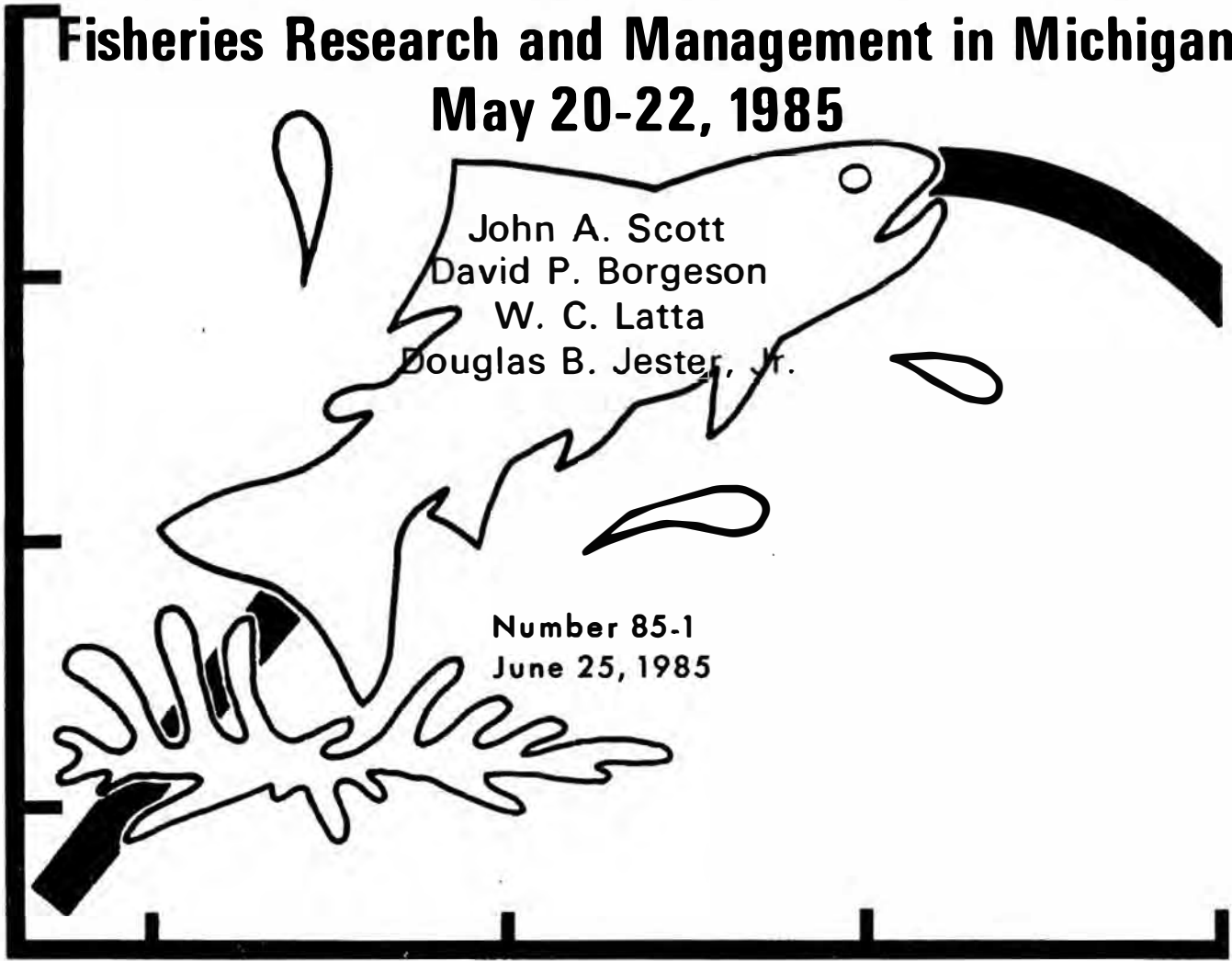


FISHERIES DIVISION

TECHNICAL REPORT

Proceedings of the Workshop on Future Direction in Coolwater-Warmwater Fisheries Research and Management in Michigan May 20-22, 1985



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David P. Borgeson
W. C. Latta
Douglas B. Jester, Jr.

