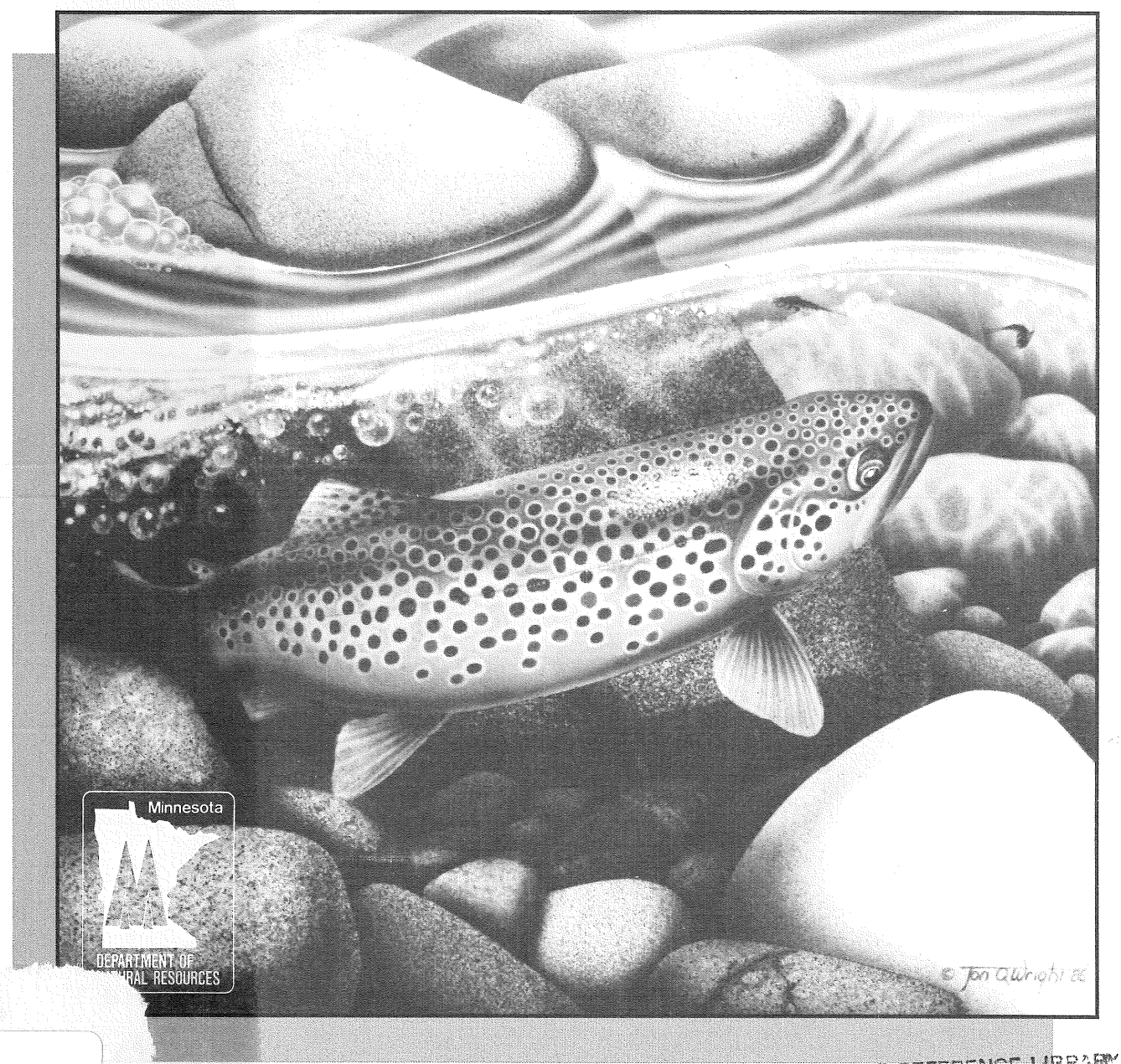
Proceedings of Trout and the Trout Angler in the Upper Midwest Workshop



June 9-11, 1988 La Crosse, Wisconsin

TROUT AND THE TROUT ANGLER IN THE UPPER MIDWEST WORKSHOP

La Crosse, Wisconsin
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Hosted by

Departments of Natural Resources - Michigan, Minnesota and Wisconsin

Trout Unlimited - Minnesota and Wisconsin

Federation of Fly Fisheries - Michigan, Minnesota and Wisconsin

University of Wisconsin-La Crosse

CONFERENCE LOCATION

Midway Motor Lodge
1835 Rose Street
La Crosse, Wisconsin

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Sincere appreciation is extended to the Steering Committee (who are listed below) whose efforts and commitment to the trout resource led to a very successful workshop. Special thanks are extended to Bob Jackson whose fertile mind spawned this workshop concept as well as providing invaluable ideas and leadership.

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INTRODUCTION

There are few outdoor recreational activities that create the dedication, emotional commitment and intensity of activity found in trout fishing. It is a sport that many associate with an aura of mystery in terms of the fish and its environment; others offer accusations that those who angle for trout can be elitist and even arrogant in their attitudes when comparing trout to other "lesser" fishing activities.

The call to develop a workshop did not reflect a feeling that a crisis existed in trout angling in the Upper Midwest. But we did know that trout are a fragile resource and that, compared to other fish species, in need of more ideal habitat and subject to overharvest. The individuals who planned this workshop were aware of these problems. They also knew of the tremendous range of individual differences in attitudes, values and opinions held by the many individuals and groups who are involved with the sport (anglers, fisheries managers, researchers and administrators, angling organizations, fishing tackle industry, and landowners). When the workshop coordinator approached a major manufacturer of trout fishing equipment for financial support for this meeting, he was refused, based on an anticipation that a gathering of this type would result in an emotional, divisive meeting. The planners, of course, kept this in mind in selecting a format which would build consensus and unity, rather than division and disagreement.

The goals of the planners were formulated almost a year before the meeting was held and are described in the following objectives:

1. To review what is the state of the art in terms of trout management and human dimensions research and issues;
2. To define and clarify problems and issues related to trout angling;
3. To foster communication among the diverse groups involved in trout angling, research, management, and administration;
4. To preserve and enhance the unique and distinctive aspects of trout angling;
5. To develop action plans for trout angling in the 1990s.

Based on these objectives, the workshop was then designed to provide a common ground of information through three paper sessions (the abstracts of these are reported in this document). A comparable amount of time was allotted to a workshop format where small (5 or 6 persons), heterogeneous groups representing all the disciplines, states, and interest groups in attendance, could thoroughly discuss the problems and issues of trout fishing and develop recommendations for the future. These solutions were to be reached through consensus rather than confrontation. It is to the credit of both the planners and those who attended that this spirit of communication and cooperation flourished at the conference. Recommendations were made and action plans developed on complex and touchy issues. These were made by consensus and with a sense of collective responsibility; first to the natural resource; second to all other anglers and non-anglers; and finally with a special sense of obligation to the sport of trout angling.

In the final hours of the workshop, individuals from each of the three sponsoring states met and created their own action plan for the next decade. Many individuals commented how they were helped and stimulated in developing this action plan through the examples and ideas communicated by other workshop participants. The type of format used in this workshop permitted everyone in attendance to act as a resource to the final conference product. Incidentally, many participants voiced their belief that other regions of the country should consider this type setting as a model to conduct their own workshop.

Finally, I would like to recognize and thank all of those who participated or in any way made this event possible. The easy part of the job has been completed. Now is the time to begin implementing the recommendations and action plans produced at this workshop.

Good fishing!

KEYNOTE ADDRESSES

TROUT STREAM ECOLOGY AS A BASIS FOR MANAGEMENT

Ray J. White, Department of Biology, Montana State University

Trout stream ecology involves the relationship of trout to the environment of the stream and its drainage basin. We cannot understand how to manage trout streams unless we understand trout population processes and the stream-and-drainage-basin ecosystem in which they take place. An ecosystem is composed of elements classified as climatic--matters of light, temperature, winds, and water currents; morphometric--shape and size, in our case, the structure of the stream channel and drainage basin; edaphic--the nutritive and other chemical influences of soil and water; and biotic--matters of the organisms present. Trout habitat is the part of the ecosystem that forms the immediate arena in which the trout can dwell and properly interact with other organisms (that are not habitat), such as its food, predators, and competitors.

Fish populations maintain and expand abundance by striving toward the goals of maximizing reproduction, maximizing body growth, and minimizing risks of death. These goals compete with each other, requiring trade-off strategies, and are subject to physiological and physical constraints. In achieving the goals, stream-dwelling fish, such as trout, have evolved efficient ways of using natural channel form and water flow.

The trout's reproductive strategy is to seek special gravel deposits during a short season, produce enormous numbers of fertilized eggs, and protect them by burial in the gravel. The usual result is a number of young so vast that survival of only a small percentage often creates whatever population of large trout the habitat can support. During the short spawning period, the trout gives decreased attention to body growth and death risks.

For most of the year, trout concentrate on a growth-and-survival strategy, taking in as much energy (food) as possible, while, in doing so, expending as little energy as possible and trying to avoid becoming the food of a predator. Being flexible in their diet, fish generally are

characterized not so much by what they eat as by how and where they feed. Thus, for a drift-feeding fish, such as a stream trout, the species composition of invertebrates in the drift is probably far less important than food particle abundance and size. A trout uses channel form and flow to advantage in trying to occupy (and defend against competitors) the stream site that allows it to intercept the most food possible while resting and remaining hidden from predators--or near hiding cover into which it can flee when threatened. The greatest concentration of such sites tends to occur where swift current veers strongly against channel sides, creating lateral-scour pools beneath dense bank cover. Special energy-conservation and predation-reduction behaviors and habitats are used when stressful extremes of winter or midsummer water temperature render growth impossible.

