000
chinook salmon	138,932	85,000	190,000
coho salmon	81,487	50,000	140,000
lake trout	52,573	30,000	82,000

Problem 1. The number of lake trout available for stocking in Lake Michigan is limited, and the allocation to Wisconsin waters is subject to negotiation with the other states.

Lake trout stocked into Lake Michigan are produced by the USFWS and stocked according to guidelines specified by Lake Michigan Committee. Those guidelines are expressed in the Lakewide Management Plan for Lake Trout Rehabilitation in

[21] Lake Michigan Technical Committee. 1985. A Lakewide Management Plan for Lake Trout Rehabilitation in Lake Michigan. 12 pp.

[22] Krueger, C.C. and T.R. Dehring. 1986. A procedure to allocate the annual stocking of salmonids in the Wisconsin waters of Lake Michigan. Fish Management Report 127, Bureau of Fish Management, Wisconsin Department of Natural Resources. Madison, WI.

Lake Michigan[21] and other documents. A recent Consent Decree[23] between the federal government, the state of Michigan, and several tribes in the state of Michigan calls for increasing lake trout stocking in waters of northern Lake Michigan. This will require either moving fish from previously stocked locations to this new area or increasing the total number of fish reared and stocked, and is therefore subject to agreement by the Lake Michigan Committee.

Tactic a) Work with the Lake Michigan Committee to sustain current stocking levels of lake trout in Wisconsin waters in the revised Lakewide Management Plan for Lake Trout Rehabilitation in Lake Michigan.

Problem 2. The available forage in Lake Michigan can only support a limited predator population.

The salmon and trout program must recognize the limitations of the ecosystem. When salmon and trout stocking began in Lake Michigan in the 1960s, lake trout had been extirpated and burbot were very scarce. Alewife were abundant and provided plentiful forage for stocked salmon and trout. As the numbers of salmon and trout increased through the 1970s and peaked in the 1980s, forage fish populations changed. Alewife levels declined in the 1980s and remained low but stable during the 1990s. Bloater chubs proliferated and became the most abundant planktivore, but then declined substantially during the 1990s. Diet studies in our waters indicated that salmon and trout continued to feed primarily on alewife and make little use of the bloater chubs as forage populations changed. Concern developed that the high level of stocking was more than the reduced alewife populations could support. The chinook catch declined after 1987, an indication the high sport harvests of the mid-1980s could not be sustained. Bioenergetics models indicate that chinook salmon has a greater impact on alewives than any other species. In 1991 chinook salmon stocking in Wisconsin waters was reduced approximately 25% and the commercial harvest of alewife was prohibited to help stabilize the alewife population. The chinook harvest has gradually increased since then. In 1999 all four states agreed to cut annual chinook stocking by an additional 27% (from 6,000,000 to 4,400,000 fish, lakewide) because of signs of another possible crash of the chinook population. The major concern again was excessive stocking of trout and salmon exceeding the available forage, especially alewives.

Agencies on Lake Michigan have sought to monitor forage fish abundance and to understand how many salmon and trout can be safely stocked without depleting forage species. Since 1973 the abundance of the principal forage species has been assessed annually by biologists with the Great Lakes Science Center (USGS) using bottom trawls. In addition, the Department has recently worked with the USGS and other states to implement a cooperative lakewide forage survey using hydro-acoustics and trawling. Bioenergetics models have been used to estimate the amount of forage fish needed to support stocked salmon and trout and the Lake Michigan Technical Committee is working to identify warning signals of over stocking.

Tactic a) Maintain appropriate salmon and trout stocking levels and species mix, guided by lakewide estimates of forage abundance and modeling of forage consumption.

[23] 1836 Great Lakes Treaty Waters Consent Decree.

Tactic b) Support continued efforts to improve models of forage consumption by stocked fish.

Tactic c) Continue to participate with other agencies in lakewide acoustical surveys.

Tactic d) Quantify and work to continue to minimize incidental loss of forage species (e.g. alewives in water intakes; bloater chubs in trawls).

Problem 3. Accurate sport harvest estimates are needed.

Our knowledge of sport harvests is based on creel surveys funded largely from the sale of Great Lakes Salmon and Trout Stamps and on reports submitted by charter captains. Creel surveys provide needed information about numbers of fish harvested, movements of marked fish, growth and fitness of harvested fish, extent of natural reproduction, and angler effort. They can also be used to collect data related to special studies or management questions. Recognizing that states differ in creel survey methods, the Creel Task Group of the Lake Michigan Technical Committee compared creel surveys in the four states and issued recommendations in 1995. The Wisconsin creel survey was considered well designed. All recommendations to improve Wisconsin's survey have been implemented. The Creel Task Group recommended that all states annually provide a standardized set of data to a lakewide creel survey data base. Wisconsin has consistently submitted data to the GLFC for this purpose, but no lakewide synthesis has occurred.

The charter reporting system needs improvement. For example, during 1998, 68 charter boats were contacted at dock by SER fisheries staff. Data collected by DEPARTMENT personnel were used to verify the accuracy of reports submitted by those captains. Despite the fact that the captains were contacted at dock and informed that they were being scrutinized, four of the 68 trips were not reported and data in 15 of the 64 submitted reports contained errors. During 1998 through 2000, surveys were mailed to 3,308 purchasers of two-day Outlying Waters Sport Fishing licenses in Manitowoc and Kewaunee counties. Four hundred fifty-eight survey responses related to charter trips. Non-reported or inaccurate reports were associated with 240 charter trips (i.e., over 50% of charter trips were found to be inaccurate). As a result of the investigation, citations were issued to approximately 25 captains.

Tactic a) Continue conducting sportfishing creel surveys.

Tactic b) Expand the creel survey to assess winter and spring brown trout, brook trout and splake harvest and effort.

Tactic c) Encourage synthesis of lakewide creel results.

Tactic d) Work with Law Enforcement in setting up a task force to improve charter fishing reporting, through statutory or administrative code changes if needed.

Problem 4. Population dynamics of salmon and trout are not adequately understood.

Over the last decade the agencies responsible for the management of Lake Michigan have tried to improve our collective understanding of the population dynamics of the trout and salmon populations we manage. Working through the Lake Michigan Technical Committee, a Lakewide Assessment Plan (LWAP) has been developed. Through implementation of this plan, specific attempts are being made to improve our understanding of the early life history, growth, diet, mortality, health, and

movement of the three main predators in the lake (chinook salmon, lake trout, and burbot). Other studies by various cooperating agencies and universities have been designed and implemented to gather additional information regarding natural reproduction, energetics, and forage demand.

To date, good progress has been made lakewide with regard to the lake trout and burbot portion of the LWAP but the state of Wisconsin has had difficulty implementing their portion of the chinook assessment because of limited sampling capability. Wisconsin has now acquired and retrofitted a used commercial fishing vessel (the Perca) capable of fishing deep gill nets for the open lake assessment of chinook salmon, and will be able to participate in the chinook assessment portion of the LWAP.

Although burbot are naturally reproducing, chinook salmon and lake trout populations in Lake Michigan are currently maintained by stocking. Over the last decade there is increasing evidence to indicate that naturalized reproduction by chinook salmon (especially in tributaries from the state of Michigan) has reached levels that will impact overall forage fish populations in Lake Michigan. The ability to quantify the contribution of naturalized reproduction by chinook salmon that is occurring in Lake Michigan is important to understanding the overall forage demand of the predator population in Lake Michigan.

The Department has been collecting biological information from chinook salmon at the Strawberry Creek spawning weir since the early 1980s. As both the Besadny Anadromous Fisheries Facility on the Kewaunee River and the Root River Steelhead Facility have come on line, biological information has also been collected from these spawning weirs. These data sets have proved invaluable in tracking chinook, coho, and steelhead age of maturity, size at age, and rate return to the spawning weirs.

Tactic a) Continue lakewide assessments of chinook salmon , lake trout, and burbot, pursuant to LWAP.

Tactic b) Participate with other states in appropriately designed lakewide estimates of natural reproduction chinook salmon.

Tactic c) Maintain weir data sets for Strawberry Creek, the Kewaunee River, and the Root River.

Problem 5. Pathogens and early mortality syndrome continue to threaten salmon and trout fisheries.

In the late 1980's, chinook salmon experienced large scale die-offs in Lake Michigan. Although no one factor was responsible for the disease outbreaks, several were implicated; *Renibacterium salmoninarum*, the causative agent of Bacterial Kidney Disease (BKD); *Echinorhynchus salmonis*, a parasite that caused serious intestinal hemorrhaging and anemia; bacterial gill disease; and the absence of visceral body fat. The lack of visceral fat indicated a nutritional stress was present (insufficient forage), which was thought to be the underlying stressor responsible for the conditions mentioned above. Since that time, DEPARTMENT hatchery staff have worked to reduce the prevalence of BKD in fish reared at state hatcheries and fisheries biologists have worked to adjust stocking quotas to reflect the amount of available forage. These efforts have reduced the prevalence of *Renibacterium salmoninarum* in spawning fish to less than 5% compared to 66% in 1988.

In the early 1990's, an early life stage mortality syndrome (EMS) was identified as the cause of seriously high mortality (up to 90% at some hatcheries) in fry of coho salmon, and to a lesser extent in the fry of chinook salmon, steelhead and seeforellen brown trout. Research studies showed that EMS resulted from a thiamine (vitamin B_1) deficiency in the eggs. There is evidence that this deficiency occurs when adult fish consume diets comprised exclusively of alewife. The intestine of alewife contains an enzyme, thiaminase, that breaks down thiamine. Based on these studies, hatchery staff now treat newly fertilized eggs in a thiamine solution which improves fry survival.

Tactic a) Continue to rigorously test returning feral broodstocks and their progeny reared in the state hatcheries for fish pathogens including: *Renibacterium salmininarum, Aeromonas salmonicida, Yersinia ruckeri, Echinorhynchus salmonis, Myxobolus cerebralis*, Infectious Pancreatic Necrosis virus, Infectious Hemorrhagic Necrosis Virus, Viral Hemorrhagic Septicemia virus.

Tactic b) Continue to treat salmon and trout eggs with thiamine.

Tactic c) Continue to identify ecological factors that cause stress in feral and hatchery populations and develop ways to ameliorate the stresses so that disease/mortality events do not occur

Tactic d) Continue to monitor the health of non-spawning salmon and trouts in open water according to the lakewide fish assessment protocol (Goal II, Objective A, Problem 4).

Tactic e) Continue to monitor trend information regarding the percent lipid in fish fillets as an indicator of nutritional stresses.

Problem 6. Steelhead runs have been erratic.

Wisconsin's Lake Michigan steelhead are managed as a feral broodstock. Steelhead stocked in brood rivers (i.e., the Root and Kewaunee Rivers) are marked with a unique fin clip to allow identification to strain, and marked fish that return to the brood rivers are captured for egg collections. This is in contrast to captive broodstock management, where brood fish are maintained in ponds or raceways. Natural reproduction occurs in some Michigan streams, but not in Wisconsin streams, and is an unknown component of the Lake Michigan steelhead fishery. If this natural component is ignored, then lakewide exploitation of steelhead (number harvested divided by number stocked) averaged 15.5% during 1993 through 2000, and exploitation by Wisconsin anglers (number harvested divided by Wisconsin stockings) averaged 18.6%. Research has been conducted at Michigan State University to better understand the contribution of naturally-reproduced fish.

Since 1988, Wisconsin's Lake Michigan steelhead program has been based on a steelhead management plan[24] that established an annual harvest goal of 25,000 to 50,000 steelhead. To achieve this goal the plan recommended the stocking of three strains of steelhead, Skamania, Chambers Creek and Ganaraska, to provide lake fishing opportunities as well as up to ten months of stream fishing opportunities. The harvest goal has been surpassed every year since 1991. In the years 1993 through 1995 the number of steelhead harvested was more than twice the harvest target. This dramatic improvement in the fishery may be credited to a management

[24] Wisconsin Department of Natural Resources. 1988. Lake Michigan Steelhead Fisheries Management Plan. Bureau of Fisheries Management. Madison, WI. 18 pp.

plan that clearly gave direction to the steelhead program. The strains selected, improved hatchery practices, and other management activities have produced a product that anglers have utilized and once again made steelhead an important component of the Lake Michigan fishery.

