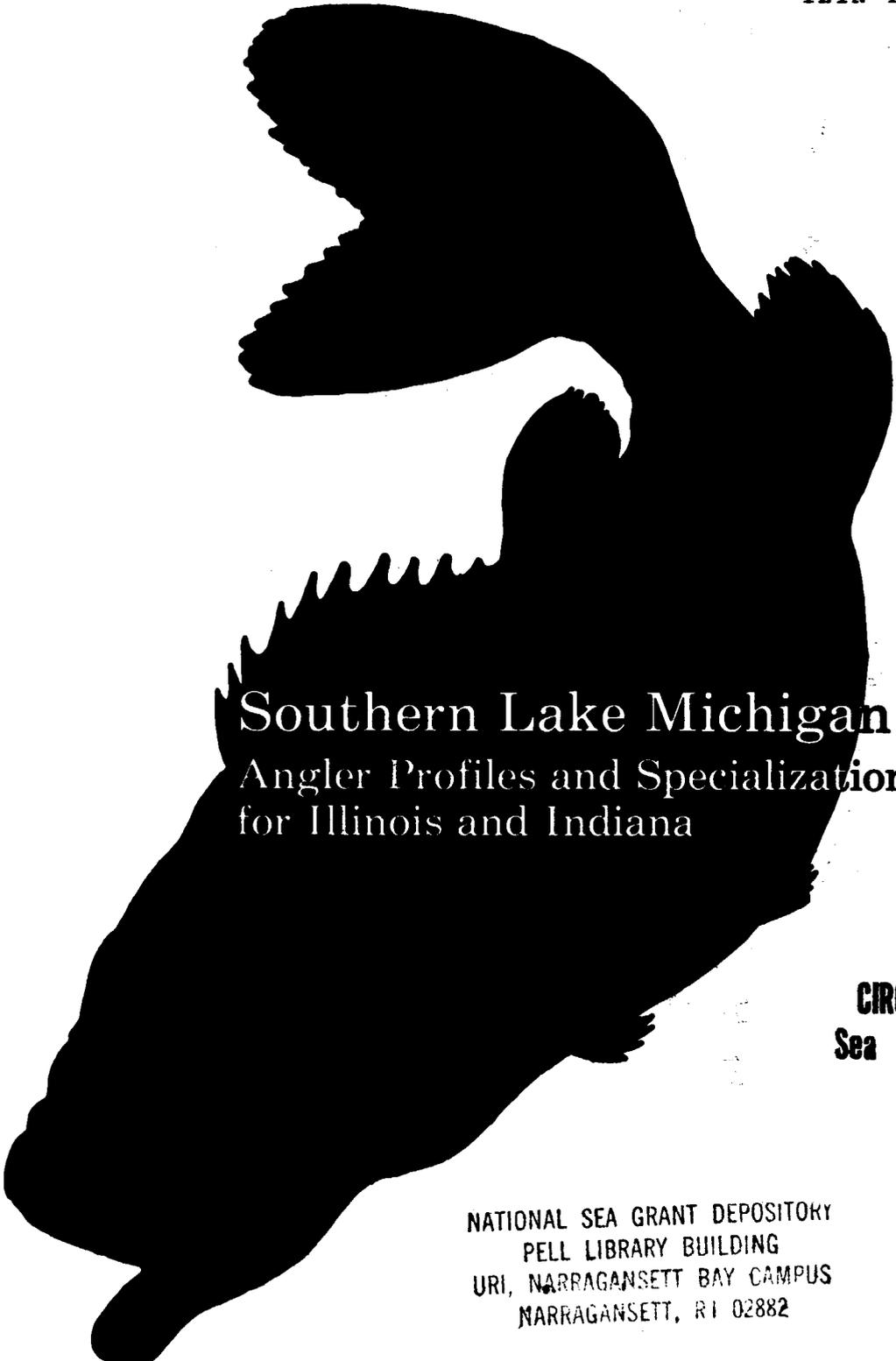


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Southern Lake Michigan Sportfishery:
Angler Profiles and Specialization Index
for Illinois and Indiana

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Southern Lake Michigan Sportfishery:

Angler Profiles and Specialization Index for Illinois and Indiana

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Southern Lake Michigan Sportfishery:
Angler Profiles and Specialization Index for Illinois and Indiana
Final Research Report

January, 1987

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INTRODUCTION

The Illinois-Indiana portion of the Lake Michigan shoreline is only 105 miles long, but two factors make this relatively small shoreline area extremely significant. First, state boundaries reach well out into the Lake and thereby represent the majority of surface water acreage in both states. Second, most of the lands adjacent to this 105-mile stretch are densely populated and highly industrialized, including the Chicago-Gary metroplex. As a result, the southern Lake Michigan (SLM) sportfishery is within a one-hour drive for over eight and one-half million people (Department of Conservation, 1983a; Department of Natural Resources, 1979).

In this area alone, the two states sold approximately 383,000 basic sportfishing licenses in 1983 (Baur and Rogers 1983; Gamble 1983). While exact estimates are not available, the number of days fished on Lake Michigan by Illinois and Indiana anglers is probably about 5.7 million angler-days. Knowledge about the socioeconomic and demand characteristics of the Illinois-Indiana sportfishery is limited to occasional creel censuses and general catch-effort studies (Baur 1983; Gamble 1983) or to inferences from studies done in neighboring states (e.g., Talhelm 1981). A priority need for resource managers is better information from anglers about their knowledge of the resource base and fishing opportunities, their preferences for management alternatives, and socioeconomic aspects of their angling behavior. Since there is only a very limited commercial fishery in this portion of the Lake, the recreational fishery (sportfishing plus the charter industry, etc.) is essentially the entire fishery for Illinois and Indiana.

The importance of sportfishing to residents around southern Lake Michigan is underscored by the intense urbanization in the Chicago-Gary area and by the fact that access to the Lake's fisheries has been an enduring concern for the respective state management agencies (Department of Conservation, 1983b; Department of Natural Resources, 1979). Lastly, the data on species sought by these anglers suggests that the Lake fishing effort is locally specialized around a few species not commonly sought or found in other waters of the states (Baur and Rogers, 1983). Some sub-fisheries, such as the coho salmon runs, support specialized charterboat industries and tournaments, which add to the local economic impact of the sportfishery by attracting anglers from further away than might otherwise be expected.

Study Goals and Objectives

The overall project goals were twofold--first, to provide baseline data on the use of the SLM sportfishery and, second, to further refine and test the concept of recreational specialization. Within these two broad goals there were four distinct objectives:

- o To generate baseline information about the anglers' fishing knowledge and preferences, and management-related fishing behavior for each state.
- o To estimate the extent to which pollution is a concern among southern Lake Michigan sportfishermen, and its effect on their decision to fish in SLM or to eat their catch.

- o To develop and evaluate an expanded fishing-specialization model for southern Lake Michigan and make recommendations on its generalizability.
- o To identify the implications of the study results for fisheries development and management in the two-state region, especially in relation to user satisfaction.

Data and analysis related to the first two objectives are contained in Part I; data and analysis related to the third objective are contained in Part II. Both sections of this report address the fourth objective, as appropriate to the data and issues being discussed.

Organization of the Report

In the introduction it was stated that very little is known about anglers who rely on SLM. Because sound resource management must rely on accurate and specific data about clientele groups, this research should help meet that need. Simple counts for factors such as boats, recreationists, and visitor-days are the first step. Yet this sort of data does not go very far toward answering the questions managers must ask when faced with a diverse resource intended to serve a multiplicity of user groups (often under rather restricted physical and political circumstances). Therefore, Part I contains a generalized angler profile, which includes data on sociodemographics, angler preferences, fishing habits, and populations. Separate analyses for each state in the survey (Illinois and Indiana) are provided. The last part of this section presents a more detailed look at the anglers' management preferences and motivations.

Part II explores more thoroughly conceptual issues of interest to recreation researchers and those concerned with management policies. The first section is largely the same as in the profile report. It presents the methodological details. The second section introduces the concept of recreational specialization and develops a fishing specialization model for SLM. The specialization model is a general concept that has been promoted as a means for managers to better understand the differences among anglers in ways that may have significant implications for managing the social and biological aspects of sportfishing. With this in mind the study concludes with a look at the relationship between management preferences and specialization groups. The final section presents a summary of the fisheries specialization model and the management preference data.

The Appendices at the end of the report contain additional technical information on the mailed survey as well as facsimiles of the cover letters, follow-up reminders, and questionnaires used.

METHODS

Target Population

The target population for this study consisted of all anglers that had pursued sportfishing on SLM. SLM was defined as that portion of Lake Michigan bordered by Indiana and Illinois and their offshore boundaries. A second criterion further delineated the population of users to those who engaged in sportfishing. Because the study's objectives required sampling a wide variety of anglers, the sportfisherman was described generally as any person who has tried to catch fish with a hook and line during their leisure time. Moreover, this broad definition did not mean that to be included an angler had to fish SLM exclusively or presently--only that he/she had done so at least once. The definition also implied that the target population should have purchased some type of resident or non-resident fishing license from Indiana or Illinois.

Sample

Although it was simple to define this population, obtaining adequate lists for use in a survey design was problematic. While creel census techniques were useful for catch or level-of-effort measures, they did not provide an adequate means for generalizing to the entire population nor did they typically provide an adequate information-gathering context. On the other hand, records of general fishing license purchases afforded accessibility to most Indiana and Illinois anglers, which presumably also included SLM anglers. However, this list did not lead to contacts with those who were not required to have a license and failed to distinguish those who had fished SLM from the general population. Lacking explicit information for locating a listing of SLM anglers from which to sample led us to use the past distribution of salmon stamp sales by county to infer where high concentrations of SLM anglers probably existed. This was regarded as an inference because the county where an angler purchased a salmon stamp was not necessarily the county where they resided. Furthermore, the salmon stamp only represented anglers that fished SLM for salmonids (coho and chinook salmon, steelhead, and brown and lake trout), but not those who fished exclusively for perch, smelt, or other species. Thus, while the salmon stamp was required to fish for five of the seven major game species in SLM, it provided an incomplete listing of all SLM anglers. This inference was further confounded in Indiana where the salmon stamp was required to fish a number of inland rivers containing salmonid species. Even with these limitations acknowledged, this approach seemed the most plausible for targeting areas where almost all of the SLM angler population resided. Based on the distribution of salmon stamp sales by county in each state, 18 counties were selected: ten in northwest Indiana, which represented 63.4 percent of the state's stamp sales, and eight counties in northeast Illinois, which accounted for 93.2 percent of the state's sales (Figure 1). The Indianapolis metropolitan area was the largest stamp sale region left out by this method.

Because the distribution of salmon stamp sales only located counties to be used for sampling, a second step in the study's design was to obtain anglers' addresses from the general fishing license sales in the selected counties. The number of individuals who had purchased licenses was estimated for each county based on the known prior distribution of sales by state, strata (geographic region), and resident/non-resident type of license (see

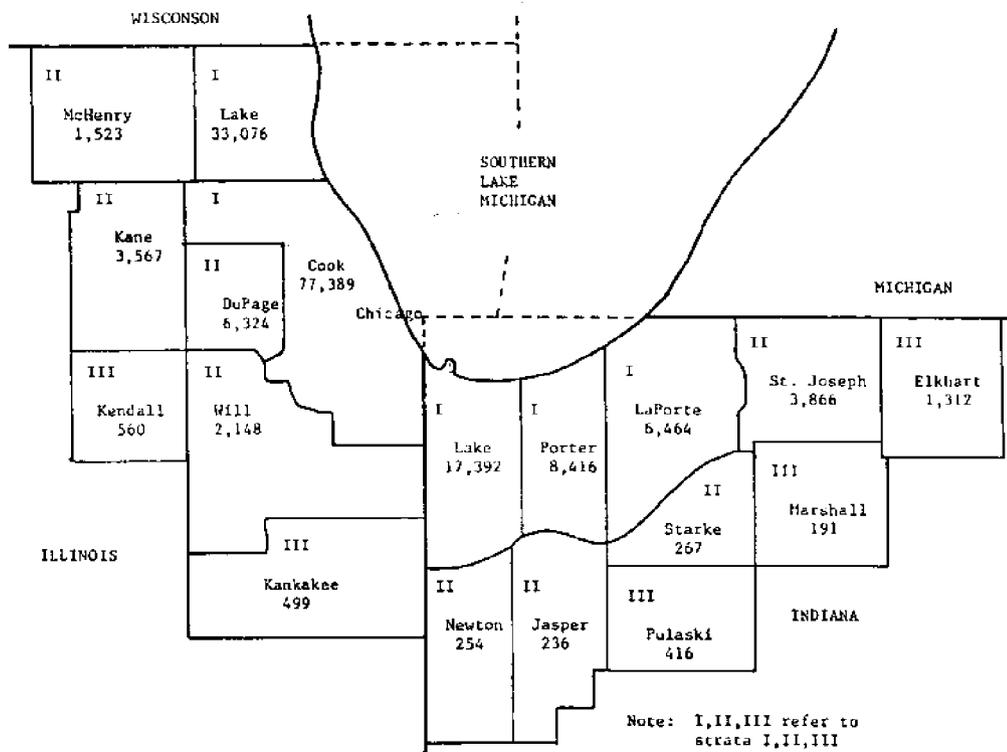


Figure 1. Counties by strata and salmon stamp sales in sampling region.