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Michigan Department of
Natural Resources

**MICHIGAN DEPARTMENT OF NATURAL RESOURCES
FISHERIES DIVISION**

Fisheries Technical Report No. 85-1

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**PROCEEDINGS OF THE WORKSHOP ON
FUTURE DIRECTION IN COOLWATER-WARMWATER
FISHERIES RESEARCH AND MANAGEMENT IN MICHIGAN
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PROCEEDINGS OF THE COOLWATER WORKSHOP
"Future Directions in Coolwater-Warmwater
Fisheries Research and Management"

INTRODUCTION

John A. Scott, Chairman

The meeting was begun by asking everyone to introduce themselves and state their affiliation. Participants included Department of Natural Resources (DNR) district and regional biologists; inland fisheries staff and research biologists; university fisheries professors from Michigan State University, The University of Michigan, and Central Michigan University; a U. S. Forest Service representative; and various clientele groups (Michigan United Conservation Clubs, Michigan Lakes and Streams Association, Michigan Steelheaders, and others).

The impetus for the workshop has been the Governor's 1985 State of the State message, the potential for \$2.6 million new money (Wallop-Breaux), the Natural Resources Commission charge to provide additional emphasis on inland fisheries management (with particular emphasis on southern Michigan), and Fisheries Division objective to implement the inland fisheries expansion program. Further, the Natural Resources Commission has appointed a task force to recommend measures to improve management of current programs and determine new priorities for spending fish and game monies.

Fisheries Division has already developed a fisheries management strategy intended to provide direction for managing Michigan's fisheries programs through the remainder of this decade and on into the next. Budget documents have been prepared for that purpose. The primary mission of this workshop was to incorporate elements of an expanded inland fisheries program and lay the foundation and direction for coolwater-warmwater fisheries research and management.

Current top Department issues were discussed and it was pointed out that a very recent exercise set priorities on the most important issues. One of the top issues relating to the resource management segment of the DNR mission is to maintain, enhance and rehabilitate Michigan's inland lakes.

While much of the recent focus of public attention has been on the Great Lakes, it should be recognized that Michigan has a tremendous public and private investment on the inland lakes as well. Without careful stewardship, these inland lake resources are vulnerable to degradation through overuse and abuse. Physical rehabilitation of an inland lake is extremely costly and, although economically justified in a few instances, in most

cases the need for such drastic action can be avoided through less costly prevention programs. Local government and private landowners look to the Department for leadership on this issue.

Possible actions to address this issue include:

1. continued priority for inland lake fisheries programs;
2. increased effort in cooperative/self-help programs for lake property owner's associations;
3. expanded pilot lake rehabilitation projects with local government participation;
4. priority for field personnel to review and regulate fill and dredge proposals on inland lakes and adjacent wetlands and to identify and quantify these impacts on fish and wildlife resources.

Given all of this, it was stated that further incentive to expand our thinking and horizons for inland fisheries research and management lies in the prospects for substantial increases in funds for those activities deriving from the newly enacted and expanded sport fish restoration legislation.

The purpose of the workshop was to develop recommendations which would establish the long-term direction that will lead to better understanding of coolwater fish community dynamics and informed management of coolwater fisheries, with particular emphasis on inland lakes and streams.

Participants were charged to:

1. translate "coolwater" to include "warmwater" species (e.g., bass, northern pike, muskie, walleye, panfish);
2. avoid project lists because the goal is to emphasize direction;
3. avoid considering trout and trout habitat;
4. stretch the imagination because "ideas" are important.

Participants were divided into two groups — fisheries managers and clients in one group and research people in the other.

Managers were to:

1. define at least 10 generic problems or needs;
2. negotiate and rank those needs;
3. provide a comprehensive description of each problem or need.