Despite the success of the past decade of steelhead management, an updated Management Plan was needed to continue the successes of the past program, and to facilitate additional improvements to the steelhead fishery. The Lake Michigan Steelhead Fisheries Management Plan of 1999[25] called for the continuation of the current stocking program with an annual harvest goal of 75,000 to 100,000 steelhead. The 1999 Plan also addressed five issues that arose from the 1988 Plan. The new plan recommended 1) reallocating some of the Root River's steelhead quota to other southeast Wisconsin steelhead streams to decrease angler crowding on the Root, 2) modifying the mix of strains stocked into streams other than the Root and Kewaunee Rivers while maintaining the total number stocked into each, 3) developing and following a spawning protocol for steelhead that would maximize the genetic fitness of each strain, 4) improving near-shore fishing opportunities by stocking domestic rainbow trout, and 5) evaluating the declining steelhead return to the Besadny Anadromous Fishery Facility on the Kewaunee River.

Many anglers believe that poor steelhead runs in Wisconsin tributaries can be attributed to large harvests by trollers in the open lake. The Department has been reluctant to reduce bag limits for trollers because a) the bag limit would have to be reduced to at most two fish per day to reduce the harvest significantly, b) steelhead move throughout the lake so the harvest by trollers in Wisconsin waters may be largely composed of steelhead stocked elsewhere or produced naturally in Michigan streams, and c) other factors, especially flow rates in tributaries, may be much more important in limiting returns to our streams (see Problem 8, below).

Tactic a)	Implement the recommendations of the Lake Michigan Steelhead Fisheries Management Plan-1999.
Tactic b)	Continue to closely monitor the steelhead return to weirs.
Tactic c)	Operate weirs to capture as many brood fish as possible throughout the run.
Tactic d)	Mark all steelhead to enable broodstock collections outside of brood rivers.
Tactic e)	Optimize spawning techniques to maintain genetic diversity in feral steelhead stocks.
Tactic f)	Continue to engage anglers in discussions of bag limits.

Problem 7. Coho salmon spawning runs have been erratic.

Coho salmon have been stocked in Lake Michigan by the Wisconsin Department of Natural Resources since 1968 as spring yearlings (14-16 months old) and as accelerated-growth fall fingerlings (9 months old). From 1996 to 1999, we compared coho salmon stocked as accelerated-growth fall fingerlings (9 months old) with others stocked as post-smolt spring yearlings (15 months old) to evaluate 1) return rates of jacks and adults to spawning weirs and to the sport fishery, 2) growth

[25] Wisconsin Department of Natural Resources. 1999. Lake Michigan Steelhead Fisheries Management Plan, 1999. Bureau of Fisheries Management and Habitat Protection Administrative Report No. 44.

rates, and 3) cost/benefit ratio for each stocking strategy. Results[26] showed that return rates of adults were higher for fish stocked as yearlings than as fingerlings.

Tactic a) Maximize the numbers of coho salmon stocked as yearlings.

Problem 8. We lack a systematic long-term research program directed at feral brood stock management.

A number of factors influence returns to spawning rivers, and hence our ability to sustain fisheries for coho salmon, chinook salmon, steelhead, and brown trout. These include factors within our control, including selection of parents for artificial propagation, age and size of fish stocked, timing of stocking relative to stream variation, location of stocking, numbers of fish stocked of all species in receiving streams, and harvest regulations.

Tactic a) Develop a systematic strategy for studying controllable factors that influence returns of stocked fish and applying the findings to fish production and stocking practices.

Objective B. Improve and enhance the statewide fish production system for Lake Michigan.

The current salmon and trout sport fishery in Lake Michigan, and particularly in Wisconsin's waters, is almost entirely dependent on artificial fish propagation and stocking. Since the stocking of salmon and trout was implemented on a large scale, one new hatchery (Kettle Moraine Springs) and two egg-collection facilities (one on the Kewaunee River and one on the Root River) have been added to the Department's Lake Michigan cold-water propagation system. The Department has also acquired the former USFWS hatchery at Lake Mills, which produces both coolwater fish (walleye, northern pike, smallmouth bass) for inland stocking and, currently, coho salmon for Lake Michigan. The remainder of the substantial increase in the number and pounds of trout and salmon required to meet Lake Michigan stocking quotas has been produced by the existing facilities to the point of overcrowding their rearing capacity, with a subsequent reduction in the quality of the fish produced. These problems have been compounded by increased space needs for the inland feral (wild) trout program, the evaluation of two new strains of rainbow trout for Lake Michigan and reductions in rearing capacity due to facility maintenance needs. Closures of two of the Department's hatcheries (Hayward and Crystal Springs) in the early 1980s because of funding shortfalls have added to the strain of the propagation system.

Problem 1. Production capacity remains inadequate.

Most of the Department's cold-water facilities were built during the 1920s and 1930s, and most depend on a "gravity-flow" water supply, either from artesian groundwater or surface water sources. Sporadic development has occurred over the years, but nothing significant for Lake Michigan fish production since the Kettle Moraine Springs State Fish Hatchery (SFH) was renovated in the early 1980s and the lake water pipeline project was completed at the Bayfield SFH in the 1990s. Two of our primary cold-water hatcheries serving Lake Michigan, Nevin and Wild Rose, are seeing continuing erosion of their production capability because of the

[26] Eggold, B.T. and W.H. Horns. 2001. A comparison of two methods of rearing and stocking coho salmon in Wisconsin's waters of Lake Michigan. North American Journal of Fisheries Management. 21:147-155.

physical collapse of rearing units, reductions in water flow due to failing artesian wells, and environmental protection compliance issues.

Even if we had adequate, structurally sound rearing units at all of our hatcheries, waters supply limits the potential expansion of fish production. At all facilities, the available water supply is being fully utilized through out most of the year. Most of the artesian wells that many of our facilities rely on for their fish rearing water supply do not meet current environmental protection laws. Compliance with these laws will require re-design of the fish rearing water supplies that will likely include abandoning some existing artesian well water supplies and constructing new pumped water supplies. This will mean an increase in maintenance and overhead. The Great Lakes Salmon and Trout Stamp account is not adequate to resolve all facility problems.

In 1997 the Legislative Audit Bureau reviewed fish stocking in Wisconsin and raised concerns about the Department's fish propagation system[27]. Since then the Department has summarized the Department's current production capacity[28], detailed projected needs[29], and outlined plans for meeting those needs[30].

Tactic a) Help clarify and document the need for improved facilities.
Tactic b) Identify a facility for near-shore captive broodstock.
Tactic c) Seek an increase in the Great Lakes Trout and Salmon Stamp and Two-day Sports Fishing License prices to help pay for Great Lakes hatchery renovations.
Tactic d) Seek a license fee surcharge to support hatchery renovations.
Tactic e) Seek an increase in the patron license reimbursement to the Great Lakes Trout and Salmon Stamp fund.

Problem 2. Wild Rose State Fish Hatchery is not meeting production goals.

To address the concerns relating to production goals, ground water compliance issues and major facility needs at the Wild Rose SFH, a partial EMS (Environmental Management System) was developed for the Wild Rose SFH. The product from the EMS was a detailed, 16 page Scope of Work that was used to guide a conceptual engineering study that will be completed early in 2003. That study will address the ground water compliance issues and the major maintenance needs for the facility. The result of this study will be conceptual level plans for the renovation of the facility along with estimates for the work required. The next step will be the development of a funding package for the Wild Rose renovation.. Once funding has been identified, a major capital development project for the renovation of the Wild Rose SFH will be submitted to the Governor and the State Building Commission.

Tactic a) Complete the Scope of Work and funding package as described above.

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[27] Bezruki, D. P. Hammer, J. Gumley, K Monroe, and D. Varna. 1997. An Evaluation – Fish Stocking Activities – Department of Natural Resources. Report 97-9, Wisconsin Legislative Audit Bureau. Madison, WI. 57 pp.
[28] Department of Natural Resources. 1998. Production capacities of the Wisconsin Department of Natural Resources' Fish Propagation Facilities.
[29] Department of Natural Resources. 1999. An evaluation of stocking strategies in Wisconsin with an analysis of projected stocking needs.
[30] Department of Natural Resources. 2002. The Fish Propagation Action Plan for Meeting Wisconsin's Fish Stocking Needs.

Tactic b) Seek funding under the Joint Restoration Plan and Environmental Assessment for the Lower Fox River and Green Bay Area[31].

Tactic c) Explore other funding sources, including increasing the price of the Great Lakes Salmon and Trout Stamp.

Problem 3. Fish quality is sometimes unacceptable

Fish produced in state facilities may not always meet health or fitness standards, or may be larger or smaller than desired. In part this reflects problems with existing facilities, as described elsewhere, but there is always room for improvement in rearing procedures and strategies. The propagation system is reviewing its practices, procedures and production assignments at all facilities producing fish for stocking in Lake Michigan.

Tactic a) Develop and implement a quality improvement program for fish production by state hatcheries.

Objective C. Enhance near-shore fishing opportunities.

There is a strong public demand for near-shore fishing opportunities on Lake Michigan for native species such as yellow perch, smallmouth bass and walleye as well as for non-native species of trout and salmon. Currently a variety of near-shore opportunities exist, but often these are available only seasonally, are limited by poor public access or have been reduced by declines in popular fisheries. With reduced yellow perch abundance and salmon and trout moving farther offshore, anglers have requested the Department to evaluate and enhance the near-shore fishery of Lake Michigan and Green Bay.

Experimental stocking of native warm-water and coolwater fish or other strains of salmon and trout might expand near-shore opportunities, however care must be taken to ensure that the effects of these efforts on existing fisheries are understood before proceeding. Construction of additional access points, or improvement of those currently existing, could increase the availability of the near-shore resources to both small boat and pedestrian anglers.

Problem 1. Access to near-shore and tributary fishing opportunities is limited.

Small boats cannot safely make long runs on Lake Michigan to reach productive areas. Pedestrian anglers are restricted to fishing areas of Lake Michigan and tributary rivers that are accessible by foot and where parking is available. Those areas are often crowded. Through acquisition of land and access rights, the Department or others can expand fishing opportunities.

Land purchase and easements have been pursued to improve access to many miles of streams. In the Northeast Region access has been improved at Fischer Creek (Fischer Creek Park), Manitowoc River (old Oslo Dam Site), Kewaunee River (Besadny Fish and Wildlife Area-boat landing and handicap accessible trails), Reibolts Creek (Door County), Whitefish Dunes State Park (handicap trails), Little River (Marinette County), Oconto River (boat ramps) and the Menominee River (boat ramps).

[31] http://midwest.fws.gov/nepa/FoxRiver/index.html

In the Southeast Region the removal of the North Avenue Dam has improved access to many stream miles for increased fishing opportunities on the Milwaukee River. Additional access has been created on Sauk Creek (fishing easements), on the Sheboygan River (boat ramps), on the Milwaukee River at Bender Park, and in Port Washington Harbor. The Department provided input, guidance, and resources to these projects.

Tactic a) Work with the private sector and municipalities for agreements to open additional public fishing areas for pedestrians and small boats.
Tactic b) Support Department efforts to acquire lands along Lake Michigan and tributary streams for public access.
Tactic c) Improve public knowledge of existing access.
Tactic d) Continue to remove dams when and where feasible.

Problem 2. Current salmon and trout populations provide limited pier and near-shore fishing opportunities.

For many years as the Lake Michigan salmon and trout fishery developed, there were ample opportunities for anglers on or near-shore to catch a variety of trout and salmon from early spring to late fall. Rainbow trout, brown trout, lake trout, and brook trout, along with chinook salmon, provided a somewhat predictable fishery for anglers. Changes in stocking methods, genetic strains, available forage, and other factors have caused shore fisheries for salmon and trout to decline in many areas. Over the last fifteen years, angler harvest of trout and salmon from near-shore areas of Lake Michigan declined from 11% of Wisconsin's total trout and salmon harvest in 1986 to an average of 6% of the total harvest in since 1990. Because some of the aforementioned factors, especially near-shore forage, are not within our control, it might not be possible to restore near-shore fisheries to past levels.

