Diversity in Gunpowder River Trout Anglers and Implications for Management

Joseph M. McGurrin, *Sport Fishing Institute, 1010 Massachusetts Avenue, Washington, D.C. 20001*

Abstract: This paper summarizes a framework for understanding freshwater trout fishermen and how such a framework can be used in coldwater fishery management. It is based on a sociological study of "angler specialization" and how it relates to fisherman behavior, attitudes, and fishery management preferences. Angler specialization refers to a continuum of fishermen types from the beginning fisherman to the advanced specialist, reflected by such factors as amount of participation, gear and equipment used, and commitment to the sport. Anglers identified themselves according to the independent variable of specialization level (occasional, generalist, specialist) and significant differences ($P \leq .05$) were found in dependent variable categories of behavior, attitudes about fishing, and management philosophy. Angler groups differed according to amount of fishing activity, gear use, water preferences, and resource management philosophy; and the specialization framework was found to be a helpful tool for describing fishing effort. It can be used in standard creel surveys to provide additional information to formulate and evaluate management strategies. Data on the diversity among trout anglers can be blended with biological, physical, and economic information to both conserve the fishery resource and provide improved fishing opportunities.

Proc. Annu. Conf. Southeast. Assoc. Fish and Wildl. Agencies 40:111–116

Increasing fishing pressure on a limited resource base is changing the character of freshwater trout fishing in Maryland. Policymakers recognize that managing any fishery resource involves understanding the fishermen and their preferences, as well as a knowledge of the physical and biological aspects of the resource. Hicks et al. (1983:7) highlight the problem:

Providing fishing opportunities to satisfy trout anglers is challenging for government agencies. Managers of trout fisheries face sharp contrasts in angler types—from those who describe their catch-and-release experience in reverent tones, to those who talk in terms of fish on the stringer. Accommodating fishermen of such different interests is made no less demanding by fiscal realities which limit the viable stocking and management alternatives. Information about anglers' characteristics and expectations is a key element in developing management strategies likely to receive broad public support.

This paper reviews the concept of "angler specialization" as a way to describe trout fishermen and their fishing effort and investigates the use of that information in fishery management.

The ability to concisely describe the wide range of angler types has been the subject of a number of studies (Katz 1981, Ditton et al. 1982) based on the work of Bryan (1977). The term "recreational specialization" as used by Bryan refers to a continuum of behavior from the general to the particular, reflected by equipment, participation, and setting preferences. Fishermen, as well as other recreationists, can be arranged according to experience and commitment to the sport, from the beginner to the advanced specialist. Bryan's original pilot study was based on trout fishing and significantly different preferences and behavior were observed among sportsmen at each level of specialization. When applied to the issues of fishing quality and management of sport fisheries, the specialization framework provides an additional source of information for policy decisions.

The present paper summarizes selected results from University of Maryland research (McGurrin 1984) on angler specialization that was conducted with the assistance of the Maryland Cold Water Fishery Program and Trout Unlimited. Credits for the strengths of the study are clearly shared. Responsibility for its shortcomings rests solely with the author.

Methods

Questions using the specialization framework were incorporated into a standard on-site creel survey. The survey was conducted on the Gunpowder River, a popular Maryland trout stream.

Study Area—The Gunpowder River

A 5-mile stretch of the Gunpowder River below the Prettyboy dam was chosen as the study area. It is presently stocked with rainbow trout on a put-and-take basis, but with continuing work on a water release system this area may have potential as a productive tailwater fishery. At the time of the survey (1983), 1,500 adult fish were planted for the opening week of the season. A number of small native brook trout streams also are located in the area and are generally small (3.7 km average length), direct tributaries to the main stem of the river. Thus, the Gunpowder was chosen as the study site of this project for its natural diversity and ability to draw a wide range of angler types. Its attributes of containing both stocked and natural trout populations, a great variety of water conditions, and prominence in offering different management alternatives made it a logical choice for the survey research.

The Survey

Information was collected from opening day on April 2 through April 7, 1983. The primary objective of sampling was to contact all Gunpowder anglers who fished during the survey times. A self-administered questionnaire was used and trained

interviewers were stationed at the only 4 access points to the stream to clarify questions about the survey. This procedure was 90% effective in reaching all river fishermen. The remaining 10% refused to complete the survey.

