

THE ANGLER SPECIALIZATION CONCEPT

APPLIED: NEW YORK'S SALMON RIVER

ANGLERS

Chad P. Dawson

Assistant Professor, Faculty of Forestry, SUNY College of Environmental Science and Forestry, Syracuse, NY 13210

Tommy L. Brown

Senior Research Associate, Human Dimensions Research Unit, Department of Natural Resources, Cornell University, Ithaca, NY 14853

Nancy Connelly

Research Support Specialist, Research Support Specialist, Human Dimensions Research Unit, Department of Natural Resources, Cornell University, Ithaca, NY 14853

The concept of angler specialization was applied to a study of Salmon River anglers to test this concept when using a variety of angling techniques and two species groups within the same environmental setting. A revision of the concept is suggested to account for angler expectancy and cognitive processes.

Introduction

The concept of angler specialization proposed by Bryan (1976, 1977, and 1979) states that there were four basic types of anglers: (1) the occasional angler of novice ability and only casual interest in the sport; (2) the generalist angler who is interested in catching some fish in any environment by any legal method; (3) the tackle-species specialist who specializes in the skill of a particular angling method and/or angling for a particular species; and (4) the method-species-setting specialist who specializes in the method, species, and setting which make up a particular experience. These angler types are based on degree of specialization in fishing and specific motives in using the fishery resource. The four basic types of anglers reportedly changed their attitudes and motivations as specialization increased so that their emphasis shifted from consumption to conservation and natural settings. More specialized anglers were predicted by Bryan (1979) to: decrease their interest in harvest motives; increase their interest in non-harvest motives and specialized fishing equipment; and increase their dependence on the resource setting "to determine the difference between luck and skill".

Research on New York's Salmon River (Dawson and Brown, 1989; Connelly et al., 1990) suggests that the concept of recreational specialization may not hold true for some segments of anglers. For example, Connelly et al. (1990) reported that 45 percent of steelhead anglers (highly specialized) also participated in salmon snagging/lifting activities (low specialization and focused on harvest more than skill) in 1989. The goal of this paper is to attempt to apply the angler specialization concept to data available from a 1989 survey of Salmon River anglers (Connelly et al., 1990). While this data was collected for other purposes, it provides some information to test the angler specialization concept and helps illustrate the

need for a revision of the concept. The concern over the general lack of empirical evidence to support the specialization concept is outlined in a paper by Dawson, Buerger, and Gratzner (1991) in this same proceedings.

New York's Salmon River Fishery

The 1989 Salmon River angler survey was designed to measure angler impacts on the fishery resources, angler attitudes toward existing and potential fishery regulations, and economic impacts on the local communities. The study consisted of three survey components: (1) a streamside creel census of 5,755 anglers to estimate their catch and effort; (2) a mail survey of 1,609 anglers (69% responded) to estimate trip characteristics, attitudes about salmon fishing, and reactions to potential changes in salmon fishing regulations; and (3) focus group interviews with 8 angler groups (115 anglers) to investigate in-depth reactions to potential fishing regulations and attitudes about salmon fishing (Connelly et al., 1990).

During August 15 to December 31, 1989, anglers were generally in pursuit of either Pacific Salmon or Steelhead that were returning to the Salmon River to spawn after leaving Lake Ontario. Pacific Salmon return earlier than Steelhead during the fall season. Pacific Salmon die after spawning and can be taken by a variety of methods at different times and locations. For example, as the season progresses, salmon can be taken in some locations by legally snagging the fish in the body with a weighted treble hook since the fish will soon die anyway. Steelhead return later in the fall and winter to spawn; however, they do not die after spawning and can return to spawn in subsequent years.

For this study (Connelly et al., 1990), anglers were divided into three groups based on their fishing methods. Anglers who claimed to use only snagging methods on the Salmon River in 1989 comprised 17% of all anglers and are referred to as snagging-only anglers. Anglers who reportedly only used artificial or bait tackle comprised 40% of all anglers in 1989 and were referred to as non-snagging anglers. The remaining 43 percent of the anglers reportedly used both snagging and non-snagging methods at some point during the season and were referred to as mixed-method anglers.