Restoration of near-shore trout fishing opportunities began in 2001 with the experimental stocking of Arlee strain rainbow trout, obtained from Montana. Arlees have been stocked in Illinois waters of Lake Michigan for a number of years. In 2003 the experimental stocking of Kamloops strain rainbow trout, obtained from Minnesota, will be initiated.

Tactic a) Continue to stock domestic rainbow trout and evaluate their contribution to the near-shore fishery.
Tactic b) Implement the Lake Michigan Steelhead Fisheries Management Plan-1999[32].
Tactic c) Compare the contributions of current strains of brown trout to the near-shore fishery.
Tactic d) Investigate new strains of brook trout that could increase near-shore angling opportunities.

Problem 3. Cool and warm-water fisheries desired by anglers in Lake Michigan and its tributaries may be limited by habitat and may conflict with other management objectives.

[32] Wisconsin DNR. 1999. Lake Michigan Steelhead Fisheries Management Plan. Administrative Report No. 44, Bureau of Fisheries Management, Department of Natural Resources, Madison Wisconsin.

In the lower reaches of some tributary streams the amount of available warm-water habitat has increased because of improvements in water quality and the removal of dams. With the removal of the North Avenue Dam in Milwaukee smallmouth bass have thrived and northern pike are also doing well. Additionally, in the Milwaukee River a number of mature walleye can be found (see Goal 1, Objective B, Problem 3). However, the lower reaches of most Lake Michigan tributaries provide limited habitat for warm-water species, so only small increases in harvest opportunities for warm-water species can be expected.

Moreover, the Department is concerned about the impact of smallmouth bass, walleye, and northern pike on salmon and trout. Currently, many of Wisconsin's Lake Michigan tributary streams are managed for those anadromous cold-water species. Those rivers not only are host to returning adult fish, but also are the sites of stocking of thousands of fingerlings and yearlings. To mitigate this problem in the Milwaukee River, the Department has worked with the Milwaukee Great Lake Sport Fishermen to deploy net rearing pens outside the mouth of the river, where young chinook salmon can be held prior to release.

Tactic a) Survey and describe existing warm-water habitat (habitat needed by walleyes, northern pike, smallmouth bass, yellow perch, and muskies), and describe what each location can support.

Tactic b) Assess impacts of enhanced populations on other species.

Tactic c) Continue to stock limited numbers of walleyes in the Milwaukee River and assess potential impacts of a walleye stocking program on other species as outlined in the lower Milwaukee River and estuary walleye restoration plan through 2004.

Objective D. Discourage unethical fishing practices.

Snagging and the use of snag hooks was completely banned on Lake Michigan, Green Bay, and the tributary streams by 1987. Concentrations of spawning walleye, northern pike, trout, and salmon in Lake Michigan and Green Bay tributaries attract anglers. Many anglers are intentionally snagging these vulnerable fish or retaining foul-hooked fish. We want to give anglers the clear message that unethical angling practices are unacceptable on our waters. This will require restrictions on gear, closed seasons, and fish refuges. Some additional restrictions are necessary to maintain legitimate fishing opportunities and clean up the unacceptable practices. Because new regulations must be enforceable, it is essential to involve Department law enforcement staff in the rule development process.

Problem 1. Snagging and foul hooking still occur.

Because illegal snagging often occurs after dark, night fishing is currently prohibited in most Lake Michigan tributaries from October 1 through the first Saturday in May. However, large numbers of salmon and trout begin migrating into those streams before October 1, so an extension of the night fishing prohibition was proposed to address the problems during September. This proposal was rejected in an advisory vote of the Conservation Congress because of concern with the loss of fishing opportunity. It is also felt by some members of Law Enforcement that current exemptions in statutes allowing the sale of eggs from legally caught trout and salmon also facilitate unethical practices and illegal sales. Enforcement is complicated when sport fishers do not speak or read English and may not be familiar with our regulations.

Tactic a) Enforce existing regulations.
Tactic b) Initiate efforts to educate anglers who do not speak or read English about fishing laws.
Tactic c) Bring before the Conservation Congress an advisory question seeking to repeal or modify current laws authorizing the sale of eggs from lawfully caught trout and salmon.

Problem 2. Some tournaments facilitate waste.

Occasionally tournaments result in unnecessary mortality of fish held by anglers for purposes of verifying the catch.

Tactic a) Discourage waste by including fish-handling guidelines in tournament permits.
Tactic b) Monitor tournaments to determine the extent to the problem.

Objective E. Increase public awareness of positive aspects and benefits of the Lake Michigan sport fishery.

The Lake Michigan sport fishery provides substantial economic, sport, and ecological benefits. It has been estimated that sport fishing on both Lake Michigan and Lake Superior, of which the majority takes place on Lake Michigan, generates over $190 million in retail sales and supports over 4,000 jobs[33]. Department creel surveys estimate that sport fishing on Lake Michigan provides 3 million angler hours of recreation annually[34]. The salmon and trout stocking program reduces the abundance of alewives, thus benefiting native species. Because the salmon and trout remove the largest alewives, the maintain an alewife population that is not only reduced in numbers, but is also made up of smaller individuals with lower PCB concentrations, thus reducing the accumulation of PCBs in predators[35,36].

Problem 1. The benefits of the Lake Michigan sport fishery are not adequately communicated to the public.

Information about the benefits of the program is not readily available to the general public.

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[33] Preliminary data developed by Southwick Associates, Inc. for the American Sportfishing Association and presented to the International Association of Fish and Wildlife Agencies in September, 2002.
[34] Kubisiak, J. Wisconin's 2001 open water sportfishing effort and harvest from Lake Michigan and Green Bay. PUB-FH-830-2002. Wisconsin DNR. 19 pp.
[35] Jackson, L.J. 1997. Piscivores, predation, and PCBs in Lake Ontario's Pelagic Food Web. Ecological Applications, 7(3)991-1001.
[36] Stow, C.A., S.R. Carpenter, C.P. Madenjian, L.A. Eby, and L.J. Jackson. 1995. Fisheries management to reduce contaminant consumption. BioScience, 45(11): 752-758.

Tactic a) Work with Sea Grant and the Lake Michigan Fisheries Forum to disseminate information.

Tactic b) Continue to disseminate Great Lakes Memo to update information.

Tactic c) Update information on the Department's web page.

GOAL III. A stable commercial fishery.

The emphasis here is on stability, again with recognition of the limitations of the ecosystem. Within this goal we address the challenges of adequately funding our commercial fishing management program, minimizing mortality of non-target species, improving the catch reporting system, and streamlining administrative procedures.

Objective A. Sustain populations of commercial species.

For each of the important commercial species in Lake Michigan, the table below shows the range of annual harvests for the past ten years, the current commercial harvest limit, and the reported commercial harvest from Wisconsin waters of Lake Michigan during the 2001-2002 license year. Although we recognize that the ecological capacity of the lake is dynamic and changing, we believe that the historic harvest ranges shown in Table 2 are realistic and within the current ecological capacity of Lake Michigan.

Over the past two decades total annual harvest limits have been established for each of the important Lake Michigan commercial fish species. Some of the harvest limits are individually allocated to a specific licensee, generally based on some measure of past performance, and some of the harvest limits are assigned to a group of commercial fishers that have qualified to participate in a "racehorse" fishery.

A recommendation to the Natural Resources Board for the total annual harvest limit for each species is adjusted up or down based on the best information available to the Department with the intent of supporting a healthy and viable fish population and a sustained commercial harvest within the ecological capacity of Lake Michigan. The best available information available to the Department comes from a variety of sources. In some cases (i.e. lake whitefish and yellow perch) the Department maintains a time series data base and conducts specific biological surveys targeting these species. In other situations, (i.e. smelt and round whitefish) the Department does not conduct specific biological surveys for those species but uses other available information (i.e. USGS surveys, commercial catch rates) to develop recommendations.

Annual commercial harvest ranges (1993-2002), current annual harvest limits, and reported harvests from Wisconsin waters of Lake Michigan during the 2001-2002 license year.

	Harvest range during 1993-2002 (pounds)	Harvest Limit (pounds)	2002 Harvest (pounds)
lake whitefish	1,153,143 to 1,800,378	2,470,000	1,453,785
bloater chubs	965,516 to 2,480,665	3,600,000	1,382,459
yellow perch			
Green Bay	18,952 to 400,986	20,000	18,952
Lake Michigan	0 to 288,739	Closed	0
round whitefish	429 to 16,386	75,000	3,584
rainbow smelt	268,990 to 1,677,778	1,000,000	316,076

Harvest limits have been increased recently for lake whitefish and decreased for yellow perch and smelt. These changes have not been sufficient to keep harvests within the target ranges, demonstrating that, while harvest limits are needed to protect declining populations, factors outside our control dominate the Lake Michigan ecosystem and changes in harvest limits are insufficient to completely regulate fish populations.

Problem 1. Periodic harvest limit adjustments are needed to address natural variations in fish populations.

Harvests of most commercial species, including lake whitefish, yellow perch, bloater chubs, round whitefish, and rainbow smelt, are limited through the establishment of annual harvest limits, which are adjusted in response to changes in fish abundance. The purpose of limiting commercial harvests is to maintain abundant fish populations that can sustain stable commercial fisheries. Annual reproductive success and survival of these species can be highly variable. Also, growth rates can vary in response to competition with other species or in response to environmental conditions. Variable growth rates affect harvest potential. As a result, extensive annual harvest and population information needs to be collected to follow long-term trends, which form the basis for harvest limit recommendations.

The lake whitefish harvest limit has been increased four times since it was first established at 1.15 million pounds for quota year 1989-90 and is currently at a record 2.47 million pounds. Recent dramatic declines in *Diporeia* populations cast doubt on the ability of Lake Michigan to continue to sustain the current whitefish population. After many consecutive years of poor yellow perch recruitment in southern Lake Michigan, the commercial season in Lake Michigan was closed. Similar problems in Green Bay, where the adult yellow perch stock is also declining, lead to the harvest limit being reduced from 300,000 pounds to 20,000 pounds. Lakewide declines in smelt populations, as documented by USGS surveys, have also lead to smelt harvest limit reductions.

The adjustment of commercial harvest limits is often highly controversial. It may be possible in some cases to link harvest limits explicitly to objective routinely-collected measures of fish abundance, thus in a sense automating the process of adjusting them. This would help reduce controversy in this area and help sport and commercial fishers work with the Department toward shared fish population goals.

Tactic a) Maintain and improve current population and harvest assessments.
Tactic b) Review and update population models used to estimate fish abundance.
Tactic c) Review harvest limits and make recommendations every other year, unless the resource is threatened.
Tactic d) Explore ways to automate commercial harvest limit setting.
Tactic e) Review expiring (sun-setting) rules at least 12 months prior to expiration date.

Problem 2. Fisheries management is complicated because fish populations cross jurisdictional boundaries.

Four states the USFWS and the Chippewa Ottawa Resource Authority (CORA) share management responsibilities for the fishery resources of Lake Michigan. The Lake Michigan Committee of the Great Lakes Fishery Commission is the primary forum for discussing and resolving inter-jurisdictional management problems. The states each have different management strategies with differing harvest regulations for commercial fisheries. Movements of commercial fish species over state borders are known to occur but are not well understood. Thus allocation of shared stocks has been a problem for the different management agencies and commercial fishers.

This has been a particular problem for management of the North/Moonlight Bay stock of lake whitefish. The Lake Michigan Committee of the Great Lakes Fishery Commission has assembled a panel of experts which has reviewed current available information with regard to the Lake Michigan whitefish stocks with special emphasis on the North/Moonlight Bay stock. A pilot study to evaluate stock discreteness and ID using detailed scale analysis has been suggested.