Researchers were to:

1. identify current trends in fisheries research and technology;
2. identify future trends in relevant science and technology;
3. "catalog our ignorance."

Participants were instructed to keep in mind there is a need to establish a prospectus for fisheries research and experimental management to focus and coordinate deployment of resources on aspects of disequilibrium in warmwater fish communities. Further, considerations should include the causes, effects, and possible corrective actions for addressing problems of stunting and non-game species dominance in inland lakes and streams. The group was asked to consider:

1. standards and criteria for comparative classification and description of fish communities and fishing quality of inland lakes;
2. theory on causes and effects of disequilibrium in warmwater fish communities;
3. hypotheses testing through experimental (trial and error) management, artificial construction and/or modeling, and manipulation of "good" warmwater fish populations;
4. market segmentation of warmwater anglers;
5. analysis and quantification of the consequences of environmental change or stress on fish communities and on the aquatic environment.

Managers and researchers should also seek financial support from the following work groups when seeking input: Michigan State University Agricultural Experiment Station, watershed councils, conservation organizations, and riparian owner groups.

DEFINITION AND RANKING OF PROBLEMS AND
NEEDS BY MANAGERS AND CLIENTS

D. P. Borgeson, Chairman

A general discussion was started by asking clients to provide an overview of Fisheries Division strengths and weaknesses. The following comments were made:

"The Division is not doing enough for the non-avid or casual angler. Most of the problems seem to be a lack of information. Anglers often do not know where access is. More bank fishing opportunity is needed."

The angler not being served was described as:

"southern Michigan person (urban or city dweller) with no boat, no waders, little equipment, little knowledge (of how or where to fish)" or "young married, with children, with cars," or "mobility restricted."

Those anglers were identified as casual fishermen with the following species preferences: panfish, perch, walleye, bullheads, and catfish. They usually were still fishermen.

Public access was suggested as our largest problem to expanding inland fishing opportunities and the fear among riparian owners that public access will result in increased power boating on "their" lake.

Problems were summarized as inadequate opportunities for persons with limited mobility (handicapped, senior citizens, and others), quality river fishing, inadequate support services (i.e., boat rentals), limited public access, inadequate promotion, and lack of information (brochures, maps, how to fish, etc.).

The discussion shifted to biological considerations including bass-bluegill (causes of stunting, over-cropping, season lengths), acceptable growth rates (state average or up to 1 inch below, with local modifications), acceptable mortality rates (to 70% total annual mortality), and lack of survey information.

The subject of surveys prompted considerable discussion. Though there was a general feeling that more surveys should be carried out (or at least surveys should be more frequent), numerous points were made that much could be gained if greater emphasis were placed on better planning and design of current survey efforts.

Considerable time was spent discussing causes and effects of stunting. There was consensus that:

1. stunted bluegill populations lead to poor bass populations;
2. density of aquatic weeds has a bearing in Region III waters;
3. where stunted panfish occur, special regulations controlling bass harvest will not change bass or panfish populations.

It was suggested that catch and release bass fishing early in the season could spread out fishing pressure and that harvest could be reduced by reducing the season for catch and keep. It was offered that access was needed on every lake 5 acres or larger to spread out fishing pressure and control exploitation.

Few problems were cited pertaining to current esocid management strategies. The advocacy of larger size limits for northern pike provoked little discussion. Others felt that we were not far off in our current regulations. Muskie anglers were characterized as specialized fishermen. Managing for pure muskies only was suggested. Others felt tigers had their benefits and were useful in other situations. Numerous comments were made that we could probably do with fewer muskie lakes. Some thought new opportunities for muskie management could be found in the large river systems. Emphasis on quality fishing was suggested.

Opportunities for managing white bass were felt to be limited. It was pointed out that the runs were usually of short duration, access was not good, but that fish were easy to catch and often abundant. The best opportunity for enhancement of this fishery seemed to be in reservoirs.