The fishing method definitions used for this study were: **Snagging** (or snatching) -- fishing with a weighted treble hook with the purpose of catching a salmon in the body; this method is legal for Pacific Salmon during certain days of the season in specific sections of the river using specific tackle. **Lifting** (or lining) -- fishing with a single pointed hook and with the weight at least 24" from the hook, with the intent of foulhooking a fish or catching it in the mouth; while the tackle is legal, the technique is not legal for either salmon or steelhead since the fish is generally foulhooked. **Foulhooking** -- snagging or lifting; catching a fish not hooked in the mouth.

Respondents from the mail survey reported using a variety of angling methods for both salmon and steelhead. For example, 45 percent of steelhead anglers reported participating in snagging/lifting activities for salmon and/or steelhead. Information gathered in the focus group interviews revealed that some anglers who fished for both salmon and steelhead expressed different values and expectations when fishing for each species. The main difference stated was that salmon were going to die anyway and lifting, lining, and snagging were acceptable to those anglers. Anglers reported that they tried different sections of the river within the same day due to the number of anglers present, number of fish evident, water flow,

and perceived success at catching a fish. Anglers tended to report in the focus group interviews that they used a variety of techniques, fished avidly, and often sought salmon and steelhead in season.

Connelly et al. (1990) reported that during the in-depth focus group interviews "some anglers expressed the view that they evolved or matured from a generalist to a more specialized type of angler who considered foulhooking salmon to be unethical. The more frequent viewpoint was expressed by a more opportunistic type of angler who considered foulhooking as ethical since it allowed for the harvesting of a resource that would otherwise be lost (from their perspective and experience). Generally, these opportunistic anglers stated that they changed their motivations, expectations, and behavior when going back and forth from nonsnagging to snagging for salmon or when going from salmon to steelhead fishing" (p.17).

Angler Specialization Applied

The angler specialization concept reported by Bryan (1979) included a hierarchy from lowest to highest specialization as follows:

- 1) occasional angler;
- 2) generalist angler;
- 3) tackle-species specialist; and
- 4) method-species-setting specialist.

The underlying principles were that an angler progressed from one type to the next and that this was a hierarchical typology.

A parallel typology for New York's Salmon River, from lowest to highest type of angling method and species, may look like the following:

- 1) snagging or lifting steelhead;
- 2) snagging or lifting salmon;
- 3) natural or live bait fishing for salmon;
- 4) natural or live bait fishing for steelhead;
- 5) artificial lure fishing (artificial eggs) for salmon; and
- 6) artificial lure fishing (artificial eggs) for steelhead.

The environmental setting would remain constant for each fishing type since each is practiced on the same river environment.

A cluster analysis (Norusis and SPSS, 1990) of the 1989 angler participation was conducted using the squared euclidean distance method (SPSS/PC+) to attempt to classify the anglers into angler groups with similar participation characteristics. The variables used for classification were the 6 types of angling participation listed above. The participation variables were calculated for each individual based on the percentage of participation within each fishing type and each anglers' total for 1989 was 100%. This approach allowed for a standardization of the measurement unit and minimized the absolute difference between those anglers who had very high or low participation rates in 1989.

The result of the cluster analysis was a five angler group cluster solution based on participation. The centroids of each of the five angler group clusters is shown in Table 1 based on the 6 participation variables. Specialization in fishing participation is conceptualized as increasing from top to bottom and the five angler clusters increase in specialization from group 1 to 5 (left to right).

Table 1. Five group cluster solution for Salmon River angling participation in 1989.