Recently the U.S. Federal Government, several Tribes, and the State of Michigan reached agreement in a Consent Decree[37] regarding the allocation, management, and regulation of fishing in 1836 Treaty waters, which include most of the northern part of Lake Michigan, but do not include Wisconsin waters. The Consent Decree has implications for Wisconsin because it supports tribal harvest of whitefish and lake trout, allows a limited commercial harvest of salmon, and calls for increased stocking of lake trout in Michigan waters of Lake Michigan. The Consent Decree recognizes the role of the Lake Michigan Committee in setting lakewide stocking goals and policies.

Tactic a) Encourage and participate in studies of whitefish stock identification.
Tactic b) Work through the Lake Michigan Committee to obtain accurate annual reports of salmon harvests by tribal fisheries in Michigan waters.
Tactic c) Work through the Lake Michigan Committee to assure that stocking changes implemented in Michigan waters pursuant to the Consent Decree do not negatively affect Wisconsin fisheries.

Problem 3. Current juvenile lake whitefish surveys do not provide reliable estimates of year class strength.

An independent estimate of lake whitefish year class strength is needed for the determination of lake whitefish harvest limits. Currently, juvenile lake whitefish abundance is estimated using a limited amount of graded mesh gill net (GMGN) fished for one or two weeks in spring. The effectiveness of the GMGN surveys in any given year is affected by weather conditions and the ability of the Department research crew to locate the juvenile lake whitefish during the survey period. The biologists with the Ontario Ministry of Natural Resources (OMNR) successfully use trawls for juvenile lake whitefish stock assessment on Lake Ontario. The Department has recently acquired the trawl design from OMNR and is exploring ways to use the Perca to establish a juvenile whitefish trawl survey.

Tactic a) Explore new techniques to assess juvenile whitefish.

Problem 4. Contaminants prevent commercial utilization of white perch from Green Bay.

Commercial fishers are authorized to harvest limited amounts of certain specified rough and detrimental fish, including white perch. Until recently their ability to market white perch from Green Bay has been limited, because PCB levels sometimes exceeded the FDA action level (2 parts per million) for sale in commercial markets. However, recent results show that PCB levels in most white perch are now well below 2 ppm, opening the possibility of increased white perch harvests. Concerns about an enhanced white perch fishery include incidental catch

[37] Enslen, Hon. R.A. 2000. 1836 Great Lakes Treaty Waters Consent Decree. 121 pp.

of yellow perch and other species and the possibility that PCB levels could increase in the future if white perch abundance falls and fat levels return to those of the past.

Tactic a) Explore options for increasing commercial white perch harvest opportunities.

Problem 5. Yellow perch are shared between commercial and sport fishers, requiring allocation.

The Department is responsible for managing the Lake Michigan fishery for both sport and commercial fishing. Historically, yellow perch have been allocated to both user groups. However, it is not possible to ensure that equal numbers of perch will be harvested each year. The sport and commercial fisheries are radically different in number of participants, effectiveness of gear, harvest response to varying yellow perch population levels, and the effect of weather on harvest. As a result, they have to be regulated differently within the dual goals of protecting the yellow perch resource and equitably allocating the long term harvest.

Tactic a) Seek to achieve a 50/50 split, by numbers, over the long term.

Objective B. Implement recommendations of the Commercial Fishing Task Force.

The Commercial Fisheries Task Force was formed in order to respond to concerns regarding the enforcement of laws and regulations within the commercial fishing industry, and to offer a recommended course of action to the Department of Natural Resources. While there are diverse perspectives among the various users of the Great Lakes fishery, the Task Force had a common commitment to the protection of that resource and the effective enforcement of laws designed to protect it. In performing their work, the Task Force utilized the DEPARTMENT staff report, prepared and submitted to Secretary Meyer on February 5, 1998, and used as a resource by the Natural Resources Board in creating this Task Force. Department staff report identified several areas of concern, including reporting, record-keeping, and licensing; monitoring the harvest; transportation and storage of fish; wholesale fish dealers; penalties, assessments and restitution; and funding. The Task Force held its initial meeting in February 1999, and has worked since that time to frame a set of recommendations that respond to these concerns. The Department's report identified issues and possible solutions as useful points of departure to our group, but the Task Force went beyond this initial thinking to attempt to craft creative solutions to these problems.

The Commercial Fisheries Task Force has reached consensus regarding several important aspects of a new and innovative system for monitoring commercial fishing in Wisconsin. They fully embrace these recommendations and promote them as a package whose elements complement one another to achieve a fair, cost-effective, efficient system that meets the needs of the Department of Natural Resources and the commercial fishing industry. This system is likely to result in high levels of respectful compliance by almost all fishermen, coupled with an enforceable means of regulation. These recommendations are presented in twelve major sections:

1) Electronic Fish Harvest Reporting System (FHRS).
2) Dockside Inspection Program.
3) Monitoring System (EMS).
4) Repeat Offenders Monitoring System (ROMS).
5) DNR Warden Inspection Authority.

6) Illegal Fish and Fishing, Definitions and Penalties
7) Funding of the Reporting and Monitoring Systems
8) Fleet Reporting System
9) Reporting Requirements for Trawlers
10) Quotas, Landed Fish, and Monitoring of Incidental Catch
11) Additional Recommendations: License Year, Confidentiality of Business Records, Penalties for Trout and Salmon Roe, Reporting Lost Nets
12) Establishment of an Ongoing Monitoring Group

Despite the creative and concerted effort of the Commercial Fisheries Task Force, several aspects of the recommendations will need a lot of work by Departmental staff.

Problem 1. Funding is inadequate to finance all the recommendations of the Commercial Fishing Task Force.

Substantial funds are needed to establish the electronic Fish Harvest Reporting System and provide continued support for wardens to implement it. Fee increases, borne by commercial fishers, and supplemental GPR funding, would cover most costs of the system. Clear and accurate information is needed from DEPARTMENT regarding commercial fisheries costs, so adjustments can be made over time to the system.

Tactic a) Seek General Program Revenues to support Law Enforcement and Fisheries Management efforts related to the management of the commercial fishery.

Problem 2. Both Wisconsin State Statutes and Natural Resources Administrative codes must be changed to reflect recommendations of the Commercial Fishing Task Force.

The Commercial Fishing Task Force recommended 12 key areas that need to be addressed (see above). Each of these areas requires Wisconsin State Statutes or Natural Resources Administrative code changes. Over 25 separate changes are required to fully implement the recommendations. Moreover, these recommendations are dependent on each other and failure to implement one change to Wisconsin State Statutes may affect several other aspects of the recommendations.

Tactic a) Work with the Natural Resource Board, Legislators, Law Enforcement, and commercial and sport groups to insure that all statute and code revisions are completed.

Tactic b) Allocate time in work planning for Fisheries Staff to complete re-writes of Natural Resources Administrative code and Wisconsin Statute.

Objective C. Minimize mortality of non-target species

The incidental catch and kill of non-target species is a problem common to most commercial fisheries worldwide. The Department and Wisconsin commercial fishery have cooperatively made important progress in the past to reduce non-target fish problems. Examples of progress include: increased use of entrapment gear, elimination of large-mesh gill nets in certain areas, use of low profile small-mesh gill nets, depth and seasonal restrictions, and use of diverters in trawls. Fluctuating fisheries populations and industry practices make the problem of non-target species ever changing.

Problem 1. Commercial fishing gear kills non-target species incidentally.

The incidental catch and kill of non-target fish species continues to occur. For example significant incidental catches of bloater chubs occur in the commercial trawl fishery and lake trout are killed in gill nets set for whitefish and bloater chubs. Trawls disturb benthos, but the impacts of commercial trawling on benthic populations has not been assessed. Non-target kill negatively impacts the sport and commercial fisheries by removing otherwise useable fish from the various fish stocks. Although most of the commercial fishing gear currently in use by the Wisconsin Lake Michigan commercial fishery is somewhat selective, improvements should be encouraged where feasible.

Tactic a) Encourage modifications in gear and fishing practices that reduce non-target mortality.

Tactic b) Investigate alternatives to gears with high non-target mortality (e.g., conversion of whitefish gill net fishery to trap or pound nets).

Tactic c) Consider a year-round 45 fathom depth restriction for chub fishing.

Tactic d) Encourage external studies of the impact of trawls on populations of benthic species.

Objective D. Address unresolved commercial fishing issues.

There are two long-standing, controversial issues regarding commercial fishing in Lake Michigan – the question of legalizing the harvest of incidentally-caught lake trout in some commercial gear and the length of the trap net season in Zone 3.

Problem 1. Commercial fishers want to legally harvest lake trout.

Commercial fishers in Wisconsin waters are currently not allowed to target lake trout or harvest any lake trout caught incidentally in their gear. All trout and salmon captured in commercial gear must be released, dead or alive. Commercial fishers believe that returning dead lake trout back to the water is a waste of a marketable resource and are requesting some level of legal harvest. There is resistance among the sport fishing public and some Department staff to a change in the law. The Commercial Fishing Task Force formed an oversight committee consisting of Department staff, commercial and sport fishers, and other members to address this issue in depth and make a recommendation. No changes can be effected unless all of the recommendations of the Commercial Fishing Task Force, including enhanced reporting, are successfully enacted.

Tactic a) Explore alternatives to the current law prohibiting commercial harvest of incidentally caught lake trout.

Problem 2. Commercial fishers in Zone 3 want to fish trap nets in July and August. They have support from some sport anglers, but many sport anglers oppose trap netting during the summer months.

The current rule regarding the use of trap nets in Zone 3 requires that they be removed from the water from June 28 until Labor Day. The rule resulted from concerns among sport fishers about the incidental kill of trout and salmon in those nets during summer; hazards to safety of sport trollers becoming entangled with

their gear in the nets; and the belief that the nets close off a prime sport fishing area during the busy months of July and August. Attempts by Department staff and others to seek a compromise between sport and commercial fishers have so far been unsuccessful.

Tactic a) Open a summer trap net season in part of Zone 3, with restrictions on numbers of nets and requirements for conspicuous marking of nets.

Objective E. Enhance the viability and stability of the commercial fishing industry.

Problem 1. Department resources are challenged by frequent requests to increase the range of available fishing options.

Commercial fishers have suggested a variety of changes to make commercial fishing easier or more productive, but often the implications of the changes for incidental mortality of non-target species or for conflict with sport fishers are not known. Studies would be helpful, but resources are limited.

Tactic a) Prioritize requests and encourage external funding for high-priority studies.

Problem 2. Commercial yellow perch fishermen on Green Bay are dissatisfied with current gear restrictions.

Currently commercial fishers for yellow perch in Green Bay are restricted by gear type and season for harvest. Prior to 1983, the commercial season for yellow perch included the use of drop nets during a time period from May 20 to June 30. This time period was eliminated because of a large sub-legal, yellow perch catch and mortality problem. There are no mesh size restrictions for drop nets and as a result they were fished with mesh sizes that caught more than half sub-legal fish. This resulted in substantial net retention, handling, and mortality of sub-legal fish. Department biologists believe that a large fraction of sub-legal yellow perch released from drop nets died within 24 hours as a direct result of handling. Additionally, many sub-legal yellow perch that were returned to the water were eaten by gulls before they can recover. Since this portion of the drop net season was closed in 1983, the estimated number of dead yellow perch washed ashore in June has declined 90%. However, Department biologist believe that it may be possible to minimize mortality of sub-legal fish through mesh size restrictions, thus allowing reopening the spring season as requested by commercial fishers.

Tactic a) Consider reopening the yellow perch trap net season with appropriate gear restrictions when the yellow perch population is sufficiently restored.

Tactic b) Consider alternative gear types that may reduce by-catch and incidental mortality to non-target species.

Objective F. Increase public awareness of positive aspects and benefits of the Lake Michigan commercial fishing industry.

Commercial fishing played an important role in the early history of Wisconsin. However, today few Wisconsin residents understand the current commercial fishery. Those residents aware of the commercial fishery often view it as a competing and consumptive use of the

Lake Michigan resource. The Wisconsin commercial fishery serves the purpose of harvesting surplus fish to provide a human food product. Increased awareness would foster a better understanding of the role a regulated commercial fishery that can play in the management of Lake Michigan.