Table 1). The strata divisions (Figure 1) were based on the county's geographical location in relation to SLM. The marginal proportions were then used to determine the sample size in each strata, based on a total desired sample size of 2,000 (Table 1). The overall sample size of 2,000 was selected to ensure a high probability of obtaining varied angler types and still remain manageable for conducting a mail survey. The weighted, stratified design employed was calculated to yield accurate and reliable estimates within 3% (plus or minus) at the .05 level of probability. This large number of respondents was also justified to ensure an ample supply of SLM angler respondents, which was impeded by the substantial probability of selecting anglers that did not fish SLM. However, such non-SLM anglers were also an important source of information. Why they did not fish SLM was an important component of the overall assessment of SLM fishing and was certainly useful when comparing angler profiles.

For some of the cell values in Table 1, the number of cases was too small for accurate statistical analysis. Thus, adjustment fractions were employed to alter the simple PPES sampling scheme and thereby increase cell sizes where needed. Simultaneously, the larger cells were decreased to maintain an overall sample size of 2,000 (Table 2). This produced a reasonable number of cases for each cell and changed the final total sample size to 2,094.

TABLE 1. Proportionate Sample Sizes and True Population Proportions by State, Strata, and Residency for a Sample Size of 2,000.

<u>Strata</u>	<u>Illinois</u>		<u>Indiana</u>		<u>Totals</u>
	<u>Resident</u>	<u>Non-resident</u>	<u>Resident</u>	<u>Non-resident</u>	
I	n=820 %=41.01	92 4.59	408 20.42	47 2.28	1.37 68.30%
II	292 14.58	33 1.63	145 7.26	16 0.51	486 24.30%
III	89 4.46	10 0.50	44 2.22	5 0.25	148 7.42%

By state:

n=	1,336	665	2,000
percent	66.77	33.23	100.0%

Residents are estimated to be 89.94% of all anglers for each state.

TABLE 2. Sampling Adjustments Used to Re-distribute Cell Sizes and Calculate Case Weights.

<u>Strata</u>	<u>Illinois</u>		<u>Indiana</u>		<u>Adj. Frac.</u>	<u>Row Sum</u>
	<u>Resident</u>	<u>Non-resident</u>	<u>Resident</u>	<u>Non-resident</u>		
I	n=410 %=41.01	106 4.59	270 20.42	146 2.28	.50	932
II	262 14.58	67 1.63	172 7.26	93 0.81	.90	594
III	250 4.46	64 0.50	164 2.22	90 0.25	2.80	568
Adjustment Fraction	1.00	2.30	1.32	6.40		
Column Sum	922	237	606	329		
State Sum	1,159		935			2094

TABLE 3. Targeted Sample Size by County, State, and Residency Status.

Strata	Illinois			Indiana			Sum
	County	Resident	Non-res.	County	Resident	Non-res.	
I	Lake	100	57	Lake	149	72	932
	Cook	310	49	Porter	65	25	
	--	--	--	LaPorte	56	49	
		<u>410</u>	<u>106</u>		<u>270</u>	<u>146</u>	
II	McHenry	34	10	Newton	21	62	594
	DuPage	76	13	Jasper	17	1	
	Kana	70	25	Starke	28	19	
	Will	82	19	St. Joseph	106	11	
		<u>262</u>	<u>67</u>		<u>172</u>	<u>93</u>	
III	Kendall	59	7	Pulaski	20	11	568
	Kankakee	191	57	Marshall	37	36	
	--	--	--	Elkhart	107	43	
		<u>250</u>	<u>64</u>		<u>164</u>	<u>90</u>	
Column Sum		922	237		606	329	
State Total			1,159			935	2,094

Within each strata, the proportion of fishing license sales by county to the total number of sales within the strata was computed. This proportion was then applied to the overall number of cases assigned to the strata to determine the targeted sub-sample size for each of the ten counties (Table 3).

Within each county a cluster sampling approach was used to save time and money. Initially, one fishing license vendor was randomly chosen from the state-wide list of all vendors. From the records held by the vendor the pre-determined number of anglers was obtained. Letters were sent that acknowledged the study and gave clearance for the vendor to release the sales information. Separate letters were obtained from the Illinois-Indiana Sea Grant Program and each state's department that oversees fishing license sales. This effort substantially encouraged vendor cooperation even though compliance was not required (Appendix A). On the rare occasion that a vendor refused to participate, the vendor selection procedure was repeated until a willing vendor was found. The final step in the sampling scheme involved visiting the vendor, totaling the number of all fishing licenses sold to date, and arranging the registration books by period of the year in which the sales were made. Usually, the chosen vendor did not have sufficient listings. Additional vendors were added to the list until the quota was reached.

This procedure yielded a total of 1,951 addresses from target counties. Each case was weighted in the final analysis by state, strata, and resident/non-resident status. This ensured a proportionate sample in relation to the true distribution of fishing license sales to make generalizations about the entire population of SLM anglers. Individuals in the sample were

then contacted through a mail survey employing a standard postcard and second meeting procedure.

Questionnaire

The questionnaire was a twelve-page, self-administering leaflet that covered a number of topical areas. Since the sample scheme precluded focusing exclusively on SLM anglers, one part of the questionnaire differentiated between SLM anglers and non-SLM anglers (Appendix B). Respondents then answered a series of questions related to their previous involvement with fishing in general. Next they were given a geographical definition of SLM and were asked to indicate whether or not they had ever fished that specific portion of Lake Michigan. Those who indicated negatively were asked, "Why not?" They were also asked about general fishing preferences, fishing behaviors, and demographic information. For the SLM angler, more detailed information was obtained to develop an overall profile of the SLM angler. The profile domains included: previous involvement in fishing SLM; orientation to other fishing areas and SLM; preferences to species, number, and size of fish caught; involvement in other fishing-related activities; the social context of their fishing trips; style of fishing; equipment owned; cost expended for a typical fishing trip; preferences toward management alternatives; perceived health risks related to eating fish from SLM; and demographic characteristics. In addition to a SLM angler profile, the same domains were used to develop a specialization typology of the SLM angler. The primary indicators of the specialization model were based on the conceptual work of Bryan (1977, 1979). Once the SLM angler sample was separated into subgroups based on the specialization concept, motives for fishing SLM and management preferences were assessed. This was in line with other studies (Graeff, 1980; Kauffman, 1984; and Ditton and Holland, 1984) that have tested other indices of specialization.

Mailing Results

After pre-testing the questionnaire for clarity and focus on a group known to fish SLM (Salmon Unlimited), the questionnaires were mailed first class to the entire sample in the latter part of December, 1984. The questionnaire was accompanied by a cover letter explaining the purpose of the study (Appendix C) and a postage paid return envelope. Each questionnaire was coded for identifying those that had been received. After ten days, 609 questionnaires had been returned. At this time, a follow-up postcard reminder (Appendix D) was mailed to all anglers who had not yet responded. Two weeks later, the number of responses had risen to 776. For all anglers who had not responded by February 1, 1985, another questionnaire packet was mailed with a cover letter (Appendix E) and a postage paid return envelope. By using this three-phase mail survey approach, a total of 909 responses out of 1,951 were received. With 25 incomplete questionnaires, the final total of usable responses was 884. During the four-week mailing period, 150 initial questionnaire packets were returned due to wrong or incomplete addresses, or lack of a forwarding address. This reduced the overall sample size from 1,951 to 1,801. Thus the 909 total responses yielded a final response rate of 50.05 percent. Although by most survey standards this is a good return rate, it is somewhat below the average for recreationist studies. Because of the considerable proportion of non-respondents a concern was raised that there was a significant non-response bias.

TABLE 4. Comparison of Non-respondents to Respondents (selected variables, means, or percents).

<u>Item</u>	<u>Category</u>	<u>Non-respondents</u>	<u>Respondents</u>
	n=	167	908
Years ago began fishing	mean	20.8	26.2
Five-year change in fishing?	increase	32.7	55.3
	same	31.0	28.9
	decrease	<u>36.3</u>	<u>5.7</u>
		100.0	99.9
Fishing trips last year	mean	12.8	17.2
Importance of fishing to satisfaction in life	extremely	13.9	15.0
	very	18.5	28.2
	moderately	32.9	32.7
	somewhat	15.7	16.1
	not at all	<u>19.0</u>	<u>7.9</u>
		100.0	99.9
Age (years)	mean	38.3	40.3
Gender	male	85.3	82.7
	female	<u>14.7</u>	<u>13.3</u>
		100.0	100.0
Have you ever fished SLM?	yes	48.7	73.2
	no	<u>51.3</u>	<u>26.8</u>
		100.0	100.0
If yes:			
Do you fish for salmon?	n=	80	635
	yes	73.0	81.9
	no	<u>27.0</u>	<u>12.1</u>
		100.0	100.0
Do you fish for trout?	yes	55.0	91.5
	no	<u>45.0</u>	<u>8.5</u>
		100.0	100.0
Do you fish for perch?	yes	52.3	64.5
	no	<u>47.7</u>	<u>35.5</u>
		100.0	100.0
Number of fishing trips to SLM last year?	mean	4.4	11.3
Perceived ability to catch fish in SLM.	beginner	37.5	27.3
	intermediate	44.7	46.3
	advanced	15.9	22.5
	expert	<u>1.8</u>	<u>3.9</u>
		99.9	100.0

Bias Check

To determine if such a bias existed, a brief follow-up phone survey was conducted (Appendix F). Ten questions were taken from the original questionnaire. The follow-up phone survey sample size was targeted at 25 percent of the total non-response list (220 individuals). Standard phone-back procedures produced 167 contacts, 13 refusals, and 40 non-contacts due to unlisted phone numbers or unavailability of the respondent.

The results in Table 4 indicate that while there was little difference in age, non-respondents had begun fishing six years later than the respondents. They also made 4.5 fewer fishing trips last year and were more likely to have decreased fishing participation over the last five years. Similarly, non-respondents rated fishing less important as a source of satisfaction in their lives and less than half had ever fished SLM. For those that had fished SLM, non-respondents exhibited a lower rate of fishing SLM during the last year and a lower self-rated fishing ability than SLM anglers. They also showed a high preference for salmon over trout and perch while the SLM angler preferred any salmonid species.

These findings indicate that the non-respondents are typically less experienced anglers, consider fishing to be less central to their lives, and have a lower perception of their fishing ability. Therefore, the study's sample underrepresents the less involved angler. This is understandable in that a lack of interest in the focus of the study is a deterrent to responding. More importantly, the underrepresentation of these individuals may alter the generalizability of the results reported in Table 4, especially those that are causally linked to variables. Such qualitative or substantive differences in the results cannot be known precisely from this bias check.

Licensed Anglers and the
Southern Lake Michigan
Sportfishery

Part I: State Profiles

ILLINOIS RESULTS

This part of the study reports a profile of the southern Lake Michigan (SLM) angler for those who purchased fishing licenses in Illinois. Twelve topics are covered that include data about the SLM anglers and their sportfishing behavior. For each state in the study area to have an idea of who fishes their portion of Lake Michigan, identical Illinois and Indiana SLM angler profiles were developed. The sample, which drew 884 respondents, was first separated into those that have fished SLM (618) and those that have never fished SLM (266). A stratified sampling scheme showed that 69.91 percent of the respondents had fished SLM. Splitting the sample into Illinois and Indiana licensed anglers produced 313 and 305 SLM anglers and 167 and 99 non-SLM anglers for each state, respectively. The Illinois SLM and non-SLM angler profiles will be presented in this chapter, followed by the identical topics in the Indiana angler profile.

Sociodemographics

The first topic is a basic sociodemographic profile. Nine variables are reported in Table 5. Of the 313 respondents 90.8 percent were males, predominantly middle aged (mean = 41.2 yrs.), and tended to have at least some post-high school education (69.6 percent). As might be expected with a highly educated, middle-aged population, 65.4 percent had an income of over \$30,000, worked more than 40 hours per week (mean = 43.7), and had an average of 24.2 vacation days per year. Most anglers in the sample were married with children (68.0 percent) or single without children (19.6 percent). They resided in all types of areas except cities with populations ranging from 100,000 to 250,000 (6.0 percent), and were most likely to have grown up in a rural or metropolitan setting (24.0 and 37.7, respectively).

TABLE 5. Sociodemographic Information for Illinois Southern Lake Michigan Anglers, n=313.