Trout, like most other fish, tend to grow throughout life, and as they grow, to change habitat and diet. Small hiding places and food for small trout are usually much more plentiful than the large hiding places and food needed for big trout. Trout have flexible growth rates, so they stay small in unfavorable situations but rapidly increase body size when conditions improve.

In trout stream management, we apply ecological knowledge to protect and enhance trout habitat and populations toward meeting human goals. In recreational fisheries, the overall goal is usually satisfaction through angling--in short, good fishing. Good fishing means various things to various people. It almost always includes not only catching many fish and big fish, but also having an interesting diversity of sizes (and possibly species) to fish for and a pleasant setting in which to do the fishing.

Habitat management in trout streams involves protecting and improving features of the channel and riparian zone, including structural aspects of streamside vegetation. It is important to consider the entire flood plain rather than just "instream" conditions. Habitat protection, logically the first priority in management, is needed to prevent damage from such activities as channelization, damming, water withdrawal, overgrazing, logging, mining, highway construction, and urban development. Habitat restoration is the repair of stream abuse, often a matter of enabling nature to engage in self-healing. Habitat

enhancement is the improvement of naturally deficient conditions. Habitat management should be geared to the needs of a particular species and life stages. It may differ greatly according to the life history mode of the target species. In improvement for stream-resident trout, we emphasize habitat for large fish, whereas, improvement for sea- or lake-dwelling salmonids that use streams only for reproductive and nursery purposes may be concentrated on habitat for spawning and for young fish.

Population management of trout and associated fishes almost always involves regulation of angling harvest, and it commonly entails stocking desired fish, sometimes after removing undesired ones. With recent recognition by managers that anglers seek large trout more than large numbers of trout, angling regulations have tended to become more restrictive of the numbers and sizes that the angler may creel, as well as of lures used. This has led increasingly, in the last 10-15 years, to catch-and-release fisheries and to inverse size and slot-limit regulations tailored to individual streams or to small geographical areas within states.

With respect to stocking trout in streams, massive planting and wholesale transfer of species beyond their native ranges began in the 1800s. Vast trout hatchery and stocking programs proliferated until the 1960s and 1970s, when in various states, not only was it realized that introducing exotics must often--perhaps always--be ecologically harmful, but also field studies indicated that hatchery-reared trout survive poorly in streams and may even decrease the population. (Effectiveness of stocking is, however, well substantiated in many lake and pond trout fisheries.) The stocking of trout has been virtually halted in Montana streams, and various states no longer stock streams that contain significant populations of wild trout. Emphasis on management of streams as wild trout fisheries is growing.

Habitat management and population (or community) management are most effective if coordinated rather than conducted separately. Trout habitat improvement increases trout abundance and may disadvantage other fish, hence, is an indirect form of population management and may affect direct population management. Particular dangers of mismanagement lie in misdiagnosis of problems, overmanagement, inattention to the needs of

non-trout fishes that belong in the community, and letting management be determined by enthusiasm for techniques rather than by needs of the resource. Although understanding and managing trout streams is not simple, we often have advantages of a shallow and visible environment with few species in the fish community. In warmwater fisheries, typically with less visible habitat and more complex communities, problems tend to be more complicated and knowledge scarcer. While much remains to be learned about trout stream ecology and management, we have a substantial fund of basic and practical knowledge ready for application. Through increasingly effective management, trout streams and fishing are improving in many areas.

HUMAN DIMENSIONS OF TROUT ANGLING

Robert M. Jackson, Department of Psychology, University of Wisconsin-La Crosse

The future of fish and wildlife resources, as well as the sport of fishing and hunting, depends on the attitudes and behaviors of the user as well as on the biological management of the species. Theorists have long contended that "a behavioral approach" has been applied too infrequently as a basis for fishery and wildlife management. As resource managers came to understand this principle, they accepted that their work is one of human, as well as resource, management.

Researchers have been slow to evidence interest in recreational development and behavior, particularly that of fishing and hunting. Studies of sports, recreation, and leisure by behavioral scientists and psychologists bypassed fishing and hunting activities, with few exceptions. In part, this can be attributed to the fact that these disciplines often manifest an urban, liberal bias. This is notable because other researchers have pointed to evidence that individuals can center their lives around leisure activities as well as work. Since the early 1970s, however, interest in the so-called "human dimension" of outdoor recreation has increased dramatically. Evidence includes a "human dimensions" group of researchers and managers, their publication of a quarterly newsletter, and a growing number of conferences and paper sessions focusing on the users of the resource, both consumptive and non-consumptive.

A broad range of participant orientations and behaviors accompanies any recreational activity. Actually, managers can engineer user groups by the type of recreational environment they provide. For example, natural and undeveloped areas attract users from higher social classes; by offering non-consumptive, rather than consumptive experience, we can recruit more women and people with higher education. It has been illustrated on Wisconsin streams that habitat improvement can attract trout anglers. In contrast, recreation that becomes too expensive limits usage to purists and more elite user groups. In short, facilities, regulations, and other aspects of management all affect user behavior. To be effective, the manager must correctly assess that cause-and-effect behavior.

INDIVIDUAL DIFFERENCES

Management of trout and trout anglers, it should be noted, is particularly difficult. Research on trout anglers supports the fact that those who fish trout may have the broadest range of individual differences of any angling sub-group, creating obvious problems for the manager who seeks to please and satisfy those who fish for trout. Angling regulations and proposals increasingly reflect the motivation of managers to provide a variety of fishing opportunities for this diverse clientele.

Individual differences in intensity are important in understanding trout angler behaviors. A number of Wisconsin studies have measured intensity by asking recreationists the question, "If you could not participate in _____ (trout fishing, deer hunting, etc.), how much would you miss it?" At the bottom of the intensity scale, backpackers and canoeists were least likely to indicate that they would miss the activity. Deer gun and muskie anglers ranked in the middle, while approximately 80% of the bowhunters and trout anglers indicated that they would miss it more than most or all other activities. Among trout anglers, fly fishermen and members of Trout Unlimited showed even greater intensity (as measured by the question).

SATISFACTION

Management practices have historically focused on increasing yield. However, as more information was gathered concerning the desires of sport anglers, it became evident that many other factors were also important to angler satisfaction. (For example, Wisconsin studies indicate that over half of all trout trips produce no catch.) Later, managers began to measure recreationists' satisfaction by counting "man days" in the field. In 1973, it was suggested that the concept of multiple satisfaction should be a fundamental assumption for understanding, predicting, and managing outdoor recreation behavior and conflict. Given the individual difference among the anglers already cited, a multiple satisfaction approach to fish management makes it possible to increase human benefits, even where fish populations are fixed or declining, through better management of angler-resource relationships and surrounding conditions. Good management thus implies providing a range of experiences for different recreationists.

Psychology suggests that expectations of an angler are critical to satisfaction. Success and satisfaction depend on congruence between the expectation one takes into the field and the actual experience. Thus, the key to participant satisfaction is principally determined by, and carried in the head of, the individual recreationist: change expectations and one changes satisfactions. The implications of this are that an angler can catch four trout in the summer where low water and other conditions make fishing particularly difficult and feel more satisfaction than he might in catching 30 on opening day: he took different (lower) expectations into the field in the summer.

To illustrate this, at one end of a continuum among trout anglers we might place the angler who visits a Missouri trout park. Within this setting, trout are stocked daily and the individual anglers must pay a daily permit fee to participate. Fifty-seven percent of these anglers said that this was more enjoyable than other trout angling settings or opportunities within the state. Their primary stated objective was to catch one fish; the next highest rated goal was to catch a limit. Crowding by other anglers, or the nature of the environmental setting was not important, as reported for these anglers.

In contrast, our studies of Wisconsin trout anglers indicated that satisfaction was indeed based on more than yield. When hundreds of trout anglers were asked to rate over 20 fishing satisfactions, these 6 were given the highest rating: (1) being in the out of doors; (2) nature appreciation; (3) opportunity to utilize skills; (4) seeing trout feeding; (5) solitude; and (6) escape. Catching trout ranked 7th. It is evident that opportunities to practice preferred angling methods and the trout angling setting were of great interest to these Wisconsin anglers.

Our Wisconsin studies also focused on individual differences among anglers who preferred different species or different angling methods. Those who fish brown trout are more likely to get satisfaction from seeing trout feeding, using fishing skills, nature appreciation, releasing their catch, and using the equipment they made. Those who fished brook trout, in contrast, were more likely to eat their fish, show it to others, and just enjoy being in the out of doors. Fly fishing anglers were more likely to prefer brown trout, and cited appreciations similar to those

preferring to angle for brown trout. (Often, of course, they were the same angler.) Fly fishermen were also likely to enjoy "the beauty of the trout," and more likely to select their fishing setting based on its beauty and the chance for a large or trophy fish. Similarly, Michigan studies show that regional differences are associated with trout angler preferences and behaviors. This makes management more complex because these anglers can choose to travel anywhere to fish.