Problem 1. The public is poorly informed about the Lake Michigan commercial fishery.

Although Wisconsin has had a commercial fishery in Lake Michigan since the 1800s, the general public does not have a good understanding of the current commercial fishery or Department management of it. Frequently, the only time the general public sees or hears information in the media regarding the commercial fishery is in reference to a conflict with the sport fishery.

Tactic a) Provide information that describes the fishery, illustrates management goals and accomplishments, and explains the need for intensive regulations.
Tactic b) Work with Sea Grant and the Lake Michigan Fisheries Forum to disseminate information.
Tactic c) Continue to disseminate Great Lakes Memo to update information.
Tactic d) Update information on the Department's web page.

Problem 2. Sport and commercial fishing gear are sometimes in physical conflict.

At times commercial fishing gear can be in direct conflict with sport anglers attempting to fish Lake Michigan. Some of the conflict is the result of an inadequate understanding, by sport fishers, of the gear commercial fishers use. Another contributing problem is that some commercial fisherman don't mark their gear as clearly as they could, especially when it is in high use areas of the lake where the potential for conflict is great.

Tactic a) Educate boaters and sport fishers about commercial fishing gear and how to avoid it through literature and presentations to fishing clubs.
Tactic b) Encourage dialogue between sport and commercial fishing groups.
Tactic c) Require standardized marking of trap nets.

GOAL IV. Science-based management.

Effective fisheries management requires well trained staff, adequate funding, inter-jurisdictional cooperation, public involvement, timely communication of information, and the involvement of trained scientists. Taken together, we refer to this as science-based management.

Objective A. Employ the best available information, methods, and technologies in the management of the fisheries of Lake Michigan.

Problem 1. Continuing education is necessary for effective fisheries management.

The Lake Michigan ecosystem is constantly changing with the introduction of new species. At the same time fisheries science is rapidly evolving with the development of new tools. These include hydro-acoustic equipment, fish population models, and genetic analysis tools. Great Lakes fisheries managers must keep up with knowledge about ecosystem changes and with new methodologies.

Tactic a) Develop a continuing education plan for field, hatchery, and law enforcement staffs.

Problem 2. Vessels need annual maintenance.

The Department's Lake Michigan fisheries program operates two research and assessment vessels, the Perca and the Barney Devine. They require maintenance and the 60+ year-old Barney Devine is nearing the end of its service life.

Tactic a) Adopt, fund, and implement maintenance schedules for both vessels.
Tactic b) Acquire a replacement for the Barney Devine.

Objective B. Obtain more external funding for the program.

A number of external funding sources are available to directly or indirectly support fisheries in the Great Lakes. These include the Great Lakes Fishery Trust, the Great Lakes Fish and Wildlife Fish and Restoration Act, the Great Lakes Protection Fund, the Fisheries Research Program of the Great Lakes Fishery Commission, Coordination Activities Funding by the Great Lakes Fishery Commission, USEPA-GLNPO, the Wisconsin Coastal Management Program, and the Water Resources Development Act.

Problem 1. Insufficient staff time is devoted to obtaining outside funding.

Despite the potential value of external funding, insufficient staff time is spent understanding and pursuing the funding opportunities.

Tactic a) Dedicate staff time to track funding opportunities and obtain external funding.

Objective C. Share information and maintain contacts with other Great Lakes fisheries management agencies.

Lake Michigan shares management authority and responsibility with other jurisdictions. The Lake Michigan Committee and Lake Michigan Technical Committee provide the appropriate forums for resolution of issues of common concern.

Problem 1. Participation in lakewide committees is not given high enough priority.

Local, immediate demands on the time and attention of Department biologists often detracts from effective participation in and leadership of the Lake Michigan Committee and Lake Michigan Technical Committee.

Tactic a) Use the annual performance evaluation process to reaffirm and highlight commitments to lakewide committees.
Tactic b) Prepare annual report summaries to share with Lake Michigan Committee.

Objective D. Continue and expand partnerships with sport and commercial fishers, and others.

The Lake Michigan Fisheries program has established important working relationships with the University of Wisconsin Milwaukee's WATER Institute, the Lake Michigan Fisheries Forum, and others. Private interests have made major contributions to the program through support for weir construction, funding for stocking, contributions of commercial boat time for assessment work, contribution of labor for fin-clipping and other activities, and other things.

Problem 1. UW/DNR position requires continued funding commitment and in-kind support.

The Department and the University of Wisconsin jointly fund a Senior Fisheries Scientist housed at the UWM's WATER Institute in Milwaukee.

Tactic a) Continue to provide in-kind support for the position.
Tactic b) Highlight products from the position.
Tactic c) Encourage the position to work with external partners.

Problem 2. The resources and energy of private partners are not being fully utilized.

Sport fishers, commercial fishers, and others might contribute more to the Lake Michigan fisheries program if common interests were identified and appropriate arrangements were made.

Tactic a) Sustain and encourage the Lake Michigan Fisheries Forum.
Tactic b) Interact with sport and commercial fishing organizations individuals and groups to identify and develop opportunities for cooperative work.

Objective E. Communicate study results, policies, etc, in a timely way.

In order for the interested public, local officials, and legislators to appreciate value and needs of the Lake Michigan fisheries program, it is essential to aggressively communicate what we do. In order to maintain high professional standards, it is essential for Department biologist to communicate findings to other professionals.

Problem 1. Department biologists collect a great deal of data, which is summarized in informal reports but rarely published.

Unfortunately, biologists often find insufficient time and support for formal writing of results and findings.

Tactic a) Incorporate publication goals in each biologist's work plan.
Tactic b) Encourage supervisors to recognize the importance of publications.
Tactic c) Identify publishable topics through the LMFT.

Problem 2. Information needs to be disseminated in an active and timely manner.

One of the greatest challenges for fisheries management is the timely dissemination of information about the program to the interested public.

Tactic a) Continue to use the Lake Michigan news memo to communicate with the interested public.
Tactic b) Work with University of Wisconsin Sea Grant to expand public awareness of the Lake Michigan Fisheries Program.
Tactic c) Publish current reports on the Lake Michigan web site.

Objective F. Expand Lake Michigan research by Integrated Science Services (ISS).

The Department supports fisheries research through the Bureau of Integrated Science Services.

Problem 1. Insufficient ISS resources are devoted to Lake Michigan issues.

Unfortunately, Great Lakes fisheries research has not been a strong focus of that Bureau.

Tactic a) Continue to encourage ISS involvement with Lake Michigan Projects.
Tactic b) Identify specific research topics.

APPENDIX 1 – THE PLANNING PROCESS

A statement of scope and process was adopted in February of 2000 to guide the planning process. It was amended along the way, mostly to reflect changing deadlines. The following reflects the process and planning timetable that were ultimately realized.

Statement of Scope and Process for the
Lake Michigan Integrated Fisheries Management Plan, 2003-2013

SCOPE

The *Lake Michigan Integrated Fisheries Management Plan – 2001-2011* (LMIFMP) will define management and policy direction pertaining to sport and commercial fisheries in Lake Michigan for the coming decade. It succeeds the *Lake Michigan Integrated Fisheries Management Plan – 1995-2001*. The LMIFMP will serve the Goals of the Wisconsin Department of Natural Resources: I. Making People Our Strength, II. Sustaining Ecosystems, III. Protecting Public Health and Safety, and IV. Providing Outdoor Recreation. Specific objectives, problems, and tactics will be developed under the following three broad Lake Michigan fishery goals carried forward from the expiring plan: 1) A diverse, balanced, and healthy ecosystem. 2) A diverse multi-species sport fishery within the productive capacity of the lake. 3) A stable commercial fishery within the productive capacity of the lake.

The planning effort will be carried forward by the Lake Michigan Fisheries Team. Integration of the LMIFMP with other DNR programs and plans will be achieved by the involvement from the outset of all relevant Department programs. Integration of the revised LMIFMP with the thinking and planning of external agencies will be achieved by the involvement of representatives of those agencies. Public participation will involve the active participation of the Lake Michigan Fisheries Forum, as well as all other members of the interested public.

PROCESS

The process of plan development is summarized by specification of who will be involved and when specified steps in the process will occur.

Participants in the planning process

Lake Michigan Fisheries Team. The LMFT will conduct the entire planning effort. The LMFT functions under the oversight of a **Guidance Team** consisting of Water Leaders for the Northeast and Southeast Regions and the Director of the Bureau of Fisheries Management and Habitat Protection.

Lake Michigan Fisheries Forum. The Lake Michigan Fisheries Forum (LMFF) will be involved in all aspects of the planning process.

Policy Support Group. This will include Region Directors from NER and SER and the Administrator of the Division of Water. This group will endorse the planning process and ratify the completed document, but need not play any other active role, except as requested by the LMFT or its Guidance Team.

Internal Partners. Other DNR programs will be asked to help. Directors of relevant bureaus and regions of the DNR will be asked to send representatives to an early scoping meeting and to provide comments on drafts of the new Plan. This participation will insure that the Plan is appropriately integrated with other DNR programs and plans.

External Partners. External partners (including but not necessarily limited to EPA, GLFC, USFWS, USGS, Michigan DNR, Indiana DNR, Illinois DNR, and CORA) will be asked to comment on drafts of the new Plan. This will insure that the planning process takes appropriate consideration of external concerns as we focus on our fisheries management issues.

Public. The public at large will be involved through the Lake Michigan Fisheries Forum and through public listening sessions at key stages in the process.

Planning Timetable

February, 2000 – A statement of scope and process is drafted by the LMFT and approved by the Policy Support Group.

September 1, 2000 – Lake Michigan Fisheries Forum formed.

September-October, 2000 – The LMFF and the internal partners meet (separately) to list issues, questions, and concerns for consideration in the planning process. The LMFT compiles those into a single Issues List.

November, 2000 – A written review of the LMIFMP for 1995-2001 is completed. Three public meetings are held at which the planning process is described. The LMIFMP review document and the Issues List are presented. Attendees are asked to comment orally or in writing.

December, 2000 – The LMFT prepares a summary of the public comments. The LMFF meets to review the public comments and develop a recommendation to the LMFT regarding the Issues List. The LMFT revises the Issues List as appropriate and develops a consolidated list of issue categories.

January-March, 2001 – Separate meetings are held for the identified issue categories. These meetings involve the LMFT, the LMFF, and other internal and external partners as needed. The purpose of these meetings is to develop lists of possible objectives (with problems and tactics) that address items on the Issues List.

August, 2001 – The LMFF provides comments to LMFT.

May, 2002 – The LMFT completes a public discussion draft of the new LMIFMP.

May-September, 2002 – Draft shared with LMFF, internal partners, external parters, and the general public. Comments encouraged from all interested parties.

October, 2002 – LMFF reviews public comments and develops a recommendation for the LMFT regarding changes to the draft plan.

November, 2002-December, 2003 – The LMFT completes a final draft of the Lake Michigan Integrated Fisheries Management Plan for 2003-2013, which upon approval by the Guidance Team is forwarded to the Policy Support Group and Secretary for approval.

January, 2004 – Approved plan presented to NRB.

APPENDIX 2 – REVIEW OF COMMENTS

Review of comments on the "Public Discussion Draft" of the Lake Michigan Integrated Fisheries Management Plan.

In May of 2002 a Public Discussion Draft of the Lake Michigan Integrated Fisheries Management Plan was circulated widely for comment. The comments that we received were reviewed by the Lake Michigan Fisheries Team. Some resulted in changes to the Plan, others were not accepted. The following summary re-states all comments that we received, followed in each case by a response indicating why the suggestion was or was not accepted. The initials after each comment refer to the individual or group who made the suggestion (see the list following this summary).