Gender:

	<u>Percent</u>
Male	90.8
Female	9.2
	100.0

Age (years):

<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>
41.2	12.25	16-79	39.6

Education Level:

	<u>Percent</u>
Grade School	0.7
Some H.S.	7.8
H.S. Grad	22.0
Vocational-Technical	10.2
Some College	26.0
Associate Degree	5.0
Baccalaureate	17.5

Masters	7.8
Ph.D.	3.1
	<u>100.1</u>

Income (total family):

	<u>Percent</u>
Under \$10,000	3.0
\$10,000-19,999	13.2
\$20,000-29,999	18.5
\$30,000-39,999	25.3
\$40,000-49,999	13.5
\$50,000-59,999	12.1
\$60,000-70,000	6.1
Over \$70,000	8.4
	<u>100.1</u>

Workweek (hours):	<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>
	43.7	10.42	1-80	40.3
Vacation (days/year):	24.2	20.67		19.7

Marital Status:

	<u>Percent</u>
Single without children	19.6
Married without children	8.4
Single with children	3.9
Married with children	68.0
	<u>99.9</u>

Residence (population):

	<u>Percent</u>
Rural	20.3
City under 20,000	23.1
City of 20,000-100,000	25.9
Urban area 100,000-250,000	6.0
Metropolitan area over 250,000	<u>24.7</u>
	100.0

Childhood Environment (population):

	<u>Percent</u>
Rural	24.0
City under 20,000	18.2
City of 20,000-100,000	18.5
Urban area of 100,000-250,000	4.6
Metropolitan area over 250,000	<u>34.7</u>
	100.0

This sociodemographic profile of the Illinois SLM angler is not entirely congruent with a recent estimate of the state's general angler profile. The U.S. Fish and Wildlife Service (1982) reported a higher female representation (39.3 percent), a majority of anglers with twelve years of schooling or less (64.0 percent), and only 33.0 percent with an income of \$30,000 or more. The differences may be due in part to the urbanized SLM locale and the nature of salmonid fishing in general.

Fishing Behavior and Habits

The next domain in the profile dealt with previous general fishing participation. This was made up of four variables (Table 6). On the average, Illinois SLM anglers began fishing over 27 years ago (mean = 27.1), but actually fished 23.9 of those years. Over the past five years, 58.8 percent of the respondents had increased their fishing participation, with 16.9 being the average number of fishing trips taken over the last twelve months.

Motivations and Satisfaction

While the number of years fished and the level of participation are prime indicators of fishing involvement, they do not necessarily reveal how central fishing is to one's life. Four indicators were used to measure the intensity component of the angler profile (Table 7); two of these were subjective measures and the other two were overt behavioral measures.

Over three-fourths of the sample (76.4 percent) reported fishing was their favorite outdoor recreation activity, while more than half (50.4 percent) valued fishing as a "very" or "extremely" important source of satisfaction in their lives. Golf, hunting, camping, and boating were the major outdoor recreation

TABLE 6. General Fishing Profile of Illinois Residents in Study Zone, n=313.

	<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>
How many years ago did you start fishing?	27.1	13.21	1-65	26.6
Of the above years, how many did you actually fish?	23.9	12.98	1-65	22.2
Fishing trips over the last twelve months (number):	16.9	30.07	1-325	6.5
Change in fishing participation over the past five years?				
			<u>Percent</u>	
Increased			58.8	
Remained the same			27.4	
Decreased			13.8	
			<u>100.0</u>	

TABLE 7. Centrality of Fishing to Lifestyle, Illinois SLM Anglers, n=313.

Is fishing your favorite type of recreation activity?		<u>Percent</u>
Yes		76.4
No		<u>23.6</u>
		100.0
How important is fishing as a source of satisfaction in your life?		<u>Percent</u>
Extremely		17.3
Very		33.1
Moderately		29.3
Somewhat		14.6
Not at all		<u>5.7</u>
		100.0
Do you plan your vacation so that it will occur during the fishing season?		<u>Percent</u>
Always		29.3
Sometimes		44.4
Not usually		16.0
Never		<u>10.3</u>
		100.0
How much has your job been influenced by your fishing involvement?		<u>Percent</u>
Almost totally		1.9
A large part		8.8
Some		18.4
Almost none		26.8
None		<u>44.1</u>
		100.0

activities listed by those anglers who did not consider fishing to be their favorite activity. Almost three-fourths (73.7 percent) indicated that they "sometimes" or "always" planned their vacation around the fishing season. A somewhat surprising 29.1 percent noted that their job had been influenced by their fishing involvement.

Next in the profile is the anglers' preferences for and use of fishing settings. Of the eight settings listed in Table 8, the average angler had fished 4.3 of the settings in the past. The Great Lakes drew the highest percentage of anglers (31.2 percent) in terms of setting fished most often, followed by small lakes and ponds (28.2 percent), and large inland lakes and reservoirs (20.3 percent). This setting preference appeared to be quite stable. A full 69.5 percent of the anglers indicated that their setting preference had not changed for the past five years. Type of setting fished was considered "very" or "extremely" important to the fishing experience by

61.2 percent of the respondents. Given a hypothetical situation where the angler learned that SLM was closed to fishing before going fishing there, 78.9 percent said they would choose another area. On the average, this area was estimated to be 99.7 miles away from their home. Compared to other fishing areas, SLM was viewed by 35.1 percent of the anglers as being either "very" or "extremely" important to their fishing experience.

TABLE 8. Setting Preferences for Illinois SLM Anglers, n=313.

Type of area fished most often:

	<u>Percent</u>
Ocean	1.2
Great Lakes	31.2
Rivers	15.1
Inland lakes	20.3
Small lakes/ponds	28.2
Streams	1.5
Other	<u>2.4</u>
	99.9

Importance of type of area to experience:

	<u>Percent</u>
Extremely	31.7
Very	29.5
Moderately	23.4
Somewhat	8.1
Not at all	<u>7.4</u>
	100.1

Has your preference for an area changed over the last 5 years?

	<u>Percent</u>
Yes	30.5
No	<u>69.5</u>
	100.0

If SLM was closed to fishing, would you go elsewhere?

	<u>Percent</u>
Yes	78.9
No	<u>21.1</u>
	100.0

Compared to other areas, how important is SLM to your fishing experiences?

	<u>Percent</u>
Extremely	18.2
Very	16.9
Moderately	28.4
Somewhat	20.9
Not at all	<u>15.6</u>
	100.0

Different types of settings fished (no.)	<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>
	4.30	1.69	1-8	4.5

TABLE 9. Past Fishing on SLM by Illinois Anglers, n=313.

	<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>
Number of years ago began fishing SLM:	10.2	10.56	1-58	5.4
Number of years actually fished SLM:	7.8	8.19	1-56	4.8
Number of fishing trips to SLM during past twelve months:	10.3	17.87	1-99	3.5
Change in fishing SLM over past five years:				
		<u>Percent</u>		
Increase		43.7		
Remain the same		34.3		
Decrease		<u>22.0</u>		
		100.0		

The average Illinois angler began specifically fishing SLM 10.2 years ago, but had actually fished 7.8 of those years (Table 9). Their fishing pattern for SLM over the past five years showed that 43.7 percent had increased, while 22.0 percent reported a decrease. The average number of fishing trips to SLM last year was 10.3. This seems to represent fairly heavy visitation given the extreme seasonality of some fisheries.

Southern Lake Michigan offers the Illinois angler seven major species of fish for harvesting with coho salmon (48.7 percent) and perch (27.0 percent) caught most often (Table 10). However, this does not correspond to what Illinois anglers prefer to catch from SLM. Only 23.0 percent of the respondents indicated that they preferred coho salmon and only 17.8 percent preferred perch. After coho salmon, "other" was the most preferred game species (18.1 percent), which ranged from northern pike, walleye, and bass to catfish and carp. Actually there appeared to be a substantial number of anglers who felt that the type of fish caught was unimportant: 50.3 percent indicated that the type of fish caught was "moderately" to "not at all" important. The same was true for the number of fish caught (52.8 percent) and the size of fish caught (48.3 percent). Yet there was a considerable amount of anglers who put most of their effort into fishing for one particular type of fish in SLM (42.1 percent).

Although only about half of the Illinois SLM anglers caught the type of fish they preferred, the quality of fishing on SLM over the past five years was considered better by 42.2 percent of the anglers, while 17.5 percent felt it had worsened (Table 11). Their overall evaluation of SLM fishing trips showed that 36.5 percent were "very" or "extremely" satisfied with fishing SLM and 20.9 percent were "somewhat" or "not at all" satisfied. One important aspect related to this satisfaction component was perceived ability to catch

fish on SLM. While the majority of Illinois anglers perceived themselves to be "intermediate" SLM anglers (51.5 percent), almost 30.0 percent (29.7) rated their ability as "advanced" or "expert."

TABLE 10. Illinois Anglers' Preferences for SLM Fish (in percent), n=313.

	<u>Coho Salmon</u>	<u>Chinook Salmon</u>	<u>Steelhead Trout</u>	<u>Brown Trout</u>	<u>Trout</u>	<u>Perch</u>	<u>Other</u>	<u>Total</u>
Type of fish caught most often	48.7	5.9	2.9	4.0	1.3	27.0	10.2	100.0
Type of fish preferred	23.0	15.9	9.8	11.1	7.3	14.8	18.1	100.0
	<u>Extremely</u>	<u>Very</u>	<u>Moderately</u>	<u>Somewhat</u>	<u>None</u>	<u>Total</u>		
Importance of type of fish caught	22.4	27.3	34.5	10.1	5.6	99.9		
Importance of number of fish caught	19.0	28.2	35.7	12.3	4.7	99.9		
Importance of size of fish caught	20.7	31.0	37.1	7.4	3.8	100.0		
Do you put most of your effort into fishing for one particular type of fish?			<u>Percent</u>					
		Yes	42.1					
		No	57.9					
			100.0					

Looking at a typical Illinois angler fishing trip to SLM revealed that the majority of anglers fished from a boat (54.9 percent). Less than half of these anglers owned the boat they used (46.2 percent), and the majority of non-boat owners fished with someone who owned a boat (61.0 percent, Table 12). The average cost of a boat owned by a SLM angler was \$15,205.77. The number of fishing items owned, excluding boats, was 12.2 items at an average cost of \$991.39. Combining boat and equipment costs, the Illinois SLM angler's average investment was \$7595.67.

TABLE 11. Illinois Resident Anglers' Evaluation of SLM Fishing, n=313.

	<u>Improved</u>	<u>Remained the same</u>	<u>Become worse</u>	<u>Total</u>
Over the past five years SLM fishing has...	42.2	40.3	17.5	100.0

	<u>Extremely</u>	<u>Very</u>	<u>Moderately</u>	<u>Somewhat</u>	<u>None</u>	<u>Total</u>
How satisfied are you with fishing SLM?	10.2	26.3	42.6	16.0	4.9	100.0

	<u>Beginner</u>	<u>Intermediate</u>	<u>Advanced</u>	<u>Expert</u>	<u>Total</u>
Rate your ability to catch fish from SLM.	18.8	51.5	25.0	4.7	100.0

Over one-third of the Illinois anglers indicated that they had chartered a boat in the past five years (38.4 percent) and, on the average, had made 3.2 charters over the past five years. The average distance traveled one way to SLM was 53.8 miles and the average cost per trip was \$44.81. The last figure includes transportation, entrance or parking fees, food and refreshments, bait, rentals, and gear repair. They were not asked to amortize major capital investments like boats nor to indicate use of the equipment on other fisheries.

Willingness to pay more for a trip was estimated by using a contingency scale. At one extreme, 15.9 percent of the Illinois SLM anglers were unwilling to make a fishing trip to SLM if the cost increased \$10.00, but on the average were willing to pay \$9.00 more (Table 13). Of the 84.1 percent that were willing to pay \$10.00 more, 36.7 percent were unwilling to pay as much as \$20.00 more to fish SLM, but were willing to pay \$13.34 more on the average. Of the 63.3 percent willing to pay \$20.00, 47.0 percent were unwilling to pay as much as \$30.00 more to fish SLM, but on the average were willing to pay \$24.29 more. Those willing to pay as much as \$30.00 more were actually willing to pay \$58.43 more per fishing trip. In aggregate, multiplying percentage-in-group by amount-willing-to-pay yielded an estimate of \$18.15 additional willingness to pay.

The social aspects of one's fishing participation can enhance many of the non-consumptive amenities associated with the experience. Such social networks afford companionship, shared knowledge, relaxation and diversion. While the majority of Illinois SLM anglers reported that one person was responsible for stimulating their interest in fishing (52.0 percent), some reported as many as six people. The average was 1.8 people (Table 14). Parents were cited the most at 59.1 percent, followed by friends at 56.4 percent, and other family members at 35.8 percent. Illinois anglers' fishing groups consisted of friends outside of business associates (57.2 percent), followed by family members at 30.7 percent. The most typical size of a fishing group was 3.5 members, but ranged from one to nine.

TABLE 12. Southern Lake Michigan Fishing-trip Characteristics, Illinois License Holders, n=313.