Motivation and satisfaction have also been known to change over time and through experience. Angler motivations apparently move from a focus on product to a primary interest in process. Those in the first stages of angler development find their greatest motivation and satisfactions from using equipment, followed by catching fish, and later by angling for a trophy. Anglers at this point in their participation in the activity or sport have been described as "general" recreationists. Ultimately, trout angling experience tends to change the participant towards one who now denotes or limits interest to some special branch of the sport and who focuses on angling methods (i.e. fly fishing). Finally, a mentor relationship emerges where the motivation to teach others is primary, or the individual fishes simply to "be a part of the setting." These techniques or method specialists identify with other recreationists with similar attitudes and interests, often adopting special vocabularies (rod blank, Quill Gordon, hex hatch, etc.) or uniforms (fly vests) which identify and associate them with the sport. Attitudes and values also change in this evolution, over time and experience, generally moving from consumption of the resource to preservation and emphasis on the nature and setting of the activity.

SOCIAL BEHAVIOR

Social characteristics are also clearly different among anglers and other recreationists. One study that surveyed 12 different recreational activities found that trout anglers were lowest in the need and desire for affiliation. As one angler told this presenter, "I don't mind riding to and from the stream with another person, and I don't mind saying hello to one old man at noon, but other than that I don't want to see another angler." Canoeists using the same streams as trout anglers are higher in their needs and motivations for affiliation. However, these individuals are often participating with organized groups which may skew the results.

For some anglers and hunters, the social experience is the dominant motivation for participation. In researching deer-gun hunters, one 17 member hunting party interviewed by the presenter had only 5 guns in the camp. They were there to socialize, play poker, and to drink beer. Smelting and walleye runs were often compared to social festivals that, like deer-gun hunting, affect the whole social life of a community. One consequence of the individualistic nature of trout fishing is the difficulty of effectively introducing new participants to the sport. The best teaching models seem to reflect the coaching of a mentor, who personally takes the neophyte trout angler under their wing and insures the safety, success and satisfaction of the pupil.

ETHICS AND VALUES

The social sciences do indicate the means for changing recreational behaviors as well as the ethics and values associated with angling experiences. Involvement with the resource demonstratively increases responsibility and stewardship on the part of the recreational user. One researcher categorized human attitudes towards animals. Among sportsmen, three of the most prevalent types are consumptive, macho (or competitive), and naturalistic. Research indicates that those who are naturalistic tend to have more empathy towards animals than other sportsmen or anglers, as well as non-consumptive or anti-hunting groups. For these naturalistic individuals, hunting or fishing is the means rather than the end or objective of the activity. Typically, naturalistic individuals have been intensely involved with the out of doors. Other research suggests this involvement enhances a sense of stewardship and responsibility. Examples of this would be tree planting, stream improvement, and other activities that directly involve the individual with his natural environment.

Peer pressure and social learning are powerful tools for shaping values and consequent behaviors, as can be witnessed in the growth of catch and release fishing among muskie anglers. The ethics relating to what to do with a successfully landed muskie have changed dramatically in the last decade. In the upper midwest waters, keeping a legal muskie is now tantamount to sin. While first emphasized by muskie clubs and organizations, guides and resorts are now pushing this behavior. All seem to recognize that release is apparently increasing overall harvest

and the incidence of sizeable, trophy fish.

Catch and release, as an angler behavior, is of critical interest to both anglers and managers today. In 1976, the Sports Fishing Institute reported on a number of studies from eastern, midwest, and western states. The article stated that each research project indicated reduced participation of anglers, apparently because of catch and release regulations. The general trend of the article was to discourage and move managers away from catch and release regulations.

Studies in other areas indicate that local populations often seem unaware of the fragility of the resource, or that it could be depleted or eliminated. Currently, this is being reported for the Cajuns in Louisiana in reference to their overharvest of ducks on the bayous. Our research interviews of regional managers have suggested this same value among the northern reaches of our three states. The ethic among these folk towards forest, field, and the critters is apparently highly consumptive. Many have testified that there is little stewardship toward the extensive and precious resources of the region. It is suggested that this relates historically to the consumptive attitudes of the "big timber" days as well as a psychological characteristic of humans to place less value of those things of greatest supply or availability. For these individuals, the resource exists to be harvested.

Yet one researcher has stated that no agency can afford to raise unlimited numbers of trout simply for purposes of their being caught and eaten. I would again cite research evidence that more intensive participation moves the recreationists away from consumption, as does years of experience and moving through phases toward mentorship. These individuals release, not because the resource is not important, but rather because it has become so critically important to them and to their satisfactions and values. Our Wisconsin studies indicate that catch and release ranks fairly high as a satisfaction for trout anglers; apparently it becomes intrinsically satisfying as well as an act which helps preserve the resource. Individual case histories indicate that individual anglers and sometimes clubs become almost evangelistic in bringing catch and release to others on the stream.

Management decisions can also influence recreational values and

behaviors. It has been suggested that the quality of outdoor recreation experience is related to its artificiality. Whenever the demand greatly exceeds the supply, pressure to fill the gap often results in inferior services or products, and environmental conditions of a more artificial quality. As cited earlier, studies of trout anglers indicate that these environmental conditions are the heart of what brings them satisfaction from their angling experience.

Managers have often created regulations or policies which convey how the fish is taken is unimportant. Catch or kill rates or yield are the only criteria. One example of this was the permitting of anglers to snag salmon and trout in Lake Michigan or its feeder streams. There are many who do think that the ethics of how fish or game are taken are the ultimate values. For example, emphasis on the clean or one shot kill rather than the size of the animal you are hunting. Trout anglers interested in process or method would have similar feelings. Many feel that the essence of sport angling is defined in how fish are taken, not simply in body counts.

Another aspect of angler focus reflects conflict. Another paper in this workshop will describe the conflict between residents and out-of-the-area anglers over regulations on the Au Sable River. The paradox is that both groups are committed, strongly opinionated, and share many common focuses. In other situations, one group of users may not be aware of the conflict. Studies of conflicts of anglers and canoeists suggests that canoeists are not aware that running into log jams is injurious to anglers' interests.

The decision maker needs at least two types of information to put into effect a management scheme which minimizes conflict: (1) a resource inventory and (2) a user inventory. Good management can thus be defined as giving people what they want to the extent that the ecosystem can support it.

These human dimensions must be considered with the biological as this conference works to create a model for satisfying and responsible trout angling for the 1990's.

PROCESSING GROUPS

At the conclusion of the workshop, attendees were separated by state and dispersed into smaller groups. Each group was asked the question: What should be your state's management strategy for the 1990's? The concensus strategies of these processing groups was distilled into the five most important things to advance trout management. The results of this processing activity are shown under the respective state headings.

STATE PLANS

MINNESOTA

Five major areas were identified by the processing group where work was needed for the successful management of the stream trout resource in Minnesota. These five areas are: inventory and classification; securing necessary funding and manpower; building a constituency; biological and sociological research; and integrated watershed management. While these five ideas are not all encompassing, the processing group felt that these were the most important areas for work in the next 10 to 12 years. It was recognized that Minnesota has not developed its trout resource like Wisconsin and Michigan, particularly in the use of special regulations and habitat improvement practices. It is felt that by working toward these five goals, Minnesota can bring its trout management program to a higher quality level.

1. Inventory and classification deals primarily with expanding and maintaining our present data base. This would include the collection of biological information as well as sociological information. A consistent biological data base will enable the manager to better understand what is happening as fishing pressure increases and/or decreases, what happens when special regulations are implemented, what happens when habitat improvement efforts are undertaken, and/or what happens when physical changes occur (water removal).

Necessary sociological information is discussed under item 4. Weithman-Anderson questions are currently asked of anglers during a creel census. These questions help quantify what the coldwater resource user needs and/or wants. In addition, a series of public meetings could be used for additional input.

2. One of the more important needs in stream trout management is to secure necessary funding for materials and personnel. Fiscal avenues need to be developed to increase the base level funding for those managers working with the stream trout resource. This could encompass such diverse things as an increase in the cost for the trout stamp, greater use of trout stamp monies for direct stream or watershed work as opposed to hatchery expenditures, and/or to utilize pull tab funds from angler groups. This concept could also include: clubs adopting a stream

and funding habitat improvement work, watershed acquisition to reduce siltation in the stream, and/or a necessary restocking program. In addition, other long term funding sources should be explored by the resource agency in conjunction with the stream trout angler. Along with an increase in money must be a demonstration by the agency that the money is being spent efficiently and effectively. This means that we must find more effective habitat improvement techniques.

3. In order for stream trout fishing quality to remain the same or to improve, it is imperative for the manager to work with the trout fishing constituency. The most basic place to start with building this constituency is with aquatic education. An educational program should encompass everything from K-12 on through retirement age. It has been shown that aquatic education will give the young angler a better appreciation of what is happening with the resource as well as helping them and other anglers understand that it is a renewable resource, but that you can only have so many things from this resource. As an example, you generally cannot have many, large fish from a single system.

There must be an effective process of communication between the manager and the trout fishing constituent. Methods could include: attendance and presentations at trout angler meetings, workshops such as this one, public hearings/public meetings where various new proposals for a given stream resource would be discussed, and perhaps action in the political realm. In order for the constituency to accept more stringent regulations and/or other new proposals, it is very necessary for them to have input into this decision. If the constituency feels that they have input into a management decision, greater acceptance of this decision by the angler and a voluntary compliance with the management decision will follow. Without this public involvement in resource allocation many management decisions are doomed to failure. All of the above ideas promote management-constituent interaction. The day when the manager can say, "I know what's best for the resource", make the decision, and implement are gone. The constituent and the manager must interact on what they want from the resource, what the resource can produce, and how we can go about producing this product.