There are some other limitations in the sampling. First, fishermen who were on the river during non-survey hours were not contacted. Second, the sample was drawn from a limited time frame at the opening of the season. Although these factors constrained the sample size and diversity, a representative number of anglers ($N = 221$) were surveyed.

Measures

Independent Variable:—In this study, the angler's self-rating of specialization level was treated as the independent variable. Anglers were given 3 levels to choose from: occasional, generalist, and specialist fishermen. These levels were defined by Bryan (1977) as follows: 1) Occasional—Anglers who fish infrequently (<10 trips per year) because they are new to the activity or do not have a major interest in the sport; 2) Generalists—Fishermen who have established trout fishing as a regular activity and use a variety of techniques; and, 3) Specialists—Anglers who specialize in fly fishing methods, largely to the exclusion of other techniques.

Dependent Variables—Three categories of dependent variables—angling behavior, attitudes, and management concerns—were analyzed. Angling behavior was measured by amount and kind of fishing activity. Attitudes about fishing covered a wide variety of topics including water preferences and commitment to the sport. Management concerns were determined through choices about the overall fishery program and specific regulations. Chi-square and Student's *t*-tests were used to determine differences among angler groups.

Results and Discussion

The purpose of this study was to investigate a typology of specialization for trout fishermen and apply the typology to the Gunpowder River fishery. The research shows that there is variation within trout fishing activity and that fishing effort can be considered in terms of diverse constituencies, rather than a single homogeneous group. Significant differences were found between different specialization groups and angler behavior, attitudes about fishing, and management preferences.

Angler Behavior and Attitudes

Gear use can serve as 1 general indicator of level of specialization and was found to be significantly different among all 3 groups ($P \leq .001$). A substantial number of occasional fishermen used warmwater baitcasting equipment (21%), while generalists used spinning gear (94%), and specialists employed fly tackle (82%). Gear use is an important charcteristic because gear type is often a criteria for regularing different trout areas. A general description of the groups, along with

their distinguishing characteristics is included below (groups differed significantly on angling experience, water preference, and commitment to the sport at $P < .05$).

Occasional anglers made up 23% of the total sample and had the least cumulative experience, ($\bar{x}$ = 4.6 years, 6.8 trips per year), the most variable water preferences, and had the fewest numbers of individuals attaching high importance to trout fishing as a recreational activity (30%).

Generalists made up the majority of the sample (64%) and had substantial trout fishing experience ($\bar{x}$ = 12.5 years, 16.4 trips per year), preferred stream fishing over lakes and other areas (77% for streams), and placed significant importance on trout fishing activity (61%).

Specialists made up 13% of the total sample and had the most trout fishing experience ($\bar{x}$ = 18.4 years, 25.8 trips per year), preferred stream fishing, particularly limestone waters (57% favored streams, 43% favored limestone streams), and attached great importance (86% of this group) to trout fishing.

While there always will be some individual variation within these groups, the results support a continuum of specialization that serves as a general guide to describe fishing effort. The intention is not to stereotype fishermen, but rather to give fishery managers an overall picture of various angling constituencies and their fishing effort.

Specialization and Fishery Management

Given the variation in behavior and attitudes among different angler specialization groups, it followed that there also were significant differences in fishery management concerns ($P < .05$). In terms of preferences, specialists opposed increased creel limits on natural waters, supported more catch and return areas, and identified improved habitat quality as most important to management. Occasional and generalist fishermen supported increased creel limits on natural waters, were divided on catch and return, and considered an active stocking policy to be most important to trout management.

Using Specialization Behavior to Determine Management Preferences—A major problem with angler surveys is identifying manageable differences in user behavior and attitudes. Angler specialization is a particularly useful tool for surveys because it is based on behavioral differences between groups. This can be demonstrated by analysis of responses on a particular management issue for Maryland waters.

A major management proposal in 1983 was the raising of the creel limit on natural trout waters within the Gunpowder basin from 3 to 5 fish. Concerns were raised about the impacts of these changes on trout populations and angler support for such a program. When asked about the regulation change, the overall sample favored increasing the limit by a wide margin (74%). A related question determined who had actually fished these areas. Specialists (79%) were far and away the most active users and also were opposed (79%) to raising the creel limit. When the creel limit preference question was reanalyzed using only those respondents who had fished natural waters, the specialists preferences were evident. Only about half

(53%) of those who had actually fished those waters actually approved of the higher creel limit.