Style of fishing:		<u>Percent</u>			
Shoreline					30.1
Pier					15.0
Boat					<u>54.9</u>
					100.0
If boat, do you own a boat?		<u>Percent</u>			
Yes					46.2
No					<u>53.8</u>
					100.0
					n=172
If don't own a boat, how do you <u>boat</u> fish?		<u>Percent</u>			
Rent					4.1
Borrow					0.8
Charter					34.2
Go with boat owner					<u>61.0</u>
					100.1
					n=92
	<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>	
Boat costs:	\$15,206	20,714	100-109,998	8,900	
Equipment costs:	\$ 991	1,221	19-5,996	400	
Total costs:	\$ 7,596	16,408	19-115,694	630	
Number of fishing items owned:	12.2	12.4	1-119	8.1	
Have you ever chartered a boat on SLM?		<u>Percent</u>			
Yes					38.4
No					<u>61.6</u>
					100.0
If yes, how many times in past 5 years?		<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>
		3.4	3.0	1-18	2.3
One-way distance to SLM (miles):	53.8	128.57	1-999*	20.4	
Costs for typical SLM fishing trip:	\$44.81	45.59	1-386	30.4	

* Response limited to 3 digits.

TABLE 13. Illinois SLM Anglers' Willingness to Pay More for a Fishing Trip.

Willing to pay \$10.00 more per trip?	<u>Percent</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>n</u>
				313
Yes	84.1			
No	15.9			
	100.0			
If no, how much more?		\$9.00	6.59	50
If yes to \$10.00, willing to pay \$20.00 more per trip?				
Yes	63.3			263
No	36.7			
	<u>100.0</u>			
If no, how much more?		\$13.34	7.40	97
If yes to \$20.00, willing to pay \$30.00 more per trip?				
Yes	53.0			166
No	47.0			
	<u>100.0</u>			
If no, how much more?		\$24.29	14.41	78
If yes to \$30.00, how much more?		\$58.43	25.92	88

Aside from the actual activity of sportfishing, many anglers pursued related fishing interests. One of these interests was reading current literature to learn more about the sport. For the Illinois SLM angler, 30.6 percent had subscribed to various types of fishing publications and, on the average, subscribed to 2.97 literature items (Table 15). To a lesser extent, 13.3 percent of the respondents indicated that they presently belonged to a fishing club, but the level of their participation in club events was nearly equally distributed among four levels ranging from "almost all" events to "almost none." Making some type of fishing gear was a popular interest for 27.9 percent of the anglers, with 1.97 items being the average number made. Fishing clinics and tournaments were two additional interests that drew 19.6 and 19.7 percent of the angler sample, respectively. The average level of participation in clinics or tournaments over the past five years was 3.2 and 4.2 events, respectively.

TABLE 14. Illinois SLM Anglers' Fishing-group Characteristics, n=313.

Which of the following first influenced your desire to fish?	Percentage of respondents who chose these categories			
Parents				59.1
Spouse				9.5
Family (Other)				35.8
Friends				56.4
Fishing Club				4.1
Other				6.5
Number of influences:	<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>
	1.8	0.99	1-6	1.5
Typical SLM fishing group:	Percent			
Family				30.7
Friends				57.2
Business Assoc.				6.1
Club Members				1.1
Alone				4.9
				100.0
Size of group:	<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>
	3.5	1.5	1-9	3.3

It is also important to understand why one chooses to fish SLM. This information allows us to go behind the overt behavior to look at factors that are crucial to the experience. For this task, we used 44 of Driver's (1977) pool of "psychological outcome" items, which covered 16 distinct domains (Table 16). Responses to these items ranged from 1 = "very important" to 5 = "not at all important." Table 16 ranks the 44 items according to the overall mean score for each item. Not surprisingly, "catch fish" was rated the most important reason for fishing SLM with a mean score of 1.94. Aside from catching fish, twelve additional motivational items had a mean score of less than 3.0, suggesting they were less than "moderately important."

The "escape personal and social pressures" domain was represented by three motivational items: "escape daily routines," "escape role overloads," and "tension release" rated second, ninth, and twelfth, respectively. The "physical rest" domain was rated third and the "achievement-stimulation" domain was represented by two "skill development" items rated tenth and eleventh and by two "excitement" items rated fourth and eighth. The "similar people" domain had two items rated fifth and sixth while the "escape physical pressures" domain was rated seventh. "Learning" was the other domain, which was rated thirteenth. This set of important domains reflected an angler motivated to catch fish, seek achievement and stimulation from fishing, escape the pressures of daily life, and share this time with friends or people with similar interests. The remaining six domains were not represented by moderately important items. Surprisingly, motivations of "family togetherness," "nature" and "self-esteem" were of little importance to one's fishing SLM.

TABLE 15. Adjunct Fishing Interests, Illinois SLM Anglers, n=313.

Do you subscribe to any fishing literature?

	<u>Percent</u>
Yes	30.6
No	<u>69.4</u>
	100.0

If yes, how many?	<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>
	2.97	2.2	1-9	2.3

Have you ever made any fishing gear?

	<u>Percent</u>
Yes	27.9
No	<u>72.1</u>
	100.0

If yes, how many items?	<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>
	1.97	1.1	1-5	1.7

Have you ever attended a fishing clinic?

	<u>Percent</u>
Yes	19.6
No	<u>80.4</u>
	100.0

If yes, how many over the past 5 years?	<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>
	3.2	2.7	1-15	2.5

Have you ever participated in a fishing tournament?

	<u>Percent</u>
Yes	19.7
No	<u>80.3</u>
	100.0

If yes, how many over the past 5 years?	<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>
	4.2	5.1	1-24	2.3

Are you currently a member of a fishing club?

	<u>Percent</u>
Yes	13.3
No	<u>86.7</u>
	100.0

If yes, how often do you participate in club activities? (percent)	Almost All	Several	Few	Almost None	Total
		20.5	29.8	19.5	30.1

TABLE 16. Importance Values* of Reasons for Fishing Southern Lake Michigan, Illinois Residents, n=313.

<u>Rank</u>	<u>Reason**</u>	<u>Mean</u>	<u>Std. Dev.</u>
1	Catch fish	1.94	1.04
2	Change daily routine	2.28	1.11
3	Relax physically	2.37	1.15
4	Experience excitement	2.38	1.12
5	Be with friends	2.39	1.14
6	Be with others, enjoy	2.42	1.20
7	Experience tranquility	2.58	1.24
8	Have thrills	2.68	1.23
9	Get away from demands	2.79	1.28
10	Become better at it	2.86	1.28
11	Develop skills/abilities	2.89	1.33
12	Get rid of tension	2.90	1.39
13	Know lake better	2.93	1.28
14	Rely on skills/abilities	3.01	1.39
15	Be with similar people	3.01	1.31
16	Experience new things	3.01	1.21
17	Test abilities	3.04	1.32
18	Use my equipment	3.07	1.38
19	Do with family	3.21	1.44
20	Think about good times	3.22	1.34
21	Move at slower pace	3.23	1.37
22	Be with my group	3.25	1.23
23	With respectful people	3.32	1.33
24	Get away from noise	3.33	1.45
25	More elbow room	3.42	1.34
26	Free to make choices	3.42	1.36
27	Near considerate people	3.46	1.32
28	Talk to new people	3.47	1.19
29	Learn what capable of	3.50	1.35
30	Be on my own	3.51	1.37
31	Be creative	3.67	1.25
32	Develop self pride	3.68	1.22
33	Teach outdoor skills	3.76	1.18
34	Think of personal values	3.82	1.23
35	Bring family together	3.88	1.31
36	Be in control of things	3.91	1.24
37	Supplement my food	4.01	1.23
38	Talk about equipment	4.07	1.13
39	Control things	4.14	1.15
40	Away from family	4.15	1.11
41	Gain self-confidence	4.36	1.01
42	Direct activities	4.42	0.99
43	Show others I can do it	4.54	0.87
44	Others think highly of me	4.75	0.67

* Importance is rated on a five-point scale where 1=Extremely, 3=Moderately, 5=Not at all.

** For full text of reasons see Appendix B.

Management Preferences

Illinois anglers' opinions about present and potential management practices were divided into three general areas: those related to fisheries management, those associated with fishing facilities, and those related to the SLM angler. When asked about which fish to stock, coho salmon was the most preferred species (19.9 percent) out of the six major fish species in SLM. However, 25.8 percent of the Illinois SLM anglers preferred salmonids, suggesting no particular species preference of salmon or trout. Surprisingly, another 19.9 percent preferred stocking a type of fish other than the six major species currently caught. The preferences for other types of fish ranged from pike, walleye, and muskie to bass, catfish, dogfish, and cod. This preference for more diversity also turned up in another question in which 62.3 percent of the anglers strongly supported increasing the variety of fish species in SLM. Of course, not all their preferences were practical or even possible. The general point may be that more diversity is desirable. Creating more reefs for fish habitat was another management practice supported by the majority of anglers (76.4 percent). However, restricting the fishing season as an alternative fisheries management strategy received only slight support (9.4 percent) from Illinois anglers.

Illinois anglers were divided on some issues. Presently, Illinois law allows the snagging of salmon during spawning season, yet 44.9 percent of the anglers "strongly" supported a program where salmon snagging would be made illegal, while 32.3 percent were opposed to such a program. Another question was asked about the regulations on the number and size of fish harvested from SLM. The majority of anglers felt the current practices were "about right" (78.1 and 83.6 percent, respectively). Decreasing commercial fishing on SLM received "moderate" or greater support from 68.3 percent of the anglers, while 31.7 percent gave little or no support to such a practice. Anglers gave their strongest support to restricting offshore dumping by commercial industries (98.0 percent) and showed strong support for the appropriation of more state monies toward SLM fisheries management (80.0 percent). It seemed that the Illinois SLM anglers as a whole supported management practices aimed at improving the quality of fish populations, and were satisfied with the current fishing regulations, but preferred a larger variety of fish species than presently exists in SLM.

The second set of management issues involved support facilities for fishing SLM. Over 70.0 percent of all anglers gave at least "moderate" support for additional facilities for all public fishing areas, which included boat slips, piers, access ramps, parking spaces, and more public shoreline (Table 18).

The third set of management issues dealt more directly with the angler. When asked about the \$7.50 cost for an Illinois fishing license, the majority felt it was "about right" (67.7 percent), while 26.0 percent felt it was overpriced (Table 19). However, when asked to give a "fair" price for a fishing license, the mean value was \$10.28 with a mode of \$10.00. Creation of a single multi-state license to fish anywhere on Lake Michigan was "strongly" supported by 66.2 percent of the Illinois anglers, but requiring a license and a permit to fish for any type of SLM fish was definitely opposed by 70.9 percent of the anglers. The majority of anglers were also definitely opposed to an increase in the excise tax on fishing goods (72.0 percent) and an increase in the motor fuel tax for boats (53.0 percent).

TABLE 17. Management Preferences of Illinois Anglers for Southern Lake Michigan, n=313.

Type of game fish you most prefer to have stocked:

	<u>Percent</u>
Coho salmon	19.9
Chinook salmon	12.1
Steelhead trout	8.3
Lake trout	5.2
Brown trout	4.5
Perch	4.3
Salmonids	25.8
Other	<u>19.9</u>
	100.0

Opinion of present regulations on:	<u>Too Strict</u>	<u>Slightly Strict</u>	<u>About Right</u>	<u>Not Strict Enough</u>	<u>Total</u>
Total number of fish caught:	6.9	9.0	78.1	6.0	100.0
Size of fish caught:	3.3	4.9	83.6	8.2	100.0

Degree of support for management alternatives for SLM:	<u>Very Strong</u>	<u>Strong</u>	<u>Moderate</u>	<u>Somewhat</u>	<u>None</u>	<u>Total</u>
Decrease commercial fishing	26.4	14.3	27.6	16.4	15.3	100.0
Restrict industrial dumping	88.4	8.8	.8	1.1	.8	99.9
Outlaw salmon snagging	35.4	9.5	13.3	9.6	32.3	100.1
More sportfish species	34.7	27.6	18.7	8.5	10.5	100.0
Restrict fishing season	3.4	6.0	14.5	15.9	60.2	100.0
More reefs for habitat	55.2	21.3	15.0	5.2	3.2	100.0

More state monies should be applied to fish management:

	<u>Percent</u>
Yes	80.0
No	<u>20.0</u>
	100.0

TABLE 18. Preferences for SLM Fishing Facilities, Illinois Anglers
(in percent), n=313.

<u>Management alternative:</u>	<u>DEGREE OF SUPPORT</u>					<u>Total</u>
	<u>Very Strong</u>	<u>Strong</u>	<u>Moderate</u>	<u>Somewhat</u>	<u>None</u>	
Build more harbor/slips	32.2	22.3	24.5	8.9	12.1	100.0
Increase public shoreline	44.1	19.9	20.4	6.3	9.3	100.0
Build more public piers	37.5	15.8	21.7	13.5	11.5	100.0
Increase boat ramps	29.7	19.5	22.1	14.7	14.0	100.0
Increase parking along shore	34.1	20.7	27.7	10.2	7.4	100.1

TABLE 19. Preferences* for SLM Licenses and Taxes, Illinois Anglers,
n=313.