4. Management is no better than the research upon which these tools

were developed. Timely biological and sociological research is very necessary for Minnesota trout management to continue to move into the 21st century. Biological research can cover such diverse areas as: habitat improvement techniques, effects of special regulations, which special regulations are the most effective on a given stream, which watershed management regulations might be the most effective, what species in a stream might be the most effective, remodeling a stream to produce certain size trout, and/or working with the different flow regimes in a stream to enhance productivity. Sociological research would deal with finding out what the majority of the anglers (from worm to fly angler) really want, how to go about reaching those who have not made their wishes known, how to quantify what the angler really wants (i.e. when they want a 16 inch brown trout, do they really mean that they are perfectly happy with a 12 inch brown trout?), and/or a better way of meeting the expectations of the angler. This type of information should lead to a more equitable distribution of stream designation and management for the various user groups. Through biological and sociological research the agency is then in a very good position to develop a comprehensive and effective fish management plan for individual streams, look for the necessary funding and manpower needs to implement the plan with help from constituents to secure necessary funding.

5. Probably the single most important factor in working on a trout stream is integrated watershed management. Integrated watershed management might best be described as dealing with the whole watershed, dealing with all the constituencies on that watershed, and managing the watershed as a means of managing the stream. Presently, we try to manage individual streams regardless of what is happening in the watershed. We will go into a stream, do habitat improvement, work with special regulations, or change and/or work with various open and closed seasons in order to manage the trout resource. In many instances, this stream is managed by outside factors over which we presently have no control. By going to an integrated watershed management program, we would be working with all land owners to undertake more efficient or better agricultural practices to reduce the amount of surface runoff, to reduce the amount of contamination of groundwater, and/or to reduce the

amount of groundwater that was being pumped out and utilized for irrigation purposes. Once we were able to institute better management practices within the watershed, many problems with the stream could be alleviated, such as excessive siltation, flash flooding, and/or excessive contaminants. We would then be in a position to move forward with meaningful habitat enhancement in the stream instead of having it silted in or washed out because of flash floods.

The whole process of integrated watershed management is going to be very costly and is going to necessitate a better educated and better informed constituency. Some of the means of aquatic education mentioned earlier would certainly move us toward this direction. There must be concerted effort to deal with the non-angler (educationally and environmentally) who controls land which could be having an negative impact on the stream resource.

It is felt that if many of these ideas that have been mentioned could be funded and/or implemented within the next 12 years, the quality trout fishing resource in Minnesota could be further improved and more quality recreation days for everyone who is interested in trout and the trout resource could be provided.

MICHIGAN

At the conclusion of the conference the Michigan attendees reacted to the question: What should Michigan's trout management strategy be for the 1990's? We were asked to distill this strategy down to the five most important things we could do to advance the cause of the trout resource and trout fishing.

We used a brainstorming/processing technique to define and prioritize the five most important things we could do. The following approach was used to arrive at Michigan's list. Each individual reflected on the question and generated his personal list of ideas. We then made a combined list of ideas using a round robin approach to gather ideas from all group members. The group's combined list of ideas was discussed and clarified. Each group member then assigned a priority to each of the trout enhancement strategies. These individual priorities were combined to generate the Michigan group's strategy for the 1990's which is shown below. We ended up with six strategies rather than five.

1. Protection of existing water quality and habitat had the highest priority ranking. Clearly this was of high priority to everyone. Examples of what the group meant by protection were pollution control (with a greater emphasis on non-point sources versus the present emphasis on point source pollutants), green belting (buffer strips along all waters), watershed protection, land acquisitions to prevent development, and protection of streams and lakes from being dewatered by diversions or other means.

2. Education of anglers and the general public. First we need to more effectively educate the public about management techniques and their basis, and increase angler awareness of the biological limits of trout populations. We need more effective ways of instilling conservation ethics. Use of peer pressure to obtain compliance with regulations is very effective and inexpensive. There should be more public input and interaction incorporated into the process of setting management goals, regulations, and other agency functions related to trout. Anglers need to hone their political skills and activity to help accomplish what is best for trout and trout fishing. More information and education on how, when, and where to fish is needed.

3. Enhancement to provide better water quality and habitat by upgrading pollution standards and eliminating existing pollution. This includes eliminating thermal pollution and abnormal flow regimes such as those created by hydroelectric dam operations. Other suggestions were to reduce sediment loads of both bedload and suspended material. There is a need for habitat development in some streams to create more cover and improve channel morphometry to increase the carrying capacity and production of trout. More special fishing regulations should be implemented to alter the size and age structure of trout populations to provide more trophy (larger than normal) trout.

Using trout with varying genetic characteristics for fast growth rates, aggressiveness, and habitat selection is believed to have promise for enhancement of trout populations and fishing. Management for aesthetic qualities along trout streams is long overdue because angler satisfaction can be elevated greatly by simply making the surroundings more aesthetically pleasing. Really, one of the greatest things about trout fishing is the kind of stream and surrounding country where trout generally live.

4. Research. Our group believed that there should be an ongoing program of biological investigations to develop the knowledge, understanding, and tools for future trout management. Research into better ways to protect and enhance habitat are needed. Improvements or better utilization of trout genetic characteristics to enhance trout stocks and fishing should be pursued. There is a great need to survey and obtain information on most waters to determine their status and to serve as baseline data to assess future changes. Information on habitat, fish stocks, angler usage, success and satisfaction should be gathered.

It is apparent that angler desires and values are rather diverse, ranging from a desire to maximize total catch, maximize trophy catch, fishing with flies only, and catch and release. These desires are all viable options subject to the biological constraints of the population. We need to better survey our anglers to quantitatively determine their desires.

5. Allocation. Since there are a number of angler desires for trout fishing opportunities which are based upon their personal values, we should provide different fishing opportunities to satisfy the various angler interests, providing it is biologically possible. One could argue that if 5% of the trout anglers preferred to maximize the catch of trophy trout and this could be accomplished through catch-and-release fishing regulations, then 5% of the trout water (acres) could be allocated for this kind of fishing. The acceptability of a user tax on heavily used waters by anglers and others (canoeists, tubers, etc.) could be explored as an avenue to achieve limited entry thereby improving the aesthetic value of our trout resources and the satisfaction of users.

6. Funding. Reliable and new or additional funds to achieve goals and objectives is essential for the success of trout management efforts of the 1990's.

WISCONSIN

The Wisconsin group decided to use a personal basis for our action plan. It is often difficult to see how each of us fits into the larger scheme of things in agency plans. The personal approach gives us concrete things we can do right now to make a difference in the world. The most effective means of communication and influence is on an individual, one-on-one basis. The question we asked ourselves was "What are the five most important things we as individuals can do to insure quality trout angling into the 1990's?" We grouped the results as actions that can be taken by an individual, a group, or an agency. We spent the most time on individual actions. The emerging themes in all three areas are education, commitment and involvement, and cooperation and interaction.

Individual Actions

Education

There are many actions an individual can take to encourage education of others about trout fishing and the resource. We all have a deep commitment to the sport that we can share with others, wherever we encounter them. In this way we may be able to persuade people to develop an interest in the sport, or gain an appreciation of the resource and the people who care about it.

By demonstrating and sharing ethical behavior we may be able to instill the same behavior in others. Better ethics would improve relationships among anglers and with landowners.

The resource itself is the basis for the entire sport of trout fishing. If we can share our appreciation of the resource with others we may be able to expand the public's awareness and the long-term protection of the resource.

A personal commitment to learn and grow is important to keep us motivated and excited, as well as progress toward ultimate resource stewards. Showing that no one is too old to continue learning will encourage others to try the sport.

Wisconsin lacks the long-term trout fishing culture that is present in eastern and western states. Working to build traditions and encouraging this culture can only strengthen environmental protection attitudes and the economy of the trout fishing related industry in

Wisconsin.

Communication and Involvement

All of us could do more to preserve the resource we care so much about. Collectively, more individuals giving time and money could make a real difference.

It's becoming common knowledge that the resource is limited and can't sustain quality fishing while allowing unlimited harvest. By showing more personal restraint in our own fishing, we encourage others to do the same and reduce the need for more regulation.

The world seems to be run by politics and to protect our interests we must get involved in the politics of resource management at all levels of government.

Cooperation

The future is one of cooperative management and we should encourage it. Working together brings joint appreciation, ownership, and more accomplishments.

Group Actions

Individual actions when organized collectively become group actions.

Education

Watershed management must be the basis for trout management. Everything that goes on in the watershed affects the trout stream that flows through it.

Wild, naturally reproduced trout are important to most of us and should be promoted by groups. Wild trout are the barometer of a healthy environment and provide the best in quality fishing.

Environmental education is a must in our schools and with youth groups. We as groups must support and encourage environmental education.

A member of a trout fishing group suggested that sometimes the "elitist" attitude of our organizations discourages new members. We should try to shed this image and broaden our membership.

Commitment and Involvement

Groups can do a lot to provide money for trout management activities.

Volunteers can play an important role in habitat improvement

projects.

The action of groups and the people they represent is important in bio-politics.

Cooperation

Private groups can often be effective working with landowners where agencies cannot.

Groups should interact with agencies on a continuing basis.

Agency Actions

Education

Current agency education programs such as aquatic wild should be continued and expanded. Training leaders and their administrators is especially important.

One person felt that agency people are not allowed to speak their mind and therefore don't relate well to their audiences.

Cooperation

Agencies should do more work with groups to help encourage interest and participation in that group.