The following list of problems and their rank was compiled:

1. Insufficient public access – particularly near urban areas for small boats and for shore anglers. Piers and breakwalls offer many opportunities.
2. Stunting – especially of bluegills and perch. Factors include weeds, low natural mortality, and insufficient predators. Weeds inhibit fishing use and mortality and affect growth rates (related to growth standards). Factors leading to insufficient predators may be regulations (overharvest) or low natural reproduction (abundant panfish and rough fish competition).
3. Limited fishing opportunity – primarily for the casual angler in southeastern Michigan. This angler typically has no boat or waders, usually has a car, and prefers to fish for panfish, perch, walleye, catfish, and white bass.

4. Competing uses of water resource – irrigation, competition for space (canoeing, power boating), pollution, and habitat degradation.
5. Insufficient fishing information and promotion – a need to take existing information (survey results and reports) available to the public and to promote underutilized opportunities.
6. Insufficient walleye fishing – need to provide more, especially on large rivers and certain inland lakes (one field biologist pointed out the goal to produce 3 million walleye fingerlings annually is nearly at hand. In 1984, 2.6 million fingerlings were produced).
7. Insufficient Great Lakes perch fishing – includes Saginaw Bay, lakes Michigan and Huron piers, Lake Erie, and Lake Superior.
8. Limited quality river fishing – primarily for muskies, northern pike, walleye, bass, and catfish.
9. Underutilized species – better use of species, or else control methods needed (bullheads, carp, redhorse, and suckers).
10. Adjustment of selected species-management efforts – need to better serve clients who wish to specialize in muskie, northern pike, or bass fishing.

DIRECTIONS AND FUTURE TRENDS IN RELEVANT SCIENCE/TECHNOLOGY

W. C. Latta, Chairman

The charge to the convened research group (which consisted of university fisheries professors, Division managers, and research biologists) was to recommend appropriate research to answer for inland lakes the following kinds of questions.

1. What is a "good" fish population? Can we develop standards and criteria for warmwater inland lake fish populations which will permit us to correct or adjust stunting, dominance of non-game species, or environmental perturbations to the fish community?
2. What kind of fishing do the people want, and can we create the appropriate fish populations?

Further, it was suggested that to obtain these goals, some fish populations would have to be stressed experimentally, and trial-and-error management would be necessary.

The research group concluded the charge could only be fulfilled by considering warmwater inland fish populations as communities. They suggested a simplified fish community model including only the dominant fish species, with little or no emphasis on the invertebrate dynamics, would be an appropriate starting point. A proposed community would include man, bluegills, pumpkinseeds, yellow perch, largemouth bass, northern pike, cyprinids, and bullheads. Inter- and intra-specific actions would be considered as well as climatic and habitat influences, and environmental perturbations. In recent years, the yield-per-recruit or dynamic-pool model for single species has proven to be a valuable management tool. In Michigan, models for bass, walleye, northern pike, trout, and other species have been used to set fishing regulations and answer other management questions. The group believed sufficient information is available to create a working community model that will be as useful, or more so, than the single-species model. However, in order to develop a definitive model to answer most management questions, much research needs to be done.

The group recommended an Adaptive Management approach. In this research, the manager conducts the perceived manipulation of the fish population to create the angling desired, while measuring the results in some detail. This information then is utilized to make the preliminary model more realistic. At the same time, research is studying species inter- and intra-actions in ponds, enclosures, and aquaria, and recording the long-term

dynamics of a community in two natural lakes (experimental and control). In this approach, the model's predictions are tested and improved by the experimental and management results. Man's part in this community would be measured by socio-psychological-economic surveys of his behavior and desires.

This same approach could be used to analyze coolwater lake communities, such as walleye, yellow perch, northern pike, and smallmouth bass, and large river communities, such as smallmouth bass, rock bass, walleye, and suckers.

The research group believes the adaptive management-community analysis approach is the most efficient way to gain the in-depth understanding of inland lake fish populations necessary to consistently create good fishing.