<u>Present cost for a fishing license is:</u>	<u>Percent</u>			
Too high	7.8			
Somewhat high	18.2			
About right	67.7			
Too low	6.4			
	<u>100.1</u>			

<u>What is a "fair price" for a SLM license?</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>
	\$10.28	8.05	1-99	9.6

<u>Management Alternative:</u>	<u>DEGREE OF SUPPORT</u>					<u>Total</u>
	<u>Very Strong</u>	<u>Strong</u>	<u>Moderate</u>	<u>Somewhat</u>	<u>None</u>	
Create multi-state license	49.1	17.1	15.9	4.4	13.4	99.9
Increase law enforcement	34.8	19.0	27.5	10.2	8.4	99.9
License/permit for all fish	4.4	3.0	10.0	11.7	70.9	100.0
Increase excise tax	1.4	2.1	12.0	12.6	72.0	100.1
Increase boat fuel tax	13.4	5.5	14.3	13.8	53.0	100.0

* See Appendix for full wording of questions.

Increased law enforcement had strong support from 53.8 percent of Illinois SLM anglers and another 27.5 percent "moderately" supported such a program. Overall, it appeared that Illinois anglers supported programs aimed at fisheries management, facility development, stricter law enforcement, and creation of a multi-state fishing license, but opposed programs that would result in a direct financial cost.

Health Risks

A final area of inquiry concerned anglers' perceptions of and behaviors toward the health risks associated with eating fish from SLM. Nearly all the Illinois anglers (95.3 percent) indicated that they were familiar with information suggesting that eating fish from SLM was a health risk (Table 20). The most often cited sources of information were newspapers (83.6 percent), television (75.1 percent), friends (64.7 percent), and radio (59.5 percent). Special brochures printed by the state and the conservation police officers were not good vehicles for transmitting such information. The average number of sources per angler was three. Although anglers were aware of potential health risks from eating SLM fish, 62.7 percent indicated that they believed it to be only "somewhat" or "not at all" risky. Only 15.9 percent believed the health risks to be "highly" or "extremely" risky.

This lack of perceived risk in eating SLM fish might be attributed to some precautions anglers can take to reduce any potential health hazards. One precaution involves a modified way of cleaning the fish. In this method, additional fatty tissue is removed where toxic substances are known to accumulate. This was practiced by 60.0 percent of the anglers. Another precaution involves limiting the amount of fish consumed, which was practiced

TABLE 20. Perceptions of Health Risks Associated with Eating SLM Fish, Illinois Anglers, n=313.

Are you familiar with any information suggesting that eating fish from Lake Michigan may be a health hazard?

	<u>Percent</u>
Yes	95.3
No	4.7
	<u>100.0</u>

If yes, how did you become familiar with this information? (multiple responses)

	<u>Percent</u>
Newspaper	83.6
Television news	75.1
Radio news	59.3
Friends	64.7
Special brochures	24.2
Other	10.5

Number of sources listed from above:	<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>
	3.2	1.27	1-6	3.3

To what extent do you feel that eating fish from Lake Michigan is a risk to your health?

	<u>Percent</u>
Extremely	5.0
Highly	10.9
Moderately	21.4
Somewhat	44.1
Not at all	18.6
	<u>100.0</u>

Do you attempt to clean the fish you eat from Lake Michigan in a way that will reduce any possible health risks?

	<u>Percent</u>
Yes	60.0
No	40.0
	<u>100.0</u>

Do you limit the amount of fish you eat from Lake Michigan in order to reduce any health risks?

	<u>Percent</u>
Yes	65.4
No	34.6
	<u>100.0</u>

To what extent do you believe that each of the following conditions contribute to pollution of the fish in SLM?

	<u>PERCEIVED CONTRIBUTIONS</u>					<u>Total</u>
	<u>Extreme</u>	<u>Very</u>	<u>Moderate</u>	<u>Somewhat</u>	<u>None</u>	
Heavy metals	59.7	23.7	11.2	4.3	1.1	100.0
Pesticides	55.7	23.9	13.0	6.4	1.0	100.0
Other toxic chemicals	63.7	24.4	9.8	2.0	0.1	100.0
Raw sewage	56.2	20.2	16.1	6.6	0.9	100.0
Agricultural runoff	22.5	12.7	27.4	23.9	13.5	100.0
Acid Rain	27.2	15.2	29.4	21.0	7.3	100.1

Have any of the above conditions reduced your fishing SLM?

	<u>Percent</u>
Not at all	59.0
Somewhat	28.2
Pretty much	5.2
A great deal	7.6
	<u>100.0</u>

by 65.4 percent of the SLM anglers. When asked to indicate how much each of six conditions contributed to the pollution of SLM fish, over 75.0 percent believed toxic chemicals, heavy metals, pesticides, and raw sewage were sources of pollution. To a lesser extent, acid rain and agricultural runoff were believed to be major sources of fish contamination (42.4 and 35.2 percent, respectively.) As implied earlier by the substantial proportion of anglers who felt little or no risk involved with eating SLM fish, most anglers indicated that SLM's pollution conditions had only "somewhat" or "not at all"

reduced their fishing SLM (87.2 percent).

Apparently, while the majority of Illinois SLM anglers had heard from a number of sources about the health risks related to eating SLM fish, their evaluations of the risks discounted the threat. They may have felt that cleaning precautions were adequate or that the pollution problem was not too severe. Yet, the majority felt that the Lake was contaminated by a number of pollutants, but again this belief was not strong enough to alter their SLM fishing behaviors.

Non-southern Lake Michigan Anglers

Respondents that had never fished SLM were also studied. Managers need to know why they have never fished the area, their sociodemographic profile, general fishing patterns, fishing area preferences, and the role that fishing plays in their lives. Of the 167 Illinois non-SLM respondents, 78.8 percent were males, predominantly middle aged (mean = 42.1), and tended to have a high school education or less (56.5 percent, Table 21). While the majority earned an income of \$20,000 to \$30,000 (30.1 percent), 40.0 percent earned more than \$30,000. They averaged 41.0 working hours per week and took 18 vacation days per year.

TABLE 21. Sociodemographic Profile of Non-SLM Anglers, Illinois Residents, n=167.

Gender:					<u>Percent</u>
	Male				78.8
	Female				21.2
					<u>100.0</u>
Age (years):	<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>	
	42.1	14.41	17-80	41.7	
Education Level:					<u>Percent</u>
	Grade school				9.0
	Some H.S.				11.7
	H.S. grad				35.8
	Vocational/Technical				9.4
	Some college				18.9
	Associate Degree				4.4
	Baccalaureate				8.0
	Masters				2.7
	Ph.D.				0.0
					<u>100.1</u>
Income (total family):					<u>Percent</u>
	Under \$10,000				11.2
	\$10,000-19,999				18.7
	\$20,000-29,999				30.1
	\$30,000-39,999				20.4
	\$40,000-49,999				14.9
	\$50,000-59,999				3.2

\$60,000-69,999	1.5
Over \$70,000	0.0
	<u>100.0</u>

	<u>Mean</u>	<u>Std. Dev.</u>	<u>Median</u>
Workweek (hours):	40.8	10.68	40.2
Vacation (days/year):	17.8	13.45	14.3

Marital Status:	<u>Percent</u>
Single without children	15.1
Married without children	15.5
Single with children	15.2
Married with children	<u>54.2</u>
	100.0

Residence (population):	<u>Percent</u>
Rural	20.3
City under 20,000	26.2
City of 20,000-100,000	32.7
Urban area of 100,000-250,000	9.8
Metropolitan area over 250,000	<u>10.9</u>
	99.9

Childhood environment (population):	<u>Percent</u>
Rural	33.2
City under 20,000	25.0
City of 20,000-100,000	24.7
Urban area of 100,000-250,000	6.3
Metropolitan area over 250,000	<u>10.9</u>
	100.1

Most anglers in the sample were married with children (54.2 percent). Those single with children and those married without children drew about 15.0 percent of the sample. Most of the respondents resided in a town of 20,000 to 100,000 people (32.7 percent) or less populated areas and grew up in a rural area (33.2 percent) or in a town of up to 100,000 in population.

The Illinois non-SLM angler showed distinct differences from the Illinois SLM angler. Non-anglers tended to be female as opposed to male (21.2 to 9.2 percent, respectively), had less education (12.2 more with less than a high school education), earned less money (60.0 percent earned less than \$30,000), and took six fewer days of vacation per year (17.8 percent). Among non-SLM anglers a larger percentage was from married-without-children and single-with-children households. They were also less likely than SLM anglers to reside in or have grown up in a large metropolitan area.

Past fishing participation revealed that non-SLM anglers began fishing 1.6 years later than SLM anglers (25.5 years ago) and during these 25.5 years had actually fished 21 years (Table 22). As with the SLM anglers, the majority of non-SLM anglers showed an increase in their amount of fishing over the last five years (47.8 percent). Yet a larger percentage of non-SLM anglers than SLM anglers showed a decrease as well (18.5 percent). The number of days fished over the last 12 months (mean= 10.0 days) was much less than

the 16.9 days per year for SLM anglers.

Illinois non-SLM anglers showed an approximately equal preference for fishing small lakes and ponds (37.4 percent) and rivers (36.6 percent), with only 5.8 percent indicating that they had ever fished the Great Lakes (Table 23). This preference appeared to be very stable. Fully 83.0 percent indicated that their present preference for a fishing area had not changed from what it was five years ago. Somewhat less than half (44.6 percent) of the non-SLM sample indicated that the type of fishing area was "very" or "extremely" important to their fishing experience. On the other hand, 23.9 percent indicated that type of fishing area was only "somewhat" or "not at all" important. Illinois non-SLM anglers provided a number of reasons for not fishing SLM; "too far away" was the reason most often cited (19.9 percent), followed by "not familiar with" and "no opportunity."

The final set of questions looked at how central fishing was to the Illinois non-SLM angler. Fishing was the favorite outdoor recreation activity for 64.2 percent of the sample, with the other 35.8 percent listing hunting, hiking, golf, camping, or gardening as their favorite outdoor recreation activity (Table 24). Only 28.2 percent viewed fishing as "very" or "extremely" important to their lives. However, this did not mean that it generally was not a significant part of their leisure lifestyle: 65.7 percent indicated that they "sometimes" or "always" planned their vacation around the fishing season. Another 20.9 percent of the sample said that fishing had "somewhat" to "almost totally" influenced their job. This seems to reflect a deep sense of commitment to recreational fishing by many, if not most, anglers even if SLM is not a convenient locale.

TABLE 22. General Fishing Profile for Non-SLM Anglers, Illinois Residents, n=167.

How many years ago did you start fishing?	<u>Mean</u> 25.5	<u>Std. Dev.</u> 16.14	<u>Range</u> 1-60	<u>Median</u> 24.6
Of the above years, how many did you actually fish?	21.0	15.87	1-60	19.6
Fishing trips over the last twelve months?	10.0	15.10	1-100	5.1
Change in fishing participation over the past five years?			<u>Percent</u>	
Increase			47.8	
Same			33.7	
Decrease			<u>18.5</u>	
			100.0	

TABLE 23. Setting Preferences for Illinois Non-SLM Anglers, n=167.

Type of area fished most often:	<u>Percent</u>
Ocean	0.9
Great Lakes	5.8
Rivers	36.6
Inland lakes (large)	13.1
Small lakes/ponds	37.4
Streams	2.0
Other	<u>4.2</u>
	100.0

Importance of type of area to fishing experience:	<u>Percent</u>
Extremely	15.4
Very	29.2
Moderately	31.4
Somewhat	13.9
Not at all	<u>10.0</u>
	99.9

Has your preference for an area changed the over past 5 years?	<u>Percent</u>
Yes	17.0
No	<u>83.0</u>
	100.0

Why have you never fished SLM?	<u>Percent</u>
Too far	19.9
Not familiar	17.4
No opportunity	17.0
Like it elsewhere	14.2
Don't care to	12.9
Bad surroundings	7.7
Other	<u>10.9</u>
	100.0

TABLE 24. Centrality of Fishing to Lifestyle, Illinois Non-SLM Anglers, n=167.