Knowledge

Agencies must continue to gather knowledge by doing research and surveys to improve management.

In general, the conference pointed out that trout management in Wisconsin is headed in the right direction in the areas of:

- aquatic education at all levels
- cooperative management with the public
- fishing regulations that match diverse resources and angler desires
- habitat management that incorporates sound scientific principles and aesthetics
- watershed protection and management as the basis of trout fisheries management

P R O C E S S I N G:
GROUP INTERACTIONS
AND COMMUNICATION

In the processing portion of the workshop, attendees were asked to discuss two major issues: 1) "What are the elements that are essential to high quality trout fishing experiences?", and 2) "Given the vast range of individual differences among trout anglers and with the resource (habitat, water quality, etc.), what do we need to do in terms of regulating, educating and managing both the human and natural dimensions of our sport?"

The first part of this processing activity was a brainstorming activity. The group was asked to identify and list as many factors as possible in a few minutes of time. They were then asked to select and make statements about the most critical 4-5 aspects of the question at hand. In question number one, all of those comments are included in the lists which follow. The repetitions simply help us identify the most important of these dimensions because of their frequency (i.e. note the frequency of comments relating to the aesthetics of the experience). Note, also, that a few single words or phrases (solitude or water quality) were mentioned a number of times. The "x" which appears after a word denotes a second or third listing of the same idea.

QUESTION NO. 1: WHAT ARE THE ELEMENTS THAT ARE ESSENTIAL TO HIGH QUALITY TROUT FISHING EXPERIENCE?

Personal and Aesthetic Qualities

Solitude. x x

Beauty of area.

The sounds, smell and sights of the streamside upon arrival.

The exploring and discovery of what is around the next bend.

We like wild trout and the places they live.

We like clean, clear, flowing water, spring seeps, pleasant surroundings, and solitude.

We like to see trout close up - their colorations, their rises and migration.

We like to observe nature and experience weather changes.

Experiencing beautiful scenery and a chance of seeing a variety of wildlife.

Being in a beautiful natural setting in which one can see wildlife, feel and hear rushing clean water, experience the transition from day to night, and see fish rising to a heavy insect hatch.

An intense escape that allows for total relaxation.

Scenery.

Pleasant weather.

Exclusivity.

Unspoiled setting.

Environmental and aesthetic qualities such as seeing other wildlife, the sights, sounds and smells of a healthy stream environment and clean water.

A stream with rocks and riffles and the attendant sounds of water rushing over rocks.

Anticipation of catching and releasing a quality fish grew while in the solitude of the tree-lined stream.

Wild, natural streams are best; anticipation and knowledge improves those conditions.

Trip enjoyment involves nice weather, fishing success, watching and listening to wildlife in the absence of stress.

Enjoyable weather and few bugs enhances the experience.

Aesthetics is essential to a quality fishing experience.
Solitude of a pristine trout stream is a quality experience in itself.
Stream "character" is essential to a quality experience.
Aesthetics is what it's all about!
Fishing in a biologically diverse environment with abundant wildlife, invertebrate hatches, unique encounters, and few signs of civilization (no litter).
Aesthetic elements such as solitude, observing other wildlife, quietness, and wild scenery are equally as important as catching fish.
A pleasurable physical experience would include quiet surroundings, acceptable water clarity, feeling in control of your gear, having toilet paper, sighting fish (not necessarily in this order, the feel of current against your body, the simple pleasures of fly casting, success with one's own flies, and the cool taste of potable spring water).
It is important to have wilderness within reach.
The total atmosphere (isolation, pristine beauty, flies-bugs) has more importance than catching many fish.
Scenic natural setting.
Uncrowded stream with public access and room to fish.
A setting which is pure, healthy and diverse.
A pleasant setting that contains the following characteristics: solitude, clear water, no development, reasonable weather, natural sounds and smells, and other wildlife.
A good experience does not include cattle, biting insects, creek chubs, and birds' nests.
Ambience.
Experiencing the solitude in natural settings with good water quality is often a part of quality trout fishing.
The place must be aesthetically pleasing, including the following elements: attractive water, sense of solitude, and the chance to see wildlife.

Personal Experience

Cooking and sharing the catch can be as rewarding as releasing a caught fish.

A quality experience is to meet or exceed one's own expectations whether sharing a treasured experience with others, or satisfying one's own personal needs.
New experience.

Social Factors

Camaraderie with a select group of friends. x
Sharing the fishing experience.
Sharing skills with a novice.
Reliving the day's experience.
The recharging of the human spirit through solitude on the stream.
Fishing in solitude on a portion of a pristine stream.
Sharing the experience of trout fishing.
Sharing the common experience with good company.
Companionship.
Sharing the experience of catching fish in an unspoiled setting.
Sharing the experience during or after with special people.
Making new friends and sharing knowledge.
Memories of a quality trip includes reflecting on solitude/companionship.
A quality fishing experience by fishing alone (solitude) or in "good" company.
Sharing the experience with a friend who understands.
Having a pleasurable social experience if you encounter others who exhibit stream etiquette.
Friends, friendships, and the experience.
Quiet companionship may increase fishing pleasure.
An unhurried and uncrowded experience with a chance to share tales afterward.
Meet new fishermen and camaraderie with all.
Watching someone else catch a fish.
Teaching or mentoring, or perhaps being with good people, is often more important than catching fish.

Biological Factors

Quality. x x

Biotic diversity, rich ecosystem.

Good water quality.

Water clarity.

Insect hatches.

Knowing that fish are there.

Having fish that are hard, and rewarding, to catch.

We like a variation of species, size, and catch rate.

The potential to catch a desirable sized fish.

Quality fish potential.

Must include fishing in solitude, with good water quality, with anticipation of catching quality fish.

Seeing or knowing that the fish are there, whether or not you catch them.

The presence of fish provides enjoyment in itself.

Knowing that there is a healthy population of trout in the stream, inclusive of large individuals, and that failure to catch fish is not due to their abundance in the stream.

It is important to have a stream which has the ability to produce wild trout in significant numbers.

It is important to have streams that indicate the quality environment.

The quality of fish is more important than the quantity of fish.

Place must have fish populations that have one or more of the following: big fish, lots of fish, and catchable fish.

Good trout population with big fish.

Quality trout habitat with clear water and lots of insect hatches.

A wild(?) trout population with several year-classes and some large fish present.

Presence of trout.

Knowing quality fish are there.

Stream performance.

The potential for catching trophy trout, or certain species of trout (brook), or perhaps just wild trout, can be very important.

Fish/Fishing Techniques and Methods

Fish "famous" waters.

Big water.

Catching large numbers of fish.

Catching big fish.

Catching fish. x

Fishing "the way I want".

Opportunity to use various techniques.

We like the mental challenge.

We like to catch and eat trout.

We like the casting challenge.

Catching or releasing a variety of wild trout.

Anticipating an outdoor trip, preparing for it, and discovering new water.

The self satisfaction that comes from learning a new fishing technique that catches fish - sometimes for dinner.

Got to catch fish (sometimes).

The fulfillment of your anticipation.

Catching a "trophy" fish.

The opportunity and challenge of catching fish, whether you release or eat them.

The anticipation of catching and releasing quality wild fish through the application of my own knowledge and skill.

Knowledge of tackle and fish behavior provide for quality fishing.

Quality involves the challenge of fishing, catching memorable sized fish, releasing some, and eating a few.

Exploring an unfamiliar reach of stream provides a challenge to read the habitat and to place the "bait" skillfully.

The challenge of catching one or more big trout, preferably wild, in a natural (aesthetic) stream.

Additions to the quality experience include using your own fly, and a favorite rod.

The anticipation of catching a trout or just observing the fish in the stream is reason for a prime fishing experience.

A variety of angling experiences can be considered quality for one or different individuals. Variations may include: high catch rates,

fishing for wild fish, fishing for trophy fish, fishing for target fish, and challenge of catching difficult fish.
Learning the stream and becoming familiar with the ecosystem and subsequently anticipating return trips add to the overall experience.
Possessing the cognitive skills to identify the hatch, predict the right time and place to fish.
Like to catch and release them.
Technique and gear are working.
Enjoyable to fish using preferred techniques.
Fishing method is less important than exercising a conservation ethic.
A variety of fishing experiences is desirable.
Opportunity to utilize and increase your expertise with wild trout.
A challenging angling opportunity for technique/reasonable success.
Meet or exceed expectations.
Take fish on flies.
Limit of fish.
Enjoy the fight.
Teaching fly fishing to friends.
For some, fishing close to home and over a long season (opportunity to fish) is important.
Satisfaction of catching, releasing, and also eating trout; also cooking fresh trout streamside.

Access

Unrestricted access to provide opportunity.

Pre- and Post-Activity

The sound sleep that follows being pleasantly fatigued after a day on the stream.
Anticipation.
The experience lives on as memorable and worth exaggeration.
Like to eat fish.
Important to be comfortable and prepared.
Anticipation and preparation as well as memories is as important as the fishing itself.
The first part of a quality trout fishing experience is trip planning. x

QUESTION NO. 2: GIVEN THE VAST RANGE OF INDIVIDUAL DIFFERENCES AMONG TROUT ANGLERS AND WITH THE RESOURCE (habitat, water quality, etc.) WHAT DO WE NEED TO DO IN TERMS OF REGULATING, EDUCATING AND MANAGING BOTH THE HUMAN AND NATURAL DIMENSIONS OF OUR SPORT?

GROUP #1: Management situations.