Fishing Participation	Cluster Group Centers				
	Group 1	Group 2	Group 3	Group 4	Group 5
Snag/lift steelhead	2	0	1	0	2
Snag/lift salmon	<u>62</u>	6	2	5	4
Natural bait salmon	1	<u>63</u>	5	2	2
Natural bait steelhead	4	11	<u>70</u>	4	10
Lures salmon	9	21	9	<u>78</u>	17
Lures steelhead	9	3	10	10	<u>63</u>
Number Cases	366	22	102	237	320

The centroid numbers for each group in Table 1 represent the percent of participation in each fishing method. The trend of the majority of anglers (63 to 78 percent) is toward participation in one primary type of participation and this is evident in the diagonal line (i.e., the majority of participation is underlined) from the upper left to the lower right corner of the table. This suggests that this set of angler experiences generally supports the angler specialization concept. However, the centroid data is highlighted to show that many other angling methods have greater than 5% participation in any given cell. These highlighted cells indicate that anglers may be primarily using one technique but they also move up and down within the specialization continuum both between species and between methods.

The other observation from the cluster analysis is that these classified groups are, in reality, part of a continuum and do not form a clearly defined hierarchical typology as suggested by the specialization concept. The analysis of these "groups" is instructive for the sake of assessing the specialization concept and for reviewing the implications of fishery management regulations on these subgroups of anglers.

Angler Attitude Statements

The angler group responses to several attitude statements and proposed regulations are shown in Table 2. The three attitude statements were based on a Likert scale from strongly agree to strongly disagree. The percentage agree and strongly agree are shown for each angler cluster group in Table 2. Statistically significant differences were found for each of the three variables ($X^2 > 135$, $df = 16$, $P < 0.001$). Group 1, snagging-oriented anglers, consistently has the majority of anglers in support of snagging related statements; the other four groups exhibit the declining support expected as specialization increases from Group 2 to Group 5, with the exception of Group 4 which does not directly follow the pattern.

The response to the two proposed regulation statements were based on the percentage of anglers in each angler cluster group that reported support (Table 2) with the possible response categories of support, oppose, and undecided. Statistically significant differences were found for both variables ($X^2 > 200$, $df = 8$, $P < 0.001$). The percentage of anglers supporting the ban on salmon snagging and ban on foulhooking salmon and steelhead generally increases as expected from Group 1 to Group 5 as specialization increases, with the exception of Group 4 which does not directly follow the pattern.

Table 2. Five angler group cluster agreement regarding salmon fishing attitude statements in 1989.

Fishing Related Attitudes	Cluster Group Percentage Agreement				
	Group 1	Group 2	Group 3	Group 4	Group 5
Salmon will not strike a lure once they enter a stream to spawn	76	50	33	49	24
Snagging is necessary for full use of resource	77	43	40	50	37
Snagging salmon is not inconsistent with good conservation ethics	68	43	33	50	36
Fishing Regulations					
Support ban on salmon snagging	22	32	58	47	61
Support ban on foul-hooking salmon & steelhead	8	32	58	26	51

Conclusions

The specialization concept has some value in fisheries management in assessing Salmon River angler attitudes when the analysis is based on the relative number of anglers and angling participation represented by each of the five angler group clusters, and the diversity of angling techniques used and species sought. What is also evident from this analysis and the focus group interview data (Connelly et al., 1990) is that the specialization concept is too simplistic and needs to better account for the expectations and multi-dimensionality of angler motivations.

A motivational model that appears more appropriate to apply in recreational settings is expectancy theory (see Dawson, Buerger, and Gratzner, 1991 in this proceedings) which includes cognitive processes as central to the behavior decision-making/involvement process experienced by anglers. Cognitive theory approaches the motivation phenomenon from the perspective of expectancy whereby behavior is influenced by past outcomes but is more selective in anticipation and ascribing response-outcome probabilities than is the specialization concept (reinforcement theory). For example, an angler who highly values catching a salmon and has confidence in his/her ability and specialized equipment perceives that a reasonable amount of effort has a low probability of catching a fish, then he/she will either not engage in the activity or will change the setting or equipment to increase expectancy. This may be an explanation for Salmon River anglers who believe that Pacific salmon will not normally feed when spawning and so they change to a lower specialization position to increase their expectancy. Expectancy is relative to the fishery situation and is highly variable, salmon and steelhead are relatively difficult fish to catch, so angler expectancy has to be relative to the species, tackle, and setting.

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