Is fishing your favorite type of outdoor recreation activity?	<u>Percent</u>
Yes	64.2
No	<u>35.8</u>
	100.0
How important is fishing as a source of satisfaction in your life?	<u>Percent</u>
Extremely	8.7
Very	19.5
Moderately	40.4
Somewhat	17.1
Not at all	<u>14.1</u>
	99.8
Do you plan your vacation so that it will occur during the fishing season?	<u>Percent</u>
Always	18.2
Sometimes	47.5
Not usually	25.3
Never	<u>9.0</u>
	100.0
How much has your job been influenced by your fishing involvement?	<u>Percent</u>
Almost totally	1.5
A large part	3.4
Some	16.0
Almost none	14.7
None	<u>64.4</u>
	100.0

INDIANA RESULTS

This chapter reports a profile of the southern Lake Michigan (SLM) angler for those who purchased fishing licenses in Indiana. Twelve topics are covered that include data about the SLM anglers and their sportfishing behavior. For each state in the study area to have an idea of who fishes their portion of Lake Michigan, separate Indiana and Illinois SLM angler profiles were developed. The sample, which drew 884 respondents, was first separated into those that have fished SLM (618) and those that have never fished SLM (266). By employing a stratified sampling scheme, we found that 69.91 percent of the respondents had fished SLM. Splitting the sample into Indiana and Illinois licensed anglers produced 305 and 313 SLM anglers and 99 and 167 non-SLM anglers for each state, respectively. The Indiana SLM and non-SLM angler profiles will be presented here. The Illinois angler profiles are presented in the previous chapter.

Sociodemographics

The first topic to be covered is a general sociodemographic profile consisting of nine variables (Table 25). Of the 305 respondents 89.6 percent were males, predominantly middle aged (mean = 38.3 yrs.), and tended to have at least some post-high school education (52.1 percent). As might be expected with a highly educated, middle-aged population, 53.7 percent had an income of over \$30,000, worked more than 40 hours per week (mean = 42.2), and had an average of 20.0 vacation days per year. Most of the anglers in the sample were married with children (62.9 percent) or single without children (22.8 percent). They resided mainly in rural areas or cities of 100,000 people or less (76.9 percent), and were most likely to have either grown up in a rural town or city of 20,000 to 100,000 people (23.6 and 29.7, respectively).

This sociodemographic profile of the Indiana SLM angler is not entirely congruent with a recent estimate of the state's general angler profile. The U.S. Fish and Wildlife Service (1982) reported a higher female representation (42.5 percent), a majority with twelve years of schooling or less (73.4 percent), and only 16.3 percent with an income of \$30,000 or more.

Fishing Behavior and Habits

The next domain in the profile dealt with previous general fishing participation. This consisted of four variables (Table 26). On the average, Indiana SLM anglers began fishing over 25 years ago (mean = 25.5), but fished only 23.1 of those years. Over the past five years, 59.6 percent of the respondents had increased their fishing participation, with 20.3 being the average number of fishing trips taken over the last twelve months.

Motivations and Satisfactions

While the number of years fished and the level of participation are prime indicators of fishing involvement, they do not necessarily reveal how central fishing is to one's life. Four indicators were used to measure the intensity component of the angler profile (Table 27). Two of these were subjective measures and the other two were overt behavioral measures.

Almost three-fourths of the sample (72.5 percent) reported fishing as their favorite outdoor recreation activity while (43.2 percent) rated fishing as a "very" or "extremely" important source of satisfaction in their lives.

TABLE 25. Sociodemographic Variables for Indiana Anglers, n=305.

Gender:		<u>Percent</u>			
Male		89.6			
Female		<u>10.4</u>			
		100.0			
Age (years):		<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>
		38.3	13.50	16-74	34.5
Education Level:		<u>Percent</u>			
	Grade School				1.6
	Some H.S.	12.1			
	H.S. Grad	34.1			
	Vo-Tech	12.5			
	Some College	21.7			
	Assoc. degree	5.6			
	Baccalaureate	9.3			
	Masters	2.2			
	Ph.D.	<u>0.8</u>			
		99.9			
Income (total family):		<u>Percent</u>			
	Under \$10,000	6.8			
	\$10,000-19,999	21.5			
	\$20,000-29,999	28.0			
	\$30,000-39,999	23.0			
	\$40,000-49,999	14.1			
	\$50,000-59,999	5.4			
	\$60,000-70,000	0.6			
	Over \$70,000	<u>0.6</u>			
		100.0			
Workweek (in hours):		<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>
		42.2	10.34	8-95	40.2
Vacation (days/year):		20.0	15.93		15.1
Marital status:		<u>Percent</u>			
	Single without children	22.8			
	Married without children	10.6			
	Single with children	3.8			
	Married with children	<u>62.9</u>			
		100.1			

Residence (population):	<u>Percent</u>
Rural	23.9
City under 20,000	21.9
City of 20,000-100,000	31.1
Urban area 100,000-250,000	14.0
Metropolitan area over 250,000	<u>9.0</u>
	99.9

Childhood Environment (population):	<u>Percent</u>
Rural	23.6
City under 20,000	18.0
City of 20,000-100,000	29.7
Urban area of 100,000-250,000	12.8
Metropolitan area over 250,000	<u>15.9</u>
	100.0

TABLE 26. General Fishing Profile of Indiana Residents in Study Zone, n=305.

	<u>Mean</u>	<u>Std.Dev.</u>	<u>Range</u>	<u>Median</u>
How many years ago did you start fishing?	25.5	13.35	1-66	24.6
Of the above years, how many did you actually fish?	23.1	12.82	1-66	20.4
Fishing trips over the last twelve months (number):	20.3	48.34	1-999	9.6
Change in fishing participation over the past five years?			<u>Percent</u>	
Increase			59.6	
Remained the same			27.9	
Decreased			<u>12.5</u>	
			100.0	

TABLE 27. Centrality of Fishing to Lifestyle, Indiana SLM Anglers, n=305.

Is fishing your favorite type of outdoor recreation activity?	<u>Percent</u>
Yes	72.5
No	<u>27.5</u>
	100.0
How important is fishing as a source of satisfaction in your life?	<u>Percent</u>
Extremely	17.7
Very	26.5
Moderately	35.4
Somewhat	15.2
Not at all	<u>5.2</u>
	100.0
Do you plan your vacation so that it will occur during the fishing season?	<u>Percent</u>
Always	23.8
Sometimes	46.6
Not usually	21.7
Never	<u>8.0</u>
	100.1
How much has your job been influenced by your fishing involvement?	<u>Percent</u>
Almost totally	2.8
A large part	9.4
Some	22.5
Almost none	24.0
None	<u>41.2</u>
	99.9

Hunting, camping, and golf were the major outdoor recreation activities listed by those anglers who did not consider fishing as their favorite activity. Almost three-fourths (70.4 percent) indicated that they "sometimes or "always" planned their vacation around the fishing season. A somewhat surprising 34.7 percent noted that their job had been influenced by their fishing involvement.

Next in the profile is the anglers' preferences for and use of a variety of fishing settings. The average angler had fished 4.3 of the eight settings listed in Table 28. Small lakes and ponds drew the highest percentage of anglers (30.5 percent) in terms of setting fished most often, followed by the Great Lakes (30.2 percent), and large inland lakes and reservoirs (22.2 percent). This setting preference appeared to be quite stable; 76.6 percent of the anglers indicated that their setting preference had not changed from

TABLE 28. Setting Preferences for Indiana SLM Anglers, n=305.

Type of area fished most often:	<u>Percent</u>
Ocean	0.3
Great Lakes	30.2
Rivers	11.5
Inland lakes	22.2
Small lakes/ponds	30.5
Streams	4.2
Other	<u>1.1</u>
	100.0

Importance of type of areas to experience:	<u>Percent</u>
Extremely	23.8
Very	28.5
Moderately	31.1
Somewhat	13.2
Not at all	<u>3.4</u>
	100.0

Has your preference for an area changed over the last 5 years?	<u>Percent</u>
Yes	23.4
No	<u>76.6</u>
	100.0

If SLM was closed to fishing, would you go elsewhere?	<u>Percent</u>
Yes	83.0
No	<u>17.0</u>
	100.0

Compared to other areas, how important is SLM to you fishing experiences?	<u>Percent</u>
Extremely	17.5
Very	22.5
Moderately	23.6
Somewhat	21.7
Not at all	<u>14.7</u>
	100.0

Different types of settings fished:	<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>
	4.25	1.51	1-8	4.37

what it was five years ago. Type of setting fished was considered "very" or "extremely" important to the fishing experience by 52.3 percent of the respondents. Given a hypothetical situation where the angler learned that SLM was closed to fishing before going fishing there, 83.0 percent said they would choose another area. On the average this area was estimated to be 46.7 miles from their home. Compared to other fishing areas, SLM was viewed by 40.0 percent of the anglers as being either "very" or "extremely" important to their fishing experience.

The average Indiana angler began specifically fishing SLM 12.7 years ago, but had actually fished 9.2 of those years (Table 29). Their fishing pattern for SLM over the past five years showed that 42.3 percent had increased, while 29.2 percent reported a decrease. The average number of fishing trips to SLM last year was 13.4. This seems to represent fairly heavy visitation given the extreme seasonality of some fisheries.

Southern Lake Michigan offers the Indiana angler seven major species of fish for harvesting with perch (44.6 percent) and coho salmon (22.6 percent) caught most often (Table 30). However, this does not correspond to what Indiana anglers prefer to catch from SLM. Only 34.6 percent indicated that they preferred perch and only 14.7 percent preferred coho salmon. After perch, steelhead trout was the most preferred game species (19.2 percent). Actually there appeared to be a substantial number of anglers who felt that the type of fish caught was unimportant: 53.7 percent indicated that type of fish caught

TABLE 29. Past Fishing on SLM by Indiana SLM Anglers, n=305.

	<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>
Number of years ago began fishing SLM:	12.7	9.60	1-56	9.6
Number of years actually fished SLM:	f 9.2	10.45	1-56	5.2
Number of fishing trips to SLM during past twelve months:	13.4	19.80	1-99	4.8
Change in fishing SLM over past five years:			<u>Percent</u>	
Increase			42.3	
Remain the same			27.8	
Decrease			<u>29.9</u>	
			100.0	

TABLE 30. Indiana Anglers' Preferences for SLM Fish (in percent),
n=305.

	<u>Coho Salmon</u>	<u>Chinook Salmon</u>	<u>Steelhead Trout</u>	<u>Lake Trout</u>	<u>Brown Trout</u>	<u>Perch</u>	<u>Other</u>	<u>Total</u>
Type of fish caught most often	22.6	9.4	11.2	2.3	2.8	44.6	7.1	100.0
Type of fish preferred	14.7	9.9	19.2	1.4	5.4	34.6	14.8	100.0
	<u>Extremely</u>	<u>Very</u>	<u>Moderately</u>	<u>Somewhat</u>	<u>None</u>	<u>Total</u>		
Importance of type of fish caught	20.1	26.2	36.0	11.7	6.0	100.0		
Importance of number of fish caught	15.4	30.5	36.4	10.9	6.9	100.1		
Importance of size of fish caught	17.1	33.7	33.6	10.7	5.0	100.1		
Do you put most of your effort into fishing for one particular type of fish?					<u>Percent</u>			
	Yes				47.1			
	No				52.9			
					100.0			

was "moderately" to "not at all" important. The same was true for number of fish caught (54.2 percent) and size of fish caught (49.3 percent). Yet there was a considerable number of anglers who put most of their effort into fishing for one particular type of fish in SLM (47.1 percent).

Although only about half of the Indiana SLM anglers caught the type of fish they preferred, the quality of fishing on SLM over the past five years was considered better by 42.3 percent of the anglers, while 17.8 percent felt it had worsened (Table 31). Their overall evaluation of SLM fishing trips showed 29.4 percent were "very" or "extremely" satisfied with fishing SLM and 27.5 percent "somewhat" or "not at all" satisfied. One important aspect related to this satisfaction component was perceived ability to catch fish on SLM. While the majority of Indiana anglers perceived themselves to be "intermediate" SLM anglers (49.4 percent), 29.8 percent rated their ability as "advanced" or "expert."

TABLE 31. Indiana Resident Anglers' Evaluation of SLM Fishing, n=305.

	<u>Improved</u>	<u>Remained The Same</u>	<u>Become Worse</u>	<u>Total</u>		
Over the past five years SLM fishing has...	42.3	39.9	17.8	100.0		
	<u>Extremely</u>	<u>Very</u>	<u>Moderately</u>	<u>Somewhat</u>	<u>None</u>	<u>Total</u>
How satisfied are you with fishing SLM?	8.6	20.8	43.1	18.9	8.6	100.0
	<u>Beginner</u>	<u>Intermediate</u>	<u>Advanced</u>	<u>Expert</u>	<u>Total</u>	
Rate your ability to catch fish from SLM.	20.8	49.4	25.6	4.2	100.0	

Although on a typical fishing trip to SLM the majority of Indiana anglers fished from a boat (47.2 percent), less than half of these anglers owned the boat they used (48.3 percent). The majority of non-boat owners fished with someone who owned a boat (86.7 percent, Table 32). The average cost of a boat owned by a SLM angler was \$11,683.00. Numbers of fishing items owned, excluding boats, was 15.1 items at an average cost of \$661.00. Combining boat and equipment costs, the Indiana SLM angler had an average investment of \$4,898.00.

Slightly over ten percent of the Indiana anglers indicated that they had chartered a boat in the past five years (10.9 percent) and on the average had made 2.8 charterfishing trips over the past five years. The average distance traveled one way to SLM was 29.0 miles and the average cost per trip was \$41.32. The last figure includes transportation, entrance or parking fees, food and refreshment, bait, rentals, and gear repair. They were not asked to amortize major capital investments like boats, nor to indicate use of the equipment on other fisheries.