- A. Define groups.
  1. Include local representation for complete input.
  2. Consensus needed on all aspects.
  3. Develop rules and regulations positive for all.
- B. Market research and meetings (public).
  1. To achieve meaningful input.
  2. To measure behavior.
  3. To measure motivation behind actions.

GROUP #2: Education is critical.

- A. Gradual changes.
  1. Information concerning need for non-consumptive uses.
  2. Slowly restrict consumption through regulations.
- B. Grade school conservation/natural resource classes.
- C. Purchase media time or space.
  1. "Smokey the Bear" type fish program.
  2. Develop and utilize data on economic value of recreational fishing.

GROUP #3: Decrease conflict on trout streams.

- A. Need to develop conservation ethics.
- B. Education program starting at the primary school level.

GROUP #4: Education/Communication responsibilities of groups.

- A. For management/research.
  1. Communicate clearly and simply the biological basis for proposed management plans.
  2. Listen effectively to <u>all</u> impacted users and interested parties.
  3. Make an effort to communicate and contact impact people.

4. Seek support from sympathetic special interest groups to help educate user groups.
5. Use available media selectively and effectively (direct mail).

B. For user groups/public.
1. Attend public meetings.
2. Express your opinions.
3. Listen objectively to what is being said.
4. Be willing to abide by laws/regulations.
5. Recognize other user groups' rights.
6. Have realistic expectations.
7. Take responsibility for the resource.

GROUP #5: Build a communication process.

A. Survey wants and needs.
1. Sociologists ask anglers.
2. Management pays bills.

B. Determine common ground.
1. Sociologists analyze surveys.
2. Management develops "straw man" management.
3. Communication with users.
4. Users redefine by feedback.

C. Propose strategy.
1. Management develops the plan.
2. Approval?

GROUP #6: Communications.

A. Need to reach commercial owners (regarding non-fishing groups) and these other groups: Chamber of Commerce, riparian landowners, anglers, publications (magazines, newspapers, TV), conservation groups, manufacturers, user groups, professional biologists.

B. Provide hearings.

C. Work toward consensus of opinions.

GROUP #7: Strategies we recommend.

A. Limited access (provide solitude).

B. Find out who are involved (concerned user groups).

C. Involve all concerned people.

D. Have real participation in the decision process.

E. Make available habitat and other management programs.

F. Provide alternatives within regulations.

GROUP #8: Limited resource - diverse desires.

A. Problems.

1. Not one answer.
2. Does not satisfy everyone.
3. Manager/angler role conflict.
4. Resource incapable of satisfying all wants.
5. Large group of users we cannot reach.
6. Majority of anglers don't recognize problem.
7. Inability to address non-resource problems that impact resources.

B. Statements.

1. Some mechanism must be developed to inform the unaffiliated angler of the existing and potential resource problems.
   a. (Non-traditional) place signs at access points listing proposed changes and encouraging contact with agency.
   b. Try to have monthly resource rule change section in statewide papers.
   c. Hardball news releases stating that if anglers don't provide their input they may lose some of their rights.

GROUP #9: Management directions.

A. Teach conservation.

B. Emphasize need for <u>less</u> consumptive use of limited resources (in schools, sportsmens groups, opinion leaders, work with an array of print media).

GROUP #10: Points to ease conflict.

A. Promote dialogue between user groups.
   1. Methods: town meetings; publications (newspapers, letters to editor, fliers, special mailings); contacts between user groups; bait/fly fishers; farmer/fishermen; special exemptions.
B. Clarify who is responsible for what (making contacts, etc.).
C. Anglers need to be in contact with resource owners and other anglers (constituency).
D. Economic community needs to promote importance of angling to local economy.
E. Use adaptive management workshops to satisfy a segmented client's wants.

GROUP #11:

A. Educate the public.
   1. Offer to present/discuss information to all special interest groups.
   2. Intensify professional media approach.
   3. Strengthen aquatic programs in elementary school system.
B. Develop better public participation processes.

GROUP #12: Develop interest through controversy.

GROUP #13: Market analysis.

A. Identify user groups.
B. Establish dialogue with and between user groups.
C. Adopt suitable management goals set by consensus.

GROUP #14: Solutions.

A. Recognize all philosophy is legitimate.
B. Need a market analysis of trout anglers.
C. Need a comprehensive survey of resource.
D. Note difference in angler generations, philosophy and difference in rural vs. urban philosophy in B.

E. We need lots of education, public involvement, resolution of access conflicts, communication with public and management (and other user groups).

GROUP #15: Solutions.

A. DNR has to get together with the state's sporting groups to develop good ideas and an educational plan - trade ideas and opinions.

B. Use medium quality streams for multiple use of trout streams.

GROUP #16: Solutions.

A. Provide diverse angling opportunities based on resource potential.

B. Involve public in drafting the plan.

GROUP #17: Solutions.

A. Provide equitable allocation of resource proportional to interest groups.

B. Steps to implement.

1. Education of purposes and process.
2. Reach a consensus on allocations by interest groups and biologists.
3. Allocate by biologically viable waters.

Group #18: Solutions.

A. Criteria to use:

1. Regulations.
   a. Biologically sound.
   b. Protect resource.
   c. Simplicity.
   d. Only where necessary.
   e. Minimize conflict.
2. Communication.
   a. Public input, openness - multiuser, locals.
   b. Consideration of impacted non-user.
   c. Integrate manager, user and non-user.

B. Best management practices.

1. Stratified regulations - sound biologically and sociologically.
    a. Collect biological and sociological data.
    b. Formulate management practices based on sound biological and sociological data.
    c. Collect and integrate ideas from diverse interests including user groups, local populations, and enforcement feasibility.
    d. Educate and listen - open forum.
2. Try it out.
3. Reevaluate.

Group #19: Responsibilities for: Fisheries Manager/Research

A. Formulate problem/question/Best Management Practice.

B. Collect sound biological and sociological data.

C. Analyze data.

D. Communicate to educate public.

E. Formulate management plan.

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SCHEDULE OF EVENTS

THURSDAY, JUNE 9

09:00-10:00 Registration
10:00-12:00 Introductory Session
Welcome
Introduction to the Workshop
Theme Talks
"Trout Stream Ecology as a Basis for Management"
"Human Dimensions of Trout Angling"
12:00 Noon Lunch
01:00-05:00 Technical Session A - Tools of the Trade
"Role of Genetics as a Trout Management Tool"
"Upper Midwest Trout Stream Habitat Improvement Techniques"
"Beaver/Trout Interactions and DNR Reactions in the Upper Midwest"
"Adverse Effects of Sand Bed Load on Trout Stream: How to Reduce Them"
03:00-03:30 Coffee Break
03:30-05:00 Processing Activity
06:00 Social Hour
07:00 Banquet
08:15 Program
Potpourri Session
"The Management of Exceptional Coldwater Fisheries Stream Systems: Analysis of State Experiences"

FRIDAY, JUNE 10

08:00 Registration
08:00-08:10 Call to Order
08:10-10:00 Technical session B - Regulations, Options, Human Dimensions
"Biological Considerations in Choosing Trout Fishing Regulations:
"Anglers Attitudes and the Au Sable: For Whom Does the River Flow"
"Support for Trout Management Policies: The Attitudes of Fly and Bait Anglers"
"Attitudes of Minnesota Trout Anglers and Their Implications for Management"
"Satisfying Trout Anglers with Special Regulations"
"Wisconsin's Proposed Trout Regulations: Managing for Diversity of Angler Desires and Trout Resources"
10:30-12:00 Processing Activity
12:00 Noon Lunch
01:00-05:00 Field Session - Show and Tell
01:30 Field Trip to Timber Coulee Watershed
04:00 Fishing demonstrations and seminars
06:00 Happy Hour and Picnic at Timber Coulee Clubhouse of the Westby Rod and Gun Club.

SATURDAY, JUNE 11

08:00-12:00	Clientele Session: Angler Input and Trout Management for the 1990's
08:00	Announcements
08:10	Papers - Trends for the 1990's "T.U.: The Fish Come First" "Federation of Fly Fishers Views of Fish Management" "How Will We Pay in the 1990's?" "Developing Cooperative Communications" "How Can We Work Together?"
10:00-10:30	Coffee Break
10:30-12:00	Processing
12:00-12:15	Conference Summary
01:00-03:00	Action Plan for the 1990's

A B S T R A C T S

ROLE OF GENETICS AS A TROUT MANAGEMENT TOOL

Charles C. Krueger, Department of Natural Resources, Cornell University

Populations of trout often have genetically based differences in habitat use, reproductive requirements, population dynamics, behavior, and food habits. Genetic variation is an essential resource for a species' survival in a changing environment, and is therefore a critically important focus for conservation efforts by management agencies. Management goals and actions must be chosen which do not jeopardize the genetic variation that remains among native wild trout populations in North America. Genetic variation within and among populations can be used in stocking programs for population re-establishment, wild stock enhancement, and "put and take" management. Examples of the management use of genetically unique strains include cutthroat trout, Atlantic salmon, rainbow trout, brown trout, brook trout, and lake trout stocking programs. The future use of genetics in trout management will include the application of technologies that fundamentally reorganize the genetics of a species or that permanently insert foreign DNA. These technologies pose exciting opportunities to improve management, but also create awesome responsibilities if they are to be used widely.