The above analysis demonstrates the utility of specialization in determining impacts of regulation changes on anglers. In the case for raising the creel limit, the most active user group (specialists) was actually opposed to the regulation changes, although the overall response of surveyed anglers indicated overwhelming support for the measure. Thus, the specialization framework gives a more in-depth view of management impacts by identifying who is most likely to be affected by management changes and how they might respond.

Specialization and Management Philosophy—Given the differences on specific management issues, questions were posed to investigate whether these differences extended beyond the fishing activity itself and into some of the larger issues affecting the trout fishery. Anglers were asked to indicate the most important factor in the management of state trout waters. Specialists (82%) identified habitat quality as most important, while generalists (58%) and occasional anglers (50%) chose active stocking. Overall, 50% of all anglers thought an active stocking policy was the most important factor in managing Maryland trout waters. Thirty-nine percent thought improved habitat quality was most important. These two choices highlight the difference in managing stocked versus wild trout fisheries.

Until recently, Maryland has followed national trends in showing a substantial increase in the practice of stocking adult or "catchable" trout. This stocking has created many temporary fisheries designed to provide opportunities for angling activity and to provide a high catch of stocked fish. While the federal government has published a set of criteria for return of stocked fish to anglers' creels (70%), there has been little information analyzing catchable trout management in terms of its philosophy or social impacts. Johnston (1979:14) reviews this situation.

> Without adequate knowledge of the sociological impacts of catchable trout programs, we could be inadvertently influencing the angling public's attitudes in undesirable ways. For instance, by continually creating and maintaining these fisheries, we may gradually alter the public's perception of the government's role in relation to our natual resources. . . . I believe such an alteration is already taking place in the eyes of many anglers. The government is becoming not only the manager, but the ultimate 'source' of resources.

Observations on the Gunpowder highlight this point about differences in basic angler attitudes concerning fishery management. In addition to the responses about the importance of stocking and habitat quality, complaints about angler crowding and the amount of stocked fish were voiced. These findings emphasize the blurring of distinctions between the fishery manager as "caretaker" versus "supplier" of the fishery resource. By looking at the contrasting management philosophies of different angler groups, the specialization framework can help managers determine what anglers are seeking, and how it might be delivered within existing constraints. This information can be used to target educational efforts on the manager's role in relation to the resource, as well as provide guidance on angler support of different stocking strategies.

Blending Resource Conservation and Fishing Opportunities

A diversified management program contains a wide variety of strategies that blend resource conservation and fishing opportunities. Fishery managers are charged with the protection of a public resource, and at the same time, must meet public demands to utilize the resource. In order to meet this challenge, there is a need to evaluate the place of different fishing opportunities in an overall fishery management plan. By serving as a guide to the variation in fishermen and fishing effort, angler specialization provides some of the information required to make such an evaluation.

The Gunpowder River trout fishing study shows how specialization may be used to summarize the diversity of fishing effort in an area. This information can be used in promoting a variety of trout fishing opportunities, to improve angler education and reduce conflicts among fishing groups, and to fine tune management practices for the benefit of the resource and the public.

Literature Cited

Bryan, H. 1977. Leisure value systems and recreational specialization: the case of trout fishermen. J. Leisure Res. 9(3):174–187.

Ditton, R. B., A. J. Fedler, and A. R. Graefe. 1982. Assessing recreational satisfaction among diverse participant groups. Pages 134–139. Misc. Publ. 18–1982. Univ. of Minn. Agric. Exp. Sta., St. Paul.

Hicks, C. E., L. E. Belusz, D. J. Witter, and P. S. Haverland, 1983. Application of angler attitudes and motives to management strategies at Missouri's Trout Parks. Fisheries, 8(5):2–7.

Johnston, B. T. 1979. Trout concensus needed. Fisheries 4(5):14–15.

Katz, M. 1981. An assessment of intra-group differences in conservation attitudes and environmentalism as a function of activity involvement among fly fishermen. Ph.D. Diss. Penna. State Univ., Univ. Park. 277 pp.

McGurrin, J. M. 1984. Angler specialization in Maryland trout fishermen. M. C. Thesis, Univ. of Md., College Park. 84 pp.