Willingness to pay more for a trip was estimated by using a contingency scale. At one extreme, 24.6 percent of the Indiana SLM anglers were unwilling to make a fishing trip to SLM if the cost increased \$10.00, but were willing to pay \$5.92 more on the average (Table 33). Of the 75.4 percent that were willing to pay \$10.00 more, 52.8 percent were unwilling to pay as much as \$20.00 more to fish SLM, but were willing to pay \$14.72 more on the average. Of the 47.2 percent willing to pay \$20.00, 51.7 percent were unwilling to pay as much as \$30.00 more to fish SLM, but on the average were willing to pay \$23.84 more. Those willing to pay as much as \$30.00 more were actually willing to pay \$44.22 more per fishing trip. In aggregate, multiplying the percentage-in-group by the amount-willing-to-pay yielded an estimate of \$18.19 willing to pay.

The social aspects of one's fishing participation can enhance many of the non-consumptive amenities associated with the experience. Such social networks afford companionship, shared knowledge, relaxation, and diversion. While the majority of Indiana SLM anglers reported one person responsible for stimulating their interest in fishing (49.6 percent), they reported as many as five people and averaged 1.7 people (Table 34). Parents were cited the most

TABLE 32. Southern Lake Michigan Fishing-trip Characteristics, Indiana License Holders, n=305.

Style of fishing:	<u>Percent</u>			
Shoreline	23.8			
Pier	29.0			
Boat	<u>47.2</u>			
	100.0			
If boat, do you own boat?	<u>Percent</u>			
Yes	48.3			
No	<u>51.7</u>			
	100.0			
	n=100			
If don't own boat, how do you <u>boat</u> fish?	<u>Percent</u>			
Rent	1.9			
Borrow	6.2			
Charter	5.2			
Go with boat owner	<u>86.7</u>			
	100.0			
	<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>
Boat costs:	\$11,683	12,806	100-110,648	7,500
Equipment costs:	\$ 661	910	20-6,244	290
Total costs:	\$ 4,898	10,107	20-112,257	350
Number of fishing items owned:	15.1	20.2	1-198	9.5
Have you ever chartered a boat on SLM?	<u>Percent</u>			
Yes	10.9			
No	<u>89.1</u>			
	100.0			
	<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>
If yes, how many times in past 5 years?	2.8	2.5	1-12	2.1
One-way distance to SLM (miles):	29.0	77.44	1-999*	18.3
Costs for typical SLM fishing trip	\$41.32	\$70.25	1-495	21.09

* Response limited to 3 digits.

at 70.8 percent, followed by friends at 51.7 percent, and other family members at 34.8 percent. Indiana anglers' fishing groups consisted of friends outside of business associates (60.0 percent) followed by family members at 30.3 percent. The most typical size of a fishing group was 2.9 members, but ranged from one to nine.

Aside from the actual activity of sportfishing, many anglers pursued related fishing interests. One of these interests was reading current literature to learn more about the sport. For the Indiana SLM angler, 28.9

TABLE 33. Indiana SLM Anglers' Willingness to Pay More for a Fishing Trip, n=305.

Willing to pay \$10.00 more per trip?	<u>Percent</u>	<u>Mean</u>	<u>Std.Dev.</u>
Yes	75.4		
No	24.6		
	<u>100.0</u>		
If no, how much more?		\$5.92	(not calculated)
If yes to \$10.00, willing to pay \$20.00 more per trip?			
Yes	47.2		
No	52.8		
	<u>100.0</u>		
If no, how much more?		\$14.72	7.06
If yes to \$20.00, willing to pay \$30.00 more per trip?			
Yes	48.3		
No	51.7		
	<u>100.0</u>		
If no, how much more?		\$23.84	14.89
If yes to \$30.00, how much more?			
		\$44.22	24.13

TABLE 34. Indiana SLM Anglers' Fishing-group Characteristics, n=305.

Which of the following first influenced your desire to fish?		Percentage of respondents who chose these categories		
	Parents			70.8
	Spouse			5.4
	Family (Other)			34.8
	Friends			51.7
	Fishing Club			4.1
	Other			4.1
Number of influences:	<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>
	1.7	.89	1-5	1.5
Typical SLM fishing group:			<u>Percent</u>	
	Family		30.3	
	Friends		60.0	
	Business Assoc.		1.1	
	Club Members		0.9	
	Alone		<u>7.6</u>	
			99.9	
Size of group:	<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>
	2.9	1.0	1-9	2.9

percent had subscribed to various types of fishing publications and, on the average, subscribed to 2.3 literature items (Table 35). To a lesser extent, 8.4 percent of the respondents indicated that they presently belonged to a fishing club, but the level of their participation was dominated by the "few" category (39.9 percent), followed by the "almost all" category (29.5 percent). Making some type of fishing gear was a popular interest for 30.5 percent of the anglers, with 1.91 being the average number of items made. Fishing clinics and tournaments were two additional interests that drew 16.1 and 15.9 percent of the angler sample, respectively. The average level of participation in clinics or tournaments over the past five years was 4.1 and 4.1 events, respectively.

Why one chooses to fish SLM is also important to understand. It allows us to go behind the overt behavior to look at factors that are crucial to the experience. For this task, we used 44 of Driver's (1977) pool of "psychological outcome" items, which covered 16 distinct domains (Table 36). Responses to these items ranged from 1 = "very important" to 5 = "not at all important." Table 16 ranks the 44 items according to the overall mean score for each item. Not surprisingly, "catch fish" was rated the most important reason for fishing SLM with a mean score of 1.93. Aside from catching fish, fifteen additional motivational items had a mean score of less than 3.0, suggesting they are less than "moderately important."

TABLE 35. Adjunct Fishing Interests, Indiana SLM Anglers.

Do you subscribe to any fishing literature?					
		<u>Percent</u>			
Yes		28.9			
No		<u>71.1</u>			
		100.0			
If yes, how many?	<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>	
	2.29	1.3	1-9	2.1	
Have you ever made any fishing gear?					
		<u>Percent</u>			
Yes		30.5			
No		<u>69.5</u>			
		100.0			
If yes, how many items?	<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>	
	1.91	1.1	1-5	1.6	
Have you ever attended a fishing clinic?					
		<u>Percent</u>			
Yes		16.1			
No		<u>83.9</u>			
		100.0			
If yes, how many over the past 5 years?	<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>	
	4.1	5.2	1-45	3.0	
Have you ever participated in a fishing tournament?					
		<u>Percent</u>			
Yes		15.9			
No		<u>84.1</u>			
		100.0			
If yes, how many over the past 5 years?	<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>	
	4.1	4.1	0-20	2.4	
Are you currently a member of a fishing club?					
		<u>Percent</u>			
Yes		8.4			
No		<u>91.6</u>			
		100.0			
If yes, how often do you participate in club activities? (percent)	Almost <u>All</u>	<u>Several</u>	<u>Few</u>	Almost <u>None</u>	<u>Total</u>
	29.5	14.5	39.9	16.1	100.0

TABLE 36. Importance Values* of Reasons for Fishing Southern Lake Michigan: Indiana Residents, n=305.

<u>Rank</u>	<u>Reason**</u>	<u>Mean</u>	<u>Std. Dev.</u>
1	Catch fish	1.93	1.09
2	Experience excitement	2.39	0.75
3	Relax physically	2.40	0.90
4	Change daily routine	2.41	1.30
5	Be with friends	2.54	1.34
6	Get away from demands	2.56	1.25
7	Be with others...enjoy	2.57	0.94
8	Have thrills	2.60	1.23
9	Experience Tranquility	2.65	1.27
10	Know lake better	2.77	1.37
11	Rely on skills/abilities	2.77	1.28
12	Get rid of tension	2.79	1.28
13	Develop skills/abilities	2.80	1.28
14	Become better at it	2.87	1.31
15	Test abilities	2.89	1.16
16	Get away from noise	2.98	1.16
17	Use my equipment	3.01	1.17
18	Experience new things	3.03	1.31
19	Move at slower pace	3.03	1.22
20	Think about good times	3.11	1.39
21	Free to make choices	3.11	1.35
22	More elbow room	3.13	1.20
23	Be with similar people	3.23	1.16
24	Do...with family	3.26	1.32
25	Learn what capable of	3.27	1.19
26	Be with my group	3.38	1.19
27	Be on my own	3.39	1.23
28	With respectful people	3.44	1.22
29	Talk to new people	3.49	1.20
30	Be creative	3.52	1.05
31	Near considerate people	3.53	1.18
32	Develop self-pride	3.54	1.29
33	Teach outdoor skills	3.54	1.21
34	Be in control of things	3.56	1.15
35	Think of personal values	3.62	1.20
36	Supplement my food	3.77	1.14
37	Bring family together	3.82	1.30
38	Away from family	3.89	1.16
39	Control things	3.92	1.01
40	Gain self-confidence	4.10	1.19
41	Talk about equipment	4.11	1.28
42	Direct activities	4.44	1.30
43	Show others I can do it	4.53	1.26
44	Others think highly of me	4.69	1.18

* Importance is rated on a 5-point scale where 1=Extremely, 3=Moderately, 5=Not at all.

** For full text of reasons see Appendix B.

The "achievement/stimulation" domain was represented by six motivational items; two from the excitement scale rated second and eighth, one from the endurance scale rated eleventh, two from the skill development scale rated thirteenth and fourteenth, and one from the competence scale rated fifteenth. The "physical rest" domain received the third highest rating while the "escape physical and social pressures" domain was represented by three items. These three items were the "escape daily routine" scale rated fourth, the "escape role overload" scale rated sixth, and the "tension release" scale rated twelfth. Under the "similar people" domain, the "be with friends" scale had one item rated fifth and the "be with similar people" scale had one item rated seventh. The "escape physical pressures" domain was represented by two items, one from the "tranquillity scale" rated ninth and one from the "escape physical stressors" scale rated sixteenth. The "learning" domain was represented by one item rated tenth. Together, this set of domains reflected anglers motivated to catch fish, test and improve their fishing skills, relax and escape social and physical pressures, and share this time and experience with others like themselves. The remaining six domains were not represented by moderately important items. Surprisingly, motivations of "family togetherness," "nature," and "self-esteem" were of little importance to the SLM fishing experience.

Management Preferences

Indiana anglers' opinions about present and potential management practices are reported in Table 37. The management practices were divided into three general areas: those related to fisheries management, those associated with fishing facilities, and those related to the SLM angler. When asked about which fish to stock, steelhead trout was the preferred species (20.1 percent) out of the six major fish species in SLM. However, 27.1 percent of the Indiana SLM anglers indicated a preference for salmonid, suggesting no particular species preference of salmon or trout. Another 18.0 percent preferred perch and 13.3 percent preferred stocking a type of fish other than the six major species currently caught. The preferences for other types of fish ranged from pike, walleye, and muskie to bass, catfish, dogfish, and cod. This preference for more diversity also turned up in another question in which 58.6 percent of the anglers strongly supported increasing the variety of fish species in SLM. Of course, not all such preferences are practical or even possible. Creating more reefs for fish habitat was another management practice supported by the majority of anglers (74.8 percent). However, restricting the fishing season as an alternative fisheries management strategy received only slight support (6.7 percent) from Indiana SLM anglers.

Presently, Indiana law does not allow the snagging of salmon during spawning season; yet 25.1 percent of the anglers opposed such a program, while 62.9 percent strongly supported such a program. Another question was asked about the regulations on the number and size of fish harvested from SLM. The majority of anglers felt the current practices were "about right" (85.3 and 85.3 percent, respectively). Decreasing commercial fishing on SLM received "moderate" or greater support from 75.3 percent of the anglers, while 24.7 percent gave little or no support to such a practice. Anglers gave their strongest support to restricting offshore dumping by commercial industries (97.4 percent) and showed strong support for the appropriation of more state monies toward SLM fisheries management (79.0 percent). It seemed that Indiana SLM anglers as a whole supported management practices that aimed at improving the quality of fish populations and were satisfied with the current fishing regulations, but preferred a wider variety of fish species.

TABLE 37. Management Preferences of Indiana Anglers for Southern Lake Michigan, n=305.