- It would help the reader understand the document if it was stated that the objectives and problems are not listed in priority order. – LMFF
  - We have now made this point in the introduction.
- On page 2, delete "the Milwaukee River" from the sentence reading, "Excellent fishing for other cool water species, especially walleye and smallmouth bass, can be found in Green Bay, the Milwaukee River, and other river mouths and bays along the lake Michigan shoreline." – WF/GLSFC
  - The Department's experimental walleye restoration program in the Milwaukee River has been controversial. We understand that the sentence as written may imply to some that the present walleye fishery there is larger than it is, and larger than some would want to see it become. Nevertheless the sentence is accurate, since walleye is not the only species referred to.
- Explicitly list whitefish, bloater chubs, alewives, and rainbow smelt in the SGLFMP common goal statement (quoted on page 4) as species for which stable self-sustaining stocks are desired. – WF/GLSFC and WWF
  - We cannot amend that common goal statement of SGLFMP, we are simply reproducing it in the Plan.
- On page 9, expand the introductory paragraph by adding the words, "and enhancing desirable non-indigenous species and utilizing known control methods and developing new methods to control undesirable non-indigenous species."
  - All of these things have a place in the plan, but because they simply expand on the phrase, "dealing with non-indigenous species", we think they are not needed. Goal II addresses the enhancement of desirable non-indigenous species.
- Add a clause regarding sewer discharge, non-point pollution, and other contaminants to the SGLFMP common goal statement. – WF/GLSFC and WWF
  - We cannot amend the SGLFMP common goal statement, but we think concerns regarding these issues are expressed in the Plan..
- The Great Lakes Water Quality Agreement would demand that all ballast water be exchanged at sea. – WF/GLSFC and WWF
  - We are not sure if this is true, but the exchange of ballast water at sea is required by the Coast Guard, with some exceptions for ships "in ballast". The greater problem regarding the importation of species in ballast water is vessels that enter US waters fully loaded and therefore not in ballast, and therefore not required to exchange ballast.
- Add Regional Fisheries Experts to the staff list in the Overview. – Lee Meyers
  - Done
- Cite Drinking and Groundwater monitoring projects among the short term projects discussed on page 7. – DG
  - We do not do this, because that section refers only to Fisheries Projects.
- In the introductions to Objective IA, note that human activity increases runoff and decreases base flow. – DG
  - This has been done.
- The Plan should address sewage overflows from the Milwaukee Metro Sewerage District. – RP and JS
  - This is outside the scope of this plan. No known affect on fish populations.
- Given the concern about the effect of predation by walleye, smallmouth bass, and northern pike, do we want to restore habitat for those species. The discussion should include an explanation as to why the Department needs to balance stocking priorities with the desire for yellow perch. - LMFF
  - Yes, we want to restore habitat for native species. In general, better habitat supports a healthy ecosystem.. Better habitat might reduce the need for stocking. We don't know to what extent the predators affect yellow perch, but will encourage research in that area. See Tactic I.B.6.d.
- Fluctuations in base flow could be a factor in walleye and northern pike habitats. – DG
  - This has been noted.

- The walleye stocking program in the Milwaukee River should terminate in 2004 if the goal is not achieved. – WF/GLSFC and WFF.
    - The program will be reviewed after 2004. Interested individuals and clubs will be involved in this review.
- Some dredging can create or enhance habitat. Solid piers enhance shore fishing access. There is an impression that a there is a moratorium on solid pier construction permits. The process of reviewing permits for lake-bed modifications and structures should be more objective. - LMFF
    - It is questionable that dredging can enhance habitat. Solid piers can enhance access for private property owners, but typically not for the general public. There is not a moratorium on solid pier construction; permits applications are handled on a case-by-case basis.
- Degradation of the bottom should be studies in areas where commercial trawl have been used. - WF/GLSFC and WWF
    - The Department agrees that such studies would be helpful, but lacks adequate funding to pursue them. Tactic III.C.1.d calls for encouraging external studies of this issue.
- Enforcement action when fish habitat is illegally damaged should be a priority. - LMFF
    - Yes, this is a priority for the Department already.
- The Department should perform benthic studies in areas of historic bottom trawls. – WF/GLSFC and WWF.
    - We do not have the resources to carry out adequate studies of this type, but in Tactic IIIC1d we encourage external studies in this area.
- The Department should coordinate with county highway departments to better manage storm water ditch maintenance to minimize erosion. - LMFF
    - Yes. This issue is now addressed in Tactic I.A.3.f.
- New runoff rules go into effect in October 2002. – LG
    - The appropriate reference has been added.
- Increased surface flow decreases groundwater for cool water streams. – DG
    - The discussion of Problem IA3 has been changed to include this fact.
- References to the Department's Priority Watershed program are out of date. – DG
    - Noted and corrected.
- A paper by Wang, Lyons, and Kanehl regarding watershed best management practices should be cited.
    - This citation has been added.
- The Department should create a guidance document regarding land use as it may affect fish. - LMFF
    - This plan does not propose creation of a specific document, but in Tactic I.A.4.a, we support public education efforts in this area.
- The Department should work with all agencies to control contamination produced by seagulls, cormorants, and other migratory birds. – WF/GLSFC and WWF.
    - This is beyond the scope of the Lake Michigan fisheries program. It is not clear that this problem affects fish populations.
- The Department should work with other agencies to limit seagulls, cormorants, and other migratory birds to healthy levels of abundance. – WF/GLSFC
    - For the most part this is outside the scope of this plan, and outside the authority of the Department. Because of concerns about the impacts of cormorants on fish populations, the cormorant issue is addressed under Problem I.C.1
- Add or modify a tactic to address the desire to eradicate non-native or invasive species. - LMFF
    - Eradication of invasive species is usually not a realistic goal. Control is sometimes feasible. The issue of nuisance species is addressed in Objective I.C.
- Aquatic plant proliferation can be caused by NO3 in groundwater. There is a need for public education on fertilizer application and NPS. – DG
    - The text under Problem IA5, "Aquatic plant control may affect fish populations", has been modified appropriately.
- Permits are now required for aquatic plant control by harvesting, not just for chemical control. – LG
    - The text under Problem IA5 has been modified appropriately.
- Range expansion of invasive species should be a consideration in dam removals. - LMFF
    - Yes. This is issue is a major consideration for the Great Lakes Fishery Commission, which carries out the sea lamprey control program on the Great Lakes.
- Riparian land owners should be encouraged to implement habitat enhancement projects as mitigation for filling behind a bulkhead line. - LMFF
    - In principle this is correct, although the Department lacks authority to compel such habitat remediation. The tactics under Problem I.A.7. address the issue.
- The Plan should protect large northern pike in Green Bay and Sturgeon Bay. – TB and ER

- This issue was raised in advisory questions on the 2003 Conservation Congress spring questionnaire. Public support for reduced a reduced daily bag limit or an increased size limits was mixed, and the Department is not pursuing this at this time.

- A recent review by Fitzsimons et al. argues that contaminants are not an impediment to lake trout restoration in Lake Michigan, and that early mortality syndrome is attributable to thiamine deficiency. – CM
  - The review is relevant, but we did not feel that it necessary to quote or cite it in the text. The thiamine deficiency issue is addressed in Problem IIA5, "Pathogens and early mortality syndrome continue to threaten salmon and trout fisheries.
- It is desirable to obtain, in the near future, a lake-wide lake trout biomass or population estimate. This would facilitate modification of lake trout harvest regulations and may improve the capability to manage the forage base. - LMFF
  - Yes. The general problem of restoring self-sustaining stocks of lake trout is discussed in Problem I.B.2. Tactic I.B.2.d. calls for completion of the Lake Michigan Lake Trout Management Plan. Although the specific need for a lake-wide population model is not spelled out in the plan, we expect the Plan to call for such a model, and we expect to work with other agencies to develop it.
- The Plan should address concerns about the relationship between walleye abundance and yellow perch recruitment in Green Bay. - LMFF
  - This is now addressed in Tactic I.B.8.a., which encourages external research in this area.
- There is a need for better population estimates of top predators in Green Bay. -
  - These estimates would be useful, and would logically be part of external research called for in Tactic I.B.8.a.
- Regulations requiring health inspections of all fish stocked in public waters will limit the ability of private groups to supplement the Department's stocking efforts in Green Bay. – WF/GLSFC and WWF
  - The Department will work the DATCP and the clubs to attempt to make the regulations workable.
- The Plan should mention the use of rearing pens in the Milwaukee River area to protect the stocked chinook salmon fingerlings from predation immediately after stocking. - LMFF
  - This is discussed in Problem II.C.3.
- Include habitat enhancement as a tactic to help restore lake sturgeon. - LMFF
  - Tactic I.B.4.b has been added to accomplish this.
- The recommendations of the Lake Michigan Fisheries Forum that arose from the Green Bay yellow perch workshops should be included in the Plan. - LMFF
  - The recommendations are now summarized in a table under Problem I.B.6, along with actions to taken by the Lake Michigan Fisheries team.
- Re-institute the diet study of white perch and cormorants on Green Bay and Lake Michigan. – WF/GLSFC and WWF
  - This is similar to one of the research recommendations arising from the workshops on Green Bay. Because those research recommendations exceed available funds, we are supporting the development of a more focused and shorter research agenda by the new Green Bay Fisheries Research Group.
- Bloater chub abundance has probably not been affected by alewives, but deepwater sculpins and burbot once were. – DG
  - The text under Problem IB7 has been revised accordingly.
- The Plan should include a review of past commercial harvest of alewives under Problem IB7, "Alewives, at high population levels, may affect native species." - GLSC
  - This is important information but not directly germane to any proposed actions in the Plan. It is not possible to include all relevant background information in the Plan, and still keep it a reasonable length. The history of trawling for alewives is reviewed in Administrative Report 41, "Workshop on Alewives and Trawling – January 29, 1997".
- The tactics listed under Problem IB7, "Alewives, at high population levels, may affect native species," seem rather short given the importance of this issue. - LMFF
  - The tactics are to continue judicious stocking of salmon and trout and to continue to work with other agencies to assess forage fish abundance. Those may seem short, but they from a large part of what we do on Lake Michigan.
- For Problem IC3, "Exotic species move from the Great Lakes to inland waters, add another tactic reading, "Evaluate cause and effect of dam and rock removal in regards to exotic expansion before initiating such removals."
  - The positive effect of some dams in limiting the spread of aquatic nuisance species is noted earlier in the Plan (Problem IA6).
- Lake trout population abundance and predation should be considered in management of the forage base. - LMFF
  - Department biologists, working with counterparts from the other states, already take lake trout into account in management of the forage base. This is discussed in Problem IIA2, "The available forage in Lake Michigan can only support a limited predator population."