CROSS REFERENCING OF PROBLEMS/NEEDS
WITH SCIENCE/TECHNOLOGY DIRECTIONS

D. B. Jester Jr., Chairman

The perspective for this session could be characterized as an identification of management and research needs for each previously identified problem area. Participants were reminded that even managers seek to learn about things they do not know or understand and in effect develop their own research strategies. However, learning costs and it is prudent to determine the most important things to learn about.

It was suggested that, given the current state of science, we should begin to take a systems approach to research but continue to manage by incorporating new findings into management decisions as new answers are found. This form of research, sometimes called adaptive management research, could begin with studies on the relationships between and among species in selected fish communities. These relationships could be correlated with climate, habitat and the rate of zooplankton, and nutrient budgets as they relate to young-of-the-year populations.

Listed below are the 10 previously identified problems and possible areas of research.

1. Public Access

- a) user conflicts – the sociology of public access
- b) access design (ergonomics) – types (boat, shore), size, low maintenance
- c) location – bring people to where the fish are
- d) lake capacity to sustain fishing pressure
- e) dispersion of effort – where will people go if new access is created (recreation geographers)
- f) risk assessment (liability)
- g) predicting fishing demand

2. Stunting (of panfish)

- a) improve survey methods (i.e., new tools such as purse seining)
- b) fish community management models (including habitat)
- c) management strategies or operations research
- d) populations control technologies (e.g., sterilization, pheromones)
- e) effects of environmental change on fish and fish habitat

3. Urban Fishing

- a) market analysis (e.g., transportation, accessibility, fishing information, learning to fish, local desires)
- b) impacts on urban life and development
- c) arrangements with local units
- d) supply of fish

4. Competing Uses (bad guys)

- a) see also Stunting (2) above
- b) degradation of environment (bulkheading, channelization, agricultural runoff, stream flow, toxicology)
- c) power boating effects on reproduction
- d) permit follow-up
- e) guidelines for developers and landowners

5. Information and Promotion

- a) market analysis of needs and results
- b) determination of educational needs
- c) public knowledge and beliefs
- d) survey information strategy
- e) research riparians

6. Walleye

- a) determine what is enough
- b) intensive rearing
- c) river habitat investigations
- d) evaluation of strains
- e) market and biological analyses of regulations

7. Great Lakes Perch

- a) dynamics of Saginaw Bay perch populations, causes of apparent decline in growth and number – interaction with alewife and smelt, shoreline habitat, overharvest, and diet changes
- b) design and location of piers and reefs
- c) benefits of transfer of adult fish

8. River Fishing

- a) how to improve habitat for warmwater species (or “will techniques for coldwater species work”)
- b) smallmouth bass – size limits and distribution
- c) redbanded trout (warmwater strain)
- d) fish community structure
- e) fish passage for warmwater species and effects of barriers
- f) new river strains (Ohio muskie, river spawning walleye)

9. Underutilized Species

- a) utilization strategy
- b) commercial fishery
- c) population control techniques
- d) benefits of manual removals

10. Muskie, Bass, Northern Pike Programs

- a) market analysis of needs
- b) analysis of the potential benefits of regional regulations
- c) effects of complex regulations on compliance and satisfaction
- d) complete research on culture/stocking strategies and needs
- e) habitat requirements and management
- f) strains
- g) status of special population (i.e., Great Lakes muskies, sturgeon)

Areas for Research

The group next reviewed the above problem list and subtended possible research needs to isolate areas of inquiry which were common to all problems. Four areas were identified (social sciences, fish community modeling, fisheries technology, and habitat modeling) for which specific research efforts were needed. These were compiled as follows:

Social Sciences

conflict resolution
 market and demand analysis
 compliance with regulations
 landscape design
 recreation geography
 recreational business research
 urban planning
 political science/local government
 education/extension research