UPPER MIDWEST TROUT STREAM HABITAT IMPROVEMENT TECHNIQUES

Robert L. Hunt, Wisconsin Department of Natural Resources

Successful field-tested techniques have been devised to restore or enhance living conditions for trout in a variety of midwestern trout streams in terms of physical size, gradient, and biological productivity. Examples of such techniques and case history evaluations of their impacts on stream channel morphometry, trout populations, and sport fisheries will be reviewed (primarily from Wisconsin, and to a lesser degree from Minnesota and Michigan).

Most of these habitat enhancement techniques are targeted at improving both the quality and quantity of hiding/resting/security cover for trout. Such enhancement tends to benefit catchable-sized trout more than trout of sublegal size, to improve survival rates (especially overwinter survival) more than growth rates or the trout food supply, to benefit equally brook trout and brown trout when only one species is present, but to strongly favor brown trout when both species are present.

Angling use and harvest tend to increase substantially after habitat improvement; an indication that user clientele approve of and benefit from applications of this trout resource management "tool".

If more extensive use of the variety of field-tested procedures to improve trout habitat is to be realized, and new techniques are to be advised, at least two factors must come into play: (1) more money raised and designated for such trout resource management by state and federal conservation agencies; and (2) much greater inputs of on-site volunteer labor properly supervised by professional biologists and technicians.

A major future challenge is also represented by the need to devise better procedures to encourage and carry out habitat improvement projects on stream reaches bordered by privately controlled land.

BEAVER/TROUT INTERACTIONS AND DNR REACTIONS IN THE UPPER MIDWEST
Ed Avery, Wisconsin Department of Natural Resources

Beaver (Castor canadensis) and their activities on northern trout streams in the upper Midwest are the single most destructive influence on instream trout habitat. In northeastern Wisconsin, a 5-year study (1982-1986) was conducted to quantify the effects of an initial removal of all beaver dams followed by maintenance of free flowing conditions on 33 miles of stream in the North Branch Pemebonwon River (Pemonee R.) watershed in Marinette County.

The Pemonee River is a brook trout stream. The study area was initially impacted by an average of 6.4 beaver dams/mile. Trout populations, forage fish populations, water chemistries, water temperatures, aquatic invertebrate populations, and the sport fisheries were studied during 1982, the year before the initial removal of all beaver dams, and again during 1984 and 1986, the 2nd and 4th years following the initial removal of all beaver dams.

Initial removal of 219 beaver dams plus subsequent removal of an additional 327 dams over the next 4 years significantly lowered mean weekly water temperatures, improved mid-winter and mid-summer water chemistries, facilitated recovery of trout populations, reduced non-trout fish populations, and improved the invertebrate food base for trout in 6 tributaries within the study area. Effects of the beaver dam removals on the Pemonee River itself were more subtle but were positive or at least status quo, including effects on the sport fishery. Costs of beaver dam removal was $62/dam or $256/mile. Compared with expenditures ranging from $150/mile to $2,400/mile for 7 other instream trout habitat improvement techniques being applied across Wisconsin, removal of beaver dams was one of least expensive habitat management techniques. To maximize benefits, fish managers must direct their dam removal efforts to 1 or 2 high priority watersheds or to a few selected individual streams, and maintain an aggressive effort to keep the system free flowing.

Differing perceptions of the beaver problem from different factions within the Department of Natural Resources in Wisconsin, Michigan, and Minnesota are summarized to illustrate the difficulty in managing this furbearer in the upper Midwest. A synopsis of trapping regulations tried over the last 10 years in Michigan, Wisconsin, and Minnesota is presented along with comments on their effectiveness in reducing beaver populations.

ADVERSE EFFECTS OF SAND BED LOAD ON TROUT STREAMS: HOW TO REDUCE THEM
Gaylord Alexander and Edward Hansen, Michigan Department of Natural Resources

Sand bed load has been shown to have an adverse effect on trout in Michigan streams. Studies show that sand concentrations of only 60 to 100 ppm can reduce trout populations to less than half their potential abundance. Many Midwestern streams of the United States have sand bed loads of this magnitude or higher. Based upon our research, reduction of bed load to less than 20 ppm in low to moderate gradient streams can increase trout stocks by 20 to 100 percent.

Sand bed load is not obvious to the untrained observer. At normal stream flows, it moves slowly by tumbling along the stream bottom. It

does not produce the turbidity normally associated with extreme sedimentation, which usually contains clay and silt sized particles. It is most evident in sand filled reaches of streams that have low gradient. If ripples appear in sandy bottom areas, there is significant bed load in transport.

This sand adversely impacts trout in a number of ways. It fills pools, buries cover, decreases stream depth, increases stream width, warms water, decreases living space, increases water velocity, increases laminar flow, plugs spawning gravels, entraps trout fry in redds, and destroys habitat for trout food organisms.

Sources of eroding sand to streams will be discussed. Reduction of sand bed load via erosion control and the use of sediment traps will be addressed. A brief discussion of how a sediment trap functions, their design, and construction will be offered.

THE MANAGEMENT OF EXCEPTIONAL COLDWATER FISHERIES STREAM SYSTEMS: ANALYSIS OF STATE EXPERIENCES

Stephen M. Born, William C. Sonzogni, Jeffrey Mayers, J. Anderson Morton, University of Wisconsin-Madison

In recent years, the designation of "exceptional" waters has received increasing attention as a management approach. Exceptional rivers and streams as used here are those important waters distinguished from the total population of coldwater streams. They are commonly labeled "Blue Ribbon" or "Gold Medal" waters. To determine the collective experiences of states in using "exceptional" waters strategies (not to be confused with the narrower fisheries management strategy of special regulation waters), a survey of state fisheries agencies was conducted to determine how and by what criteria such trout and salmon waters are identified. We also sought to determine how the management of such exceptional waters relates to other environmental management activities. A 90 percent response rate to the survey was obtained. Seventy-six percent of these states identify "exceptional" waters in some way. The most significant criteria used in designating these waters include the presence of wild trout, high carrying capacity, undeveloped landscape, trophy trout, and public lands.

Generally, few states integrate "exceptional" waters identification and management with non-fisheries environmental management programs, such as water quality management. New federally-mandated (clean water act) anti-degradation program requirements may help foster coordination, although only a few states have developed anti-degradation policies. Analysis of the survey data is continuing, including determining the specific management techniques used, examining how these techniques are coordinated with related management efforts, and summarizing how state "exceptional" waters programs originated and were implemented.

BIOLOGICAL CONSIDERATIONS IN CHOOSING TROUT FISHING REGULATIONS

Richard D. Clark, Jr. Michigan Department of Natural Resources,

Many scientifically designed field experiments were conducted in Michigan to determine the effects of trout fishing regulations. A wide

variety of regulations were tested, including high minimum size limits, fly fishing-only rules, slotted size limits, no-kill fishing, and no fishing. Information from these studies led to the development of a computer model in 1979. In effect, the model is capable of extrapolating from results obtained in the field experiments to predict the effects of other regulations that were never explicitly tested. The model has been used to compare expected trout population structures and catches for a broad array of regulations in computer studies of Au Sable River brown trout. Results of these field and computer studies suggested that the two most important biological factors are the rates of growth and fishing mortality. The degree of the biological response to a regulation is very sensitive to these factors. For example, a seemingly modest difference in growth rate between two brown trout fisheries, say a difference in mean length at age two of only about one inch, could mean as much as a 10-fold difference in the catch of trophy-sized trout (16 inches and longer). Thus, if the success of a regulation is measured by the catch of trophy fish it produces, it seems obvious that regulations will be most successful in fisheries where anglers are killing many trout of small sizes that would otherwise survive and grow to large sizes.

ANGLERS, ATTITUDES AND THE AU SABLE: FOR WHOM DOES THE RIVER FLOW?

R. Ben Peyton and Larry M. Gigliotti, Department of Fisheries and Wildlife, Michigan State University

In Michigan, the Au Sable River has long been a center of attention from trout enthusiasts and fisheries managers. It has traditionally been the site of special regulations designed to produce and maintain populations of large trout while sustaining heavy angling pressure. The Au Sable has attracted--or developed--a large constituency of specialists who have come to consider special regulations which limit harvest and the use of gear as essential to quality fishing. At the same time, the river is popular with anglers for whom the right to keep some fish for the table and/or as trophies is an important element of quality fishing. The Au Sable River situation illustrates well the dilemma of the fishery manager who must allocate a limited fisheries resource to a variety of incompatible definitions of angling quality.

A heated controversy arose when the Michigan Natural Resource Commission (NRC) attempted to establish a catch and release (C&R) regulation for an 8.5 mile stretch of the Au Sable "Holy Waters" in response to lobbying by several trout angling groups in Michigan. As part of the plan, the sociological, economic and biological impacts of the regulation were to be thoroughly studied over a 5-year trial period. The regulation was halted by a court injunction, but the sociological study had been initiated and was allowed to continue.

The modified study had two goals. The first was to intensively study the specialization levels, attitudes and other characteristics of both anglers using the Au Sable and a statewide sample of trout anglers. This phase of the study was essentially a marketing segmentation study to provide a better basis for allocating trout streams in Michigan. One of the difficulties of doing attitude and market surveys is to find reliable, valid measures. Results of the Au Sable survey were enhanced by utilizing multiple data collection techniques. Anglers using the river were interviewed at access sites and sent follow-up questionnaires. A

state wide sample of anglers was also sent questionnaires. The intent of the surveys was to determine the extent of support for the C&R regulation, but it was also designed to probe more deeply into motives (perceived benefits and satisfactions) for trout fishing, levels of specialization, fishing intensity, and belief and value structures concerning several aspects of trout fishing.