- There should be lake-wide coordination of predator stocking and continued work to enhance forage base modeling efforts. - LMFF
    - Both of these are being done. This is discussed in Problem IIA2, "The available forage in Lake Michigan can only support a limited predator population."
- In Tactic IIA7a, expand or further explain the term "judicious". – LMFF
    - The term is not defined, but the reader is now referred to Problem IIA2, "The available forage in Lake Michigan can only support a limited predator population."
- There should be more discussion of lamprey control efforts in Problem IC1, and those efforts should be listed as a tactic. - LMFF
    - Sea lamprey control is the responsibility of the Great Lakes Fishery Commission. However, a short discussion was added to the discussion of Problem IC1, and a tactic added to support the Commissions work.
- The discussion of white perch under Problem IC1 should be softened a bit where it talks about high levels of PCBs in white perch, and the discussion should be updated to reflect the results of the white perch PCB study. – LMFF
    - This has been done.
- The Department should demand, not encourage, the USFWS to adopt a regional population management plan for cormorants. – WF/GLSFC and WWF
    - Unfortunately, the Department is not in a position to make demands on the USFWS.
- The recognized number of exotics in the Great Lakes is about 160, not "hundreds". - LMFF
    - OK
- Change Tactic IC2b to "Support efforts to block passage of exotic species into Lake Michigan via the Chicago Sanitary and Ship Canal", rather than "Seek ways to block passage . . ." - LMFF
    - This change has been made.
- Add a tactic to "Seek uniform regulations for the exchange of ocean ballast water. – WF/GLSFC and WWF.
    - We think that this is addressed in Tactic IC2a, "Support the creation of a single bi-national (U.S. and Canada) legal authority to establish ballast water discharge standards that are enforceable."
- Add a tactic indicating coordination with Sea Grant and the new state invasive species program coordinator. - LMFF
    - This has been done in Tactic IC3c.
- In the introductory paragraph under Goal II, specify that fisheries for walleye, smallmouth bass, and northern pike should be managed so as to not compete with trout, salmon, and yellow perch. – WF/GLSFC and WWF
    - This issue arises in the Milwaukee River, where some anglers are concerned that walleye restoration my harm salmon, and in Green Bay, where there is a concern that northern pike and stocked walleye may harm the yellow perch population. The Department is committed to sustaining trout and salmon fisheries and to restoring yellow perch populations. We do not believe that enhancement of fisheries for walleye, smallmouth bass, and northern pike will necessarily hurt salmon, trout, or yellow perch, but we are trying to learn as much about those interactions as we can.
- Allow each fisherman to use two lures per pole when trolling in Lake Michigan. - MC
    - The Lake Michigan Fisheries Team has discussed this issue, but is not ready to pursue this rule change. As far as we know, there is not broad public interest in this change.
- Alewife abundance neither increased nor decreased during the 1990's. – CM
    - The discussion now reflects this fact.
- The bloater chub population continues to decline. – CM
    - The discussion now reflects this fact.
- Objective IIA should include a review/discussion of brown trout management. – GLSC
    - This is another place where the desirability of a thorough review of background information was sacrificed to the desirability of a reasonably concise Plan. This comment does not provide a specific concern. Brown trout are listed among the species of that we want to sustain in Lake Michigan, but a broad discussion would take up too much space. The discussion there has actually been reduced some to help streamline the Plan. Objective IIC, "Enhance near-shore fishing opportunities", includes references to brown trout, including Tactic IIC2c, "Compare the contributions of current strains of brown trout to the near-shore fishery."
- The Lake Huron data support stocking larger yearling lake trout, in place of fall fingerlings. - CM
    - Noted.
- Maintain current harvest levels of lake trout on historic sport catch. – WF/GLSFC and WWF
    - Harvest of lake trout will be guided in the future by the revised Lakewide Management Plan for Lake Trout Rehabilitation in Lake Michigan.
- The statement that salmon stocking levels in the late 1980's probably exceeded the capacity of the alewife population to support them is probably too strong. - CM
    - We think the preponderance of data support the use of the word, "probably".

- The commercial harvest of smelt creates a detrimental bi-catch which further depletes the forage base. – WF/GLSFC and WWF.
  - The commercial smelt fishery is limited with respect to area, season, time of day, and gear in order to minimize the incidental harvest of alewives. The other forage species of concern is bloater chubs. We do not believe that the incidental harvest of bloater chubs in the smelt fishery significantly affects the bloater chub population. Tactics IIIC1a, "Encourage modifications in gear and fishing practices that reduce non-target mortality," and IIIC1c, "Encourage external studies of the impact of trawls on populations of benthic species" address the problem of incidental mortality of non-target species.
- Stop all stocking of exotic warm water species competing with trout and salmon for forage. – WF/GLSFC and WWF.
  - We do not presently stock exotic warm water species.
- Institute a moratorium on smelt harvest until the populations can be sustained at one million pounds annually. – WF/GLSFC and WWF
  - The Department has advanced a rule to close the commercial harvest of smelt from Green Bay. The problem of commercial harvest limits is discussed in Problem IIIA1."Periodic harvest limit adjustments are needed to address natural variations in fish populations." This plan does not recommend a moratorium on all smelt harvest.
- Another value of good creel surveys is to obtain information about the proportion of wild fish. - RE
  - Yes. The text under Problem IIA3 has been modified accordingly.
- In Problem IIA3, "Accurate sport harvest estimates are needed.", clarify the difference between "surveys" and the "investigation'. – LMFF
  - The word "survey"" is used to refer to creel surveys. The word "investigation" is used to refer to Law Enforcement inquiry into non-compliance with charter fishing reporting requirements.
- Is the winter/spring creel survey called for in Tactic IIA4b, "Expand the creel survey to assess winter and spring brown trout, brook trout, and splake harvest and effort", justified? – WF/GLSFC and WWF
  - Right now we don't have money to initiate this expansion of our creel survey. When and if funds become available, we will have to weigh this against alternative uses for the money.
- A better case can be made in Problem IIA5 about the role of alewives in early mortality syndrome. – RE
  - This may be true, but discussion is adequate. The Plan is not the place for a thorough discussions of every issue.
- Place a moratorium on the commercial catch of smelt until the dynamics sustain a one million pound harvest. – WF/GLSFC and WWF.
  - The Department will continue to review harvest limits for smelt, and attempt to adjust harvest limits as indices of abundance decline or rise. The Department has sought a temporary closure of smelt trawling in Green Bay.
- University of Michigan researchers are trying to quantify natural reproduction by Lake Michigan steehead. – CM
  - Department biologists have cooperated in a genetic study in this area.
- Reduce the steelhead bag limit. – numerous individuals
  - This is not called for in the Plan, but nothing there would preclude it. This is an issue that we will continue to discuss.
- Abandon the Skamania steelhead program. – PK
  - We would like to sustain this program. At this time public support for the program seems to far exceed public opposition, which is rare.
- Raise the Salmon Stamp price to help pay for hatchery renovations. – LMFF
  - The Legislature and Governor have already increased the price of a Salmon Stamp from $7.25 to $10.00. The increased funds will contribute to the cost of renovating Wild Rose SFH.
- Use a license fee surcharge to support hatchery renovation. – GLSC.
  - This has been added as Tactic IIB1d. Of course, this is outside the control of the Lake Michigan fisheries program.
- The Salmon Stamp account should receive $6.50 from the sale of each Patron License. – WF/GLSFC and WWF
  - Tactic IIB1e has been added: "Seek an increase in the patron license reimbursement to the Great Lakes Trout and Salmon Stamp fund."
- The Department should request funding from NRDA settlements for restoration of the Wild Rose SFH. – WF/GLSFC and WWF
  - Tactic IIB2b has been added: "Seek funding under the Joint Restoration Plan and Environmental Assessment for the Low Fox River and Green Bay Area." The Department is actively pursuing this right now.
- Include under Objective IIC, "Enhance near-shore fishing opportunities", work not yet completed pursuant to the 1999 Lake Michigan Steelhead Fisheries Management Plan.
  - This can be found in Tactic IIC2b, "Implement the Lake Michigan Steelhead Fisheries Management Plan – 1999."

- Change the statement of Problem IIC3 as follows: "Cool and warm-water fisheries desired by anglers in Lake Michigan and its tributaries ~~may be~~ are in conflict with habitat limitations and management objectives." [Similar changes were suggested in two other locations.] – WF/GLSFC and WWF
    - We do not agree with that change. We will continue to seek to understand how different parts of our program are inter-related, and specifically how walleye stocking may affect other species, but we will not proceed on the assumption that the stocking of walleye or other warm-water species is in conflict with the Pacific salmon program or other parts of our program.
- In Tactic IIC3c, mention that the current experimental walleye stocking program in the Milwaukee River will continue through 2004.
    - This has been done.
- Regarding snagging and foul hooking (Problem IIC1), the Department should develop enforceable laws, improve angler education, and overcome language barriers. - LMFF
    - New regulations are not needed, but angler education can be improved. We have added Tactic IIC1b to address this, "Initiate efforts to educate anglers who do not speak or read English about fishing laws".
- Bring before the Conservation Congress spring hearings as advisory question seeking to repeal or modify current laws authorizing the sale of roe from lawfully caught trout and salmon. – GLSC, WF/GLSFC, WWF
    - Tactic IID1c has been added to call for this.
- Problem IID2, "Some tournaments facilitate waste", should be modified to refer only to catch and release tournaments.
    - We have to keep an open mind to problems that may occur in all tournaments.
- The Department should not seek elimination of gill nets. Trap nets should not be allowed beyond 120 feet, because the pressure difference causes mortalities when fish are brought up from greater depths. No. 1 whitefish caught in trap nets can be 18.5" and weight only 1.5 pounds, while those caught in gill nets average over 2 pounds. You need gill nets, trap nets, and pounds nets for a balanced fishery. An earlier increase in whitefish quotas for gill nets might have prevented the large whitefish population from depleting the zooplankton. Commercial fishers should not be expected to generate revenue to fully support management – costs should be charged off to state funds. All commercial fishers should be allowed a quota of lake trout. – JBE
    - The Department is not currently proposing to eliminate gill nets. Regarding the deeper trap nets, we have studied that issue and believe that mortality attributable to being raised from depths is not a major problem. Although we have encouraged fishers to move from gill nets to live entrapment gear, we continue to allow all three types of gear that are mentioned. We have no reason to accept the speculation that a larger whitefish harvest would have kept whitefish from depleting the zooplankton population. We are not asking commercial fishers to generate revenue to fully support management, although this is a sore point with many anglers. The Commercial Fishing Task Force recommended that alternate sources of funding be found to cover the cost of managing the commercial fishery. This is covered by Objective IIIB, "Implement recommendations of the Commercial Fishing Task Force". A significant number of lake trout are killed when caught incidentally in commercial nets, especially in the gill net fishery for bloater chubs. The Lake Michigan Fisheries Forum has facilitated discussions about possibly allowing the retention of some of the incidentally-caught lake trout, but at this time the LMFF has made a recommendation on the issue, and the Department has no plans for rule changes in this highly controversial area.
- The draft plan and the recommendations of the Commercial Fishing Task Force (cited in Goal III, Obj B) should focus on providing all Wisconsin residents with a steady supply of fish, but the draft focuses instead on law enforcement. The Task Force recommendations burden fishers with additional paperwork, penalties, and bureaucracy. The Plan should address problems of zebra mussels, E. Coli, cormorants, lampreys, and other exotic species. Gill netting receives more than its share of criticism. Gill netting is a small but essential part of the fishery. A steady supply of quality fish would be further enhanced by allowing the harvest of Lake Trout. A program allowing a limited harvest of lake trout in exchange for tagging and detailed reporting would benefit everyone. – JWM
    - The Commercial Fishing Task Force was established to address law enforcement issues in the commercial fishery. Most participants believe that the proposed system will simplify reporting, while also producing better compliance. The Plan does address zebra mussels, cormorants, lampreys and other exotic species, but no E. Coli, which is an issue outside the scope of this fisheries plan. The Plan does not propose to ban gill nets. As described in the preceding response, the issue of allowing retention of incidentally caught lake trout is being considered by the Lake Michigan Fisheries Forum.
- The Plan should attempt to correct the inequities between commercial perch fishers and sport fishers. Only two families in Zone 3 will control 78% of the yellow perch quota, when commercial fishing resumes, while many sport fishers share the sport harvest. This inequity should be addressed by the Plan. Other concerns: a) Subsidization of commercial fishing with general revenue funds. b) Illegal commercial harvest. c) Small penalties for commercial violations, compared with penalties for sport fishing over-bagging. d) Limiting sport anglers to 3 hooks while commercial fishers can set miles of nets. e) Allowing the transfer of commercial quotas but fining anglers for using another sport angler limit. f) Allowing

commercial fishers to sell perch but prohibiting sport anglers from doing that. g) Fining sport anglers for unattended lines, but not fining commercial fishers when thousands of feet of gill net are lost. h) Allowing commercial fishers to pick the choicest perch, while leaving the less desirable perch for the sport anglers. – CHA

- ➢ It is correct that the commercial fishery has become consolidated in fewer hands. This was the intent of limited-entry legislation adopted over a decade ago. The goal was to help create a more stable and viable commercial fishery by helping a relative few fishing entrepreneurs create viable businesses. Regarding the specific points a) The commercial fishery is not subsidized with general revenue funds, although the Commercial Fishing Task Force recommended that GPR revenues be used to cover management costs of the fishery. b) We are attempting to address the problem of illegal commercial harvest through implementation of the recommendations of the Commercial Fishing Task Force. c) The issue of penalties was reviewed by the Commercial Fishing Task Force (see Objective IIB). d) Yes, commercial fishers are allowed more efficient tools for catching fish, but that is necessary in order to make those fisheries viable. e) Yes, one feature of commercial fishing management in Wisconsin is the existence of individual transferable quotas. This is an important feature of our management system. It allows the development of stable fishing businesses, reflecting the intent of the legislature. f) Yes, commercial fishers can sell perch, that is what makes it a commercial fisher and distinguishes it from the recreational fishery. g) Commercial fishing rules require the tending of nets and the removal of nets from the water. h) Sport anglers may harvest any size yellow perch, but commercial fishing for yellow perch is closed in Lake Michigan and subject to size limits in Green Bay.