Fish Community Modeling

warmwater lakes
 warmwater rivers
 analysis of regional regulations

Fisheries Technology

improved survey methods
 operational research
 population control
 coolwater fish culture/stocking
 warmwater stream habitat improvement
 evaluation of strains and species
 warmwater fish passage

Habitat Modeling

experimental degradation
 (i.e., dredging, filling, irrigation loss)
 effects on bulkheads
 flow periodicity

RECOMMENDATIONS

D. P. Borgeson, Chairman

The summation was begun with a reminder that the impetus for this workshop has been the desire to increase emphasis on inland fisheries management, particularly in southeast Michigan. Nevertheless, most of the problems identified and research needs suggested are not restricted to this area of the state. Four of the first five problems listed are common statewide. They include access, stunting, competing uses, and information and promotion. Research efforts in all of these areas will provide direction for solving statewide problems. Further, the Upper Peninsula, because of its uniqueness, offers some real opportunities for testing experimental management techniques, including quality fishing regulations.

Sociological Needs

Much of the discussion emphasis during the workshop was directed toward a desire for a better understanding of the sociological aspects of fisheries management. Repeatedly mentioned was a need to develop an in-house capability for market analysis. A major issue was public access and a clear need was identified for developing a prospectus on how to handle this problem. The human dimension to fisheries management is clearly the bane of the biologist.

Various ways of getting a handle on the social perspectives were mentioned and are listed below:

1. create a position and hire a specialist;
2. reassign current personnel (least desirable because expertise is lacking in-house);
3. create a task force;
4. hire consultants;
5. conduct seminars and workshops to train current existing personnel

Several university personnel pointed out that specialists already exist at their institutions, but they are scattered in various departments. It was suggested the Division might be able to meet its needs by having someone act as a liaison with university social science people.

It was concluded there was a need to define an approach to dealing with the various social issues that were identified. In particular, there was an immediate need to address the problem of access in southeast Michigan. It was suggested that an interdisciplinary

team might be useful to isolate the facts and propose solutions. The following considerations should be addressed:

1. what is the potential for creating more fishing opportunity (i.e., where are the extra fish)? – to be determined by biologists
2. are the opportunities close by? – to be determined by biologists
3. how should development occur to best fit in with existing riparian development? (sociologist can help here)
 - a) sociologists can define and collect those data needed,
 - b) consider how to prevent degradation,
 - c) develop a strategy for involving client groups in the study
4. conduct market analyses to determine needs (keeping in touch with client groups and community leaders)
5. keep in touch with client groups, community leaders (i.e., elected officials, pace-setters), politicians, resource managers (i.e., local parks and recreation and waterways personnel)

Fish Community Management Needs

In addition to a need to address sociological problems, the workshop brought out a clear need and interest in a better understanding of fish community management. A major area for emphasis was the development of an Adaptive Management strategy, featuring community modeling by researchers and experimental management by managers. Of prime importance to the success of this strategy was the need for continued evaluation of management decisions (projects). Adaptive management features the implementation of decisions, evaluation of success, followed by modification (if needed) of the management strategy and continued evaluation. Although field managers have the prime responsibility for this evaluation, cooperative studies involving research and field personnel should be designed. Following these evaluations, results must be reported and disseminated to assure a complete exchange of information.

Habitat Modeling Needs

Two areas of modeling needs were identified for warmwater streams. These included irrigation loss and flow periodicity (power dam releases).

Many models have been built for individual species, however, there is a real need to begin putting the pieces together. Warmwater fish community modeling is needed, with particular emphasis on predator-prey relationships.

CLOSING REMARKS

John A. Scott, Chairman

The participants were congratulated for doing an excellent job in fulfilling the charges given the first day. Everyone was thanked for their diligence in this effort and again appreciation was expressed for the contributions from the clientele groups.

The most important task ahead was deemed to be the design of a prospectus for the future based on the results of this workshop. This prospectus would aid in setting priorities and allocating resources for warmwater/coolwater research and management efforts for the near future. Additional follow-up workshops were not ruled out.