The second year was devoted to investigating the extent to which anglers complied with various fishing regulations on the Au Sable river. Evidence from population models suggest that the benefits of some regulations such as C&R are vulnerable to even small rates of noncompliance. A noncompliance study of Au Sable anglers was needed to indicate probable success of certain regulations. It was also an opportunity to develop some understanding of the noncompliance problem which could be used to investigate noncompliance in other lake and stream fisheries.

Three methods were used to detect noncompliance: (1) angler interviews by the researcher; (2) unobtrusive observation of anglers by the researcher; and (3) intensive checking of anglers by a conservation officer (CO) accompanied by the researcher. The three methods were found to be comparable in detecting gear violations, but interviews and observations of anglers did not adequately detect violations of size and limit regulations.

The C&R issue on the Au Sable is a classic example of resource allocation issues that result when a scarce resource is valued for different and incompatible uses. Some legitimate disagreement existed over whether C&R would have the desired effects on trout population and size, however, the primary basis for conflict was differing value priorities in the issue. C&R advocates tended to be from areas other than the region near the Au Sable River; opponents tended to be locals. In public debate and private discussions, extreme advocates stereotyped opponents as "slob fishermen" and angry opponents described advocates as "elitist snobs". However, the two groups of anglers were indistinguishable on all measured characteristics except for two: where they lived, and whether they placed a priority on the right to decide when to keep fish. The latter represents a "territorial" value which was triggered when the state and the "elite out-state" anglers attempted to regulate these local anglers on their "own" river. On any other survey the two groups would have merged together as one segment with similar fishing intensity, levels of specialization, money invested in angling equipment, the values placed on trout and trout angling, etc. Results emphasize the need to identify such emerging conflicts early so that communication between potential opponents can be improved and mutual understanding and respect for alternative positions can be fostered.

The case study also shows the powerful role which recreational ethics play in defining the quality of recreation. The extreme levels of specialization, fishing intensity and associated levels of ethics among trout anglers cultivates an intolerance of alternative recreational choices. These strong ethics are desirable in many ways, but means must be found by managers and angling groups to prevent or manage the conflicts which the differing ethics often create.

One of the positive influences of such strong ethics was evident during the noncompliance study. In a thorough check of 289 anglers during the first three weeks of trout season on the Au Sable, only one violation was detected. Further, one of the factors which caused trout anglers the

most dissatisfaction was observing other anglers violating. This apparently resulted in a "self policing" during the early season when many anglers were present. Violations increased as the season advanced. This was probably due to the presence of fewer of the highly specialized anglers and more of the "casual", less specialized anglers from nearby campgrounds.

The Au Sable study findings raise important philosophical questions concerning the management of unique fisheries such as the Au Sable River. To what extent should the management of such resources be for the benefit of the highly specialized angler versus the larger number of less specialized anglers? Should a function of regulations be to establish (or encourage the development of) specific angling ethics? Are fishery managers responsible for soliciting input from less specialized, unorganized anglers who do not find means to express their preferences; or should the members of angling groups which are actively communicating with fishery managers receive priority consideration? How important are the preferences, ethics and traditions of local anglers in determining a state management program for a fishery? These are difficult questions which present the fishery managers with increasing concern. They will require the cooperative input of all concerned.

SUPPORT FOR TROUT MANAGEMENT POLICIES: THE ATTITUDES OF FLY AND BAIT ANGLERS.

Edward B. Nelson, Wisconsin Department of Natural Resources,

Fisheries managers possess excellent tools for gathering data on size, abundance, and age distribution of fish populations. Their methods for estimating the acceptability of new rules to anglers, however, are less exact. This presentation provides a framework for analyzing anglers' acceptance of fisheries management proposals. In it I explore the relationship between different styles of trout fishing and acceptance of special regulations on trout fishing.

ATTITUDES OF MINNESOTA TROUT ANGLERS AND THEIR IMPLICATIONS FOR MANAGEMENT

William Thorn, Steve Hirsch, Steve Persons, Jodie Hirsch, and Gary Siesennop, Minnesota Department of Natural Resources

Angler attitudes can determine their fishing quality. Fishing quality, when quantified, may be used to predict angler acceptance of a management proposal or to evaluate a management technique. The methods of Weithman and Anderson (1978), Weithman and Katti (1979), and Nelson (1983) have been used to measure attitudes of Minnesota trout anglers and to quantify fishing quality. Anglers on brown trout streams in the southeast, stream trout lakes and lake trout lakes in the northeast, and several steelhead streams on the north shore of Lake Superior have been surveyed since 1981. Differences in angler attitudes among the resources and examples of the use and limitations of angler attitude surveys to quantify fishing quality for management will be discussed.

SATISFYING TROUT ANGLERS WITH SPECIAL REGULATIONS

David P. Borgeson, Michigan Department of Natural Resources

The focus of most trout regulations is to protect trout from fishermen. That may be appropriate for a basic set of angling rules for regional use, but special regulations need to focus more on satisfying the angler. Many straightforward rules will preserve or enhance trout stocks, but it is an art to maintain the balance of fishing regulations that best satisfy trout anglers.

By citing examples in Michigan, I will show how rules need to be dictated first by what is good for trout, but then (the hard part) by what is good for trout fishermen.

WISCONSIN'S PROPOSED TROUT REGULATIONS: MANAGING FOR DIVERSITY OF ANGLER DESIRES AND TROUT RESOURCES

Lawrence E. Claggett, Wisconsin Department of Natural Resources

Wisconsin has a diversity of trout resources, ranging from small, forested streams to large, white-water rivers. Wisconsin's trout anglers are also a diverse group, based on our experience and trout angler surveys. Some want to harvest enough trout for a meal using traditional bait techniques. Many want the chance to harvest larger fish on the average. Others want to catch-and-release the maximum numbers and size of trout possible, including trophies. Most seek solitude and a pleasing natural environment. How to satisfy these diverse groups of anglers and maximize the potential of the resource to provide quality of angling is a major challenge to fish managers today.

Wisconsin, using a committee approach, is proposing a range of resource categories with different regulations in each category. Categories are based on physical, biological, and social factors. Six categories are currently proposed that cover the range of resource types and would provide a variety of angling opportunities. These regulations would improve the quality of trout fishing throughout Wisconsin by:

- -providing more diverse trout fishing opportunities
- -increasing the number of brown trout over 12" and brook trout over 8" that anglers catch
- -increasing the total weight of trout harvested
- -increasing the number of trophy-sized fish that anglers catch
- -extending the period of good fishing on stocked waters.

To support this regulation scheme, we need an improved fishing regulations pamphlet, increased law enforcement, and well-designed and coordinated evaluations.

We are currently in the first year of a two-year public involvement effort before the regulations would go into effect. We are using a variety of public involvement techniques to inform people about the proposal and get ideas back from trout anglers on what they think the regulations should be.

We are attempting to develop regulations that will provide something for everybody and match those needs with the capabilities of the resource. The question remains if the department and the public will accept the degree of complication needed to optimally balance the resource and public needs.

T.U.: THE FISH COME FIRST
Richard L. Wachowski, Chairman, Wisconsin Council of Trout Unlimited

Trout unlimited began in Michigan 28 years ago and has grown to over 55,000 members nationwide. Our members annually contribute thousands of man-hours of labor and tens of thousands of dollars to resource and habitat projects in the upper Midwest. Trout Unlimited councils and chapters also work closely with fisheries managers in their areas and provide service as "watch dogs" for threats to the trout resource. Trout Unlimited is involved on the legislative, administrative, and legal fronts over stewardship of our trout streams and lakes.

THE FEDERATION OF FLY FISHERS VIEWS OF FISHERIES MANAGEMENT
Terry Lyons and Andrew K. Davidson, Illinois Fly Fishing Federation

The Federation was founded in Eugene, Oregon in 1965. Today the Federation represents 11,000 associate members and 45,000 club members. Members of the Federation have interests in warmwater, coldwater and saltwater fisheries. There is also a small hydro taskforce and a water quality surveillance program. The Federation encourages fisheries management which includes special regulations restricted to fly fishing only and catch-and-release. The Federation works with various state fisheries agencies on the restoration and maintenance of high water quality, fisheries research, and the endorsement of special regulations.

HOW WILL WE PAY IN THE 1990s?
Ron Payer, Minnesota Department of Natural Resources

Trout programs in Michigan, Minnesota, and Wisconsin are discussed in the context of historical and existing funding sources and levels of future changes. The advantages and disadvantages of operational funding, stamps, and special appropriations are discussed as well as the roles of Federal Aid reimbursement and cooperative work with private groups. Needs for emphasis in areas such as integrated watershed management, landowner participation, and cooperative ventures such as adopt-a-stream will also be discussed.

HOW CAN WE WORK TOGETHER?
Ray Hitchcock, Minnesota Department of Natural Resources

The management of our trout resource has a history of fishing groups (i.e. Trout Unlimited and Federation of Fly Fishers) working closely with state agencies to protect and improve the coldwater resource. These groups have been instrumental in supporting special legislation to protect the trout resource. They have backed special funding for trout projects, raised money for projects, and worked with the DNR on stream projects. These groups have supported research and the dissemination of information by supporting workshops. The future trends calls for continued cooperation of the angler and the DNR. Together, we must reach the majority of trout anglers to determine their needs and to educate them on trout management and fishing ethics. We must reach the young angler and nurture their appreciation for the trout resource. We must expand our perception of a trout stream to include the total watershed.

The original oil painting was done by Jon Q. Wright in 1986.