- Update the target harvest ranges for commercial species in the summary table under Objective IIIA. LMFF and LMCFB
  - ➢ We've substituted historic harvest ranges for target ranges in the table.
- Tactic IIIA1d could be a good idea, depending on the adjustment rule and the data supporting it. – LMCFB
  - ➢ No response needed.
- Add a tactic under Problem IIIA1 to explore closure [of the commercial smelt fishery] until a sustainable catch of one million pounds can be met. – WF/GLSFC and WWF
  - ➢ A new tactic was not added, but the Department has proposed closure of the Green Bay commercial smelt fishery.
- Add a tactic under Problem IIIA1 to institute a process to review all commercial catch quotas based on a five-year trend, when catch does not meet fifty percent of established quotas, immediate closures shall occur, when the DEPARTMENT determines that one hundred percent of the previous quota can be obtained, the fishery re-opens. – WF/GLSFC and WWF
  - ➢ There are some problems with this formula. For one thing, for a closed fishery we would have no way of knowing when population had recovered to the point that 100% of a previous quota could be harvested. We think that quotas should be adjusted based on population trends, rather than being switched on and off at a fixed level. Harvests and fishing efficiency (catch per unit of effort) can be used as indicators of population trends, but supplementary fishery-independent data are preferred.
- The pilot study (mentioned in Problem IIIA2) to evaluate discreteness of whitefish stocks has been completed. – LMFF
  - ➢ This is incorrect, the study has not been done.
- Commercial fishers catch juvenile whitefish in trap nets. The Department should consider how this information could be used. Sampling methods should be broadened to include trap nets and the lampara seine. – LMFF
  - ➢ There are always problems with using fishery-dependent data in assessing populations. That is because fishers try to maximize the catch, and would reduce their efficiency if they followed scientifically valid sampling designs. If commercial fishers systematically counted and reported the numbers of juvenile whitefish in trap nets, the information would provide a rough index of trends. The plan highlights the need to find better techniques for assessing juvenile whitefish.
- Use a tax on whitefish sales to fund the assessment of juvenile whitefish.. – WF/GLSFC and WWF
  - ➢ The question of how to raise funds from the commercial fishery was discussed by the Commercial Fishing Task Force, and this Plan calls for implementing their recommendations. This suggestion was not part of the Task Force recommendations, so it was not included in the Plan.
- Lipid content is not an important factor governing PCB accumulation in fish (see Borgmann and Whittle [1992], Madenjian et al. [1993], and papers by Stow et al.). The likely cause for the decline in white perch PCB concentration over time is that the PCB concentration in the food of white perch has declined over time. Also, the decline in white perch lipid content over time may be representative of a density-dependent response or may be due to a decline in the lipid content of the food of white perch over time. – CM
  - ➢ This supplemental information for Problem IIIA4, "Contaminants prevent commercial utilization of white perch from Green Bay", is interesting, but not essential for the Plan.
- What would it take to increase the commercial harvest limit for yellow perch from Green Bay? – LMFF

- Department biologists will continue assessments of young-of-year and adult yellow perch. We are working to develop a new model of the population (see Problem IB6. "Yellow perch recruitment has declined in Green Bay and Lake Michigan"), and will use that model to establish objective criteria for expanding the fishery.

- The 50/50 split seems slanted a bit toward the sport fishing harvest. – LMFF
  - We think this is a reasonable allocation rule.
- Funding to implement recommendations of the Commercial Fishing Task Force is not in place. - LMFF
  - This is correct.
- Periodically evaluate the effects of electronic catch reporting on enforcement costs associated with the commercial fishery.
  - We hope that once the electronic catch reporting system is in place, the efficiencies will be apparent. We're not sure that the cost and time of a periodic evaluation of savings would be appropriate.
- The WDNR is currently managing both the commercial and sport fishery on an equal basis, yet there is no true parity in value of sport and commercial fishing industries in the state of Wisconsin. – WF/GLSFC and WWF
  - This goes to the problem of funding, which is discussed elsewhere in comments to the Plan and in the Plan itself. We are not sure what is meant by managing "on an equal basis", but there is no question that the economic impact and value of sport fishing far outweighs that of commercial fishing.
- The American Sportfishing Association has estimated the Overall Economic Impact of the Sport Fishery in Wisconsin to be $2,137,500,309 and according to the 1999-2000 Commercial Task Force, the dockside value of the Wisconsin Commercial Fishery is $5,500,000 dollars. If the same Economic Multipliers, that the American Sportfishing Association used above, the Wisconsin Commercial Fishery would have an Overall Economic Value of $11,000,000 dollars in the state of Wisconsin. This base number was arrived on a consensus vote of the Commercial Task Force, which included numerous commercial fishermen. The ratio of economic dollars contributed to the state of Wisconsin therefore is as follows: For every $1.00 generated by the Wisconsin Commercial Fishery, the Wisconsin Sport Fishery contributes $194.00 to the Wisconsin Overall Economy. – WF/GLSFC and WWF
  - As far as we know, these numbers are accurate. There is no question that recreational fishing has a far larger economic impact than commercial fishing. Since the sport fishing numbers apply to the entire state, it would be appropriate to add Mississippi River commercial fishing and commercial bait fishing to the commercial side in making the comparison, but that would not change the main conclusion.
- The WDNR management fees regarding the Commercial Fishery are excessive on a per dollar basis when compared to the Wisconsin Sport Fishery. – WF/GLSFC and WWF
  - If the cost of managing the commercial fishery is divided by the economic activity generated by that fishery, the ratio is far larger than the ration of the cost managing the sport fishery divided by the economic activity generated by the sport fishery. This is true even though expenditures for sport fishing management far exceed those for commercial fishing management. Nevertheless, as described in the opening section of the Plan, NRB and Legislative policy dictate that the Department manage for a stable and viable commercial fishery, and that requires money.
- The Commercial Fishery is not willing or able to cover the WDNR management costs as is evidenced by their $350,000 dollar shortfall annually, which has been subsidized from Hunting and Fishing License funds paid for by the Sportsmen of the state of Wisconsin. – WF/GLSFC and WWF
  - It is well established that the cost to the Department of managing the commercial fishery exceeds our income from commercial fees. The Plan supports the recommendations of the Commercial Fishing Task Force, which include the use of GPR revenue to cover the shortfall.
- A directive needs to be included within this new management plan to explore and evaluate the manner in which the WDNR is currently managing the Wisconsin Commercial Fishery and seek new alternate and less costly methods to mange this industry, some possible alternatives are as follows: a) Increase commercial license fees to cover all expenses associated with the Wisconsin commercial fishery. b) Explore and evaluate alternative possibilities to manage the present commercial fishery which may include a contract fishery. c) Close the entire Wisconsin Commercial Fishery if other funding cannot be found. – WF/GLSFC and WWF
  - a) The possibility of increasing commercial fees to cover all management costs was discussed by the Commercial Fishing Task Force, which concluded that it was not appropriate. Instead the Task Force recommended seeking GPR funding. This Plan supports the Task Force recommendations. b) The establishment of a contract commercial fishery would represent a dramatic departure from the existing management system. The Department is committed to working within the present management system. c) Closure of the commercial fishery until additional funding can be found would be a dramatic departure from existing policy that we are not prepared to take.
- Include use of the lampara seine among the tactics under Problem IIIC1. "Commercial fishing gear kills non-target species incidentally". – LMFF
  - The value of the lampara seine has not been demonstrated. Experimental use of the lampara seine would be supported by Tactic a) "Encourage modifications in gear and fishing practices that reduce non-target mortality".

- Delete Tactic IIIC1c, "Consider a year-round 45 fathom depth restriction for chub fishing." - LMCFB
  - The incidental mortality of lake trout in chub nets is significant, and options to address that problem must be considered. This is a reasonable option for consideration.
- Specifically call for industry funding of studies of ways to make the commercial fishery easier or more productive (Tactic IIIE1a). – WF/GLSFC and WWF
  - The tactic calls for the encouragement of external funding of high-priority studies. This could include industry funding, but could also include other external sources.
- Amend Tactic IIIE2a, "Consider reopening the yellow perch trap net season with appropriate gear restrictions", with the clause, "when sustainable yellow perch populations exists". – WF/GLSFC and WWF
  - This has been done, with slightly different wording but with the same intent.
- Amend Tactic IIIE2b, "Consider alternative gear types that may reduce by-catch and incidental mortality to non-target species." in the same way.
  - Because this tactic refers to the Green Bay yellow perch fishery, which remains open, the qualification could delay helpful gear modifications unnecessarily. Gear improvements should be encouraged at any time a fishery is in operation.
- Omit Objective IIIF, "Increase public awareness of positive aspects and benefits of the Lake Michigan commercial fishing industry."
  - Because providing for a stable and viable commercial fishery is established policy of both the Legislature and the NRB, this objective is appropriate.
- The tactics under Problem IIIF1, "The public is poorly informed about the Lake Michigan commercial fishery," should explicitly include informing the public about the benefits of the commercial fishery."
  - The tactics as listed adequately support the problem statement.
- Under Problem IIIF2, "Sport and commercial fishing gear are sometimes in physical conflict" should include the tactic of standardizing net marking. - LMFF
  - This tactic has been added.
- Omit all of the Goal IV, except Objective 1, because those objectives address administrative problems and should be handled through normal management channels. – WF/GLSFC and WWF
  - The objectives that would be omitted address important aspects of the program and are appropriate for inclusion in the Plan.
- Sea Grant should be included in the outreach effort implied by Objective IVE, "Communicate study results, policies, etc., in a timely way." - LMFF
  - Tactic IVE2b has been added to address this comment.
- Merge the two tactics under Problem IVD2, "The resources and energy of private partners are not being fully utilized," to read, "Interact with sport and commercial fishing organizations, individuals, and groups such as the Wisconsin Wildlife Federation, the Conservation Congress, the Wisconsin Federation of Great Lakes Sport Fishing Clubs, and the Lake Michigan Fisheries Forum as organizations the Department will interact with in the development and planning stages to identify and develop opportunities for cooperative work."
  - This expresses the intent of the two tactics as they exist, except that the place of the LMFF is de-emphasized. We realize that the LMFF has been somewhat controversial, but it serves the unique role of providing a place where different interests can come together to find their common interests and try to resolve differences.

Individuals and groups who commented on the Public Discussion Draft of the Plan:

LMFF – Lake Michigan Fisheries Forum
LM - Lee Meyers
WF/GLSFC – Wisconsin Federation of Great Lakes Sport Fishing Clubs
GLSC – Great Lakes Study Committee of the Wisc. Cons. Cong.
WWF – Wisconsin Wildlife Federation
LMCFB – Lake Michigan Commercial Fishing Board
CM – Chuck Madenjian, for the Great Lakes Science Center
RE – Randy Eshenroder, for the Great Lakes Fishery Commission
JEB – Jacob Ellefson
JWM – Jeff McDonald
TB and ER– Terry Biltz and Eugene Reading (regarding northern pike)
CHA – Carlton Alt, for Wisconsin's Lake Michigan Yellow Perch Conservation Group

RP and JS – Rob Polewaczyk and Joshua Swanton (regarding sewage overflows from MMSD)
LG – Lisa Gaumnitz
MC – Mike Collins
PK – Paul Kruse
DG – Drinking and Groundwater
"numerous individuals" – nine people (regarding lower bag limits for steelhead)