Type of game fish you most prefer to have stocked:

	<u>Percent</u>
Coho salmon	9.1
Chinook salmon	6.0
Steelhead trout	20.1
Lake trout	2.3
Brown trout	4.1
Perch	18.0
Salmonids	27.1
Other	<u>13.3</u>
	100.0

Opinion of present regulations on:	<u>Too Strict</u>	<u>Slightly Strict</u>	<u>About Right</u>	<u>Not Strict Enough</u>	<u>Total</u>
Total number of fish caught:	2.3	5.1	85.3	7.4	100.1
Size of fish caught:	2.8	4.6	85.3	7.2	99.9

Degree of support for management alternatives for SLM:

	<u>Very Strong</u>	<u>Strong</u>	<u>Moderate</u>	<u>Somewhat</u>	<u>None</u>	<u>Total</u>
Decrease commercial fishing	40.9	12.4	22.0	14.1	10.5	99.9
Restrict industrial dumping	84.2	13.2	1.3	1.3	0.0	100.1
Outlaw salmon snagging	46.0	16.9	12.0	10.7	14.4	100.0
More sportfish species	40.6	18.0	22.2	8.4	10.8	100.0
Restrict fishing season	3.0	3.7	18.9	18.5	55.8	99.9
More reefs for habitat	51.9	22.9	18.4	4.4	2.4	100.0

More state monies should be applied to fish management:

	<u>Percent</u>
Yes	79.0
No	<u>21.0</u>
	100.0

The second set of management issues involved support facilities for fishing SLM. Over 70.0 percent of all anglers gave at least "moderate" support to additional facilities for all public fishing areas, which included boat slips, piers, access ramps, parking spaces, and more public shoreline (Table 38).

The third set of management issues dealt more directly with the angler. When asked about the \$6.00 cost for a Indiana fishing license, the majority felt it was "about right" (64.2 percent), while 34.1 percent felt it was overpriced (Table 39). However, when asked to give a fair price for a fishing license, the mean value was \$9.10 with a mode of \$10.00. Creation of a single multi-state license to fish anywhere on Lake Michigan was "strongly" supported by 59.1 percent of the Indiana anglers, but requiring a license and a permit to fish for any type of SLM fish was definitely opposed by 86.0 percent of the anglers. The majority of anglers were also definitely opposed to an increase in the excise tax on fishing goods (72.7 percent) and to an increase in the motor fuel tax for boats (53.1 percent). Increased law enforcement had strong support from 61.7 percent of Indiana SLM anglers and another 24.3 percent "moderately" supported such a program. Overall, it appeared that Indiana anglers supported programs aimed at fisheries management, facility development, stricter law enforcement, and creation of a multi-state fishing license, but opposed programs that would result in a direct financial cost.

TABLE 38. Preferences for SLM Fishing Facilities, Indiana Anglers (in percent), n=305.

<u>Management alternative:</u>	<u>DEGREE OF SUPPORT</u>					<u>Total</u>
	<u>Very Strong</u>	<u>Strong</u>	<u>Moderate</u>	<u>Somewhat</u>	<u>None</u>	
Build more harbor/slips	41.5	20.7	21.7	10.8	5.3	100.0
Increase public shoreline	50.3	22.1	14.7	6.9	6.0	100.0
Build more public piers	46.5	16.7	21.2	10.1	5.5	100.0
Increase boat ramps	35.4	17.5	23.9	12.6	10.6	100.0
Increase parking along shore	42.7	18.6	23.7	8.2	6.9	100.1

TABLE 39. Preferences* for SLM Licenses and Taxes, Indiana Anglers, n=305.

Present cost for a fishing license is:		<u>Percent</u>			
	Too high				7.5
	Somewhat high				26.6
	About right				64.2
	Too low				<u>1.7</u>
					100.0

What is a "fair price" for a SLM license?	<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>
	\$9.10	9.23	1-99	7.1

<u>Management Alternative:</u>	<u>DEGREE OF SUPPORT</u>					<u>Total</u>
	<u>Very Strong</u>	<u>Strong</u>	<u>Moderate</u>	<u>Somewhat</u>	<u>None</u>	
Create multi-state license	39.7	19.4	20.2	5.3	15.5	100.1
Increase law enforcement	36.1	25.6	24.3	6.7	7.4	100.1
License/permit for all fish	2.9	4.6	8.5	7.9	76.0	99.9
Increase excise tax	1.5	1.8	10.0	14.0	72.7	100.0
Increase boat fuel tax	8.1	5.4	17.1	16.2	53.1	99.9

* See Appendix for full wording of questions.

Health Risks

A final area of inquiry concerned anglers' perceptions of and behaviors toward the health risks associated with eating fish from SLM. Nearly all the Indiana anglers (94.7 percent) indicated they were familiar with information suggesting that eating fish from SLM was a health risk (Table 40). The most often cited sources of information were newspapers (89.2 percent), friends (68.0 percent), television (67.4 percent), and radio (55.6 percent). Special brochures printed by the state and conservation police officers were not good vehicles for transmitting such information, although the average number of sources per angler was three. Although anglers were aware of potential health risks from eating SLM fish, 57.7 percent indicated that they believed it to be only "somewhat" or "not at all" risky. On the other hand, only 14.8 percent believed the health risks to be "highly" or "extremely" risky.

This lack of perceived risk in eating SLM fish might be attributed to some precautions anglers can take to reduce potential health hazards. One precaution involves a modified way of cleaning fish. In this method, additional fatty tissue is removed where toxic substances are known to accumulate. This method was practiced by 70.2 percent of the anglers. Another precaution involves limiting the amount of fish consumed, which was practiced by 64.6 percent of the SLM anglers. When asked to indicate how much

each of six conditions contributed to the pollution of SLM fish, over 75.0 percent believed toxic chemicals, heavy metals, pesticides, and raw sewage were sources of pollution. To a lesser extent, acid rain and agricultural runoff were believed to be major sources of fish contamination (49.1 and 37.0 percent, respectively.) As implied earlier by the substantial proportion of anglers who felt little or no risk involved

TABLE 40. Perceptions of Health Risks Associated with Eating SLM Fish, Indiana Anglers, n=305.

Are you familiar with any information suggesting that eating fish from Lake Michigan may be a health hazard?

	<u>Percent</u>
Yes	94.7
No	5.3
	<u>100.0</u>

If yes, how did you become familiar with this information? (multiple responses)

	<u>Percent</u>
Newspaper	89.2
Television news	67.4
Radio news	55.6
Friends	68.0
Special brochures	27.1
Other	9.9

Number of sources listed from above:	<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>
	3.1	1.25	1-6	3.1

To what extent do you feel that eating fish from Lake Michigan is a risk to your health?

	<u>Percent</u>
Extremely	5.7
Highly	9.1
Moderately	27.6
Somewhat	36.1
Not at all	21.6
	<u>100.1</u>

Do you attempt to clean the fish you eat from Lake Michigan in a way that will reduce any possible health risks?

	<u>Percent</u>
Yes	70.2
No	29.8
	<u>100.0</u>

Do you limit the amount of fish you eat from Lake Michigan in order to reduce any health risks?

	<u>Percent</u>
Yes	64.6
No	<u>35.4</u>
	100.0

To what extent do you believe that each of the following conditions contribute to pollution of the fish in SLM?

	<u>PERCEIVED CONTRIBUTIONS</u>					<u>Total</u>
	<u>Extreme</u>	<u>Very</u>	<u>Moderate</u>	<u>Somewhat</u>	<u>None</u>	
Heavy metals	62.6	18.6	11.3	6.4	1.0	99.9
Pesticides	58.3	22.6	12.1	6.1	0.9	100.0
Other toxic chemicals	63.4	20.6	11.9	3.7	0.3	99.9
Raw sewage	53.7	21.2	17.0	7.1	1.0	100.0
Agricultural runoff	24.2	12.8	26.5	24.9	11.6	100.0
Acid Rain	32.0	17.1	24.9	18.5	7.4	99.9

Have any of the above conditions reduced your fishing SLM?

	<u>Percent</u>
Not at all	52.1
Somewhat	30.2
Pretty much	8.0
A great deal	<u>9.7</u>
	100.0

with eating SLM fish, most anglers indicated that SLM's pollution conditions had only "somewhat" or "not at all" reduced their fishing of SLM (82.3 percent).

Apparently, while the majority of Indiana SLM anglers had heard from a number of sources about the health risks related to eating SLM fish, their evaluations of the risks discounted the threat. They may have felt that the cleaning precautions were adequate or that the pollution problem was not that severe. Although the majority felt that the Lake was contaminated by a number of pollutants, this belief was not strong enough to alter their SLM fishing behavior.

Non-southern Lake Michigan Anglers

Respondents that had never fished SLM were also of interest to this study. Managers need to know why they have never fished the area, their sociodemographic profile, general fishing patterns, fishing area preferences, and the role that fishing plays in their lives. Of the 99 Indiana non-SLM respondents, 70.1 percent were males, predominantly middle aged (mean = 38.2), and tended to have a high school education or less (65.7 percent, Table 41). While the majority earned an income of \$20,000 to \$30,000 (29.0 percent), 43.2 percent earned more than \$30,000. They averaged 41.4 working hours per week and took 18.6 vacation days per year. The anglers in the sample were mostly married with children (66.7 percent) or single without children (21.1

percent). The majority of respondents resided in a rural town (43.1 percent) or in areas of up to 100,000 in population (44.8 percent) and grew up in areas of a similar size.

The Indiana non-SLM angler showed distinct differences from the Indiana SLM angler. Non-SLM anglers tended to be female as opposed to male (29.9 to 10.4

TABLE 41. Sociodemographic Profile of Non-SLM Anglers, Indiana Residents, n=99.

Gender:		<u>Percent</u>			
	Male		70.1		
	Female		29.9		
			<u>100.0</u>		
Age (years):		<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>
		38.2	13.08	18-70	35.8
Education Level:		<u>Percent</u>			
	Grade school		4.5		
	Some H.S.		16.1		
	H.S. grad		45.1		
	Vocational-Technical		9.8		
	Some college		12.5		
	Associate Degree		5.9		
	Baccalaureate		4.5		
	Masters		1.5		
	Ph.D.		0.0		
			<u>99.9</u>		
Income (total family):		<u>Percent</u>			
	Under \$10,000		16.0		
	\$10,000-19,999		20.8		
	\$20,000-29,999		29.0		
	\$30,000-39,999		20.6		
	\$40,000-49,999		9.5		
	\$50,000-59,999		4.1		
	\$60,000-69,999		0.0		
	Over \$70,000		0.0		
			<u>100.0</u>		
Workweek (hours):		<u>Mean</u>	<u>Std. Dev.</u>	<u>Median</u>	
		41.4	10.51	40.2	
Vacation (days/year):		18.6	18.14	14.3	

Marital Status:	<u>Percent</u>
Single without children	21.1
Married without children	9.0
Single with children	3.2
Married with children	<u>66.7</u>
	100.0

Residence (population):	<u>Percent</u>
Rural	43.1
City under 20,000	21.2
City of 20,000-100,000	23.6
Urban area of 100,000-250,000	9.8
Metropolitan area over 250,000	<u>2.2</u>
	99.9

Childhood environment (population):	<u>Percent</u>
Rural	40.9
City under 20,000	14.0
City of 20,000-100,000	28.7
Urban area of 100,000-250,000	12.0
Metropolitan area over 250,000	<u>4.3</u>
	99.9

percent, respectively), less educated (17.9 percent more), and were more likely to earn less than \$30,000 (65.8 percent).

Past fishing participation revealed that non-SLM anglers began fishing 1.1 years later than SLM anglers (24.4 years ago) and had actually fished 20.7 of those years (Table 42). As with the SLM anglers, the majority of non-SLM anglers showed an increase in their rate of fishing over the last five years (37.3 percent). Yet, they had a larger percentage that showed a decrease as well (30.7 percent). The number of days fished over the last 12 months (mean = 24.9 days) was higher than the 20.3 days per year for SLM anglers.

Indiana non-SLM anglers showed a strong preference for fishing small lakes and ponds (61.7 percent), followed by large inland waters (15.4 percent), with no anglers indicating that they had ever fished the Great Lakes (Table 43). This preference appeared to be very stable. Fully 91.3 percent indicated that their present preference for a fishing area had not changed from what it was five years ago. Less than 50.0 percent of the non-SLM sample indicated that the type of fishing area was "very" or "extremely" important to their fishing experience: 26.4 percent indicated that the type of fishing area was "somewhat" or "not at all" important. Indiana non-SLM anglers provided a number of reasons for not fishing SLM. "Too far away" was the reason most often cited (19.9 percent), followed by "not familiar with" and "no opportunity."

The final set of questions looked at how central fishing was to the Indiana non-SLM angler. Fishing was the favorite outdoor recreation activity for 70.0 percent of the sample, with the other 30.0 percent listing camping, hiking, swimming, and golf as their favorite outdoor recreation activity (Table 44). Only 26.0 percent viewed fishing as "very" or "extremely" important in their lives. However, this did not mean that it generally was not a significant part of their leisure lifestyles; 57.8 percent indicated

that they "sometimes" or "always" planned their vacation around the fishing season. Another 21.6 percent of the sample said that fishing has "somewhat" to "almost totally" influenced their job. This seems to reflect a deep sense of commitment to recreational fishing by many, if not most, anglers even if SLM is not a convenient locale.

TABLE 42. General Fishing Profile for Non-SLM Anglers, Indiana Residents, n=99.

	<u>Mean</u>	<u>Std. Dev.</u>	<u>Range</u>	<u>Median</u>
How many years ago did you start fishing?	24.4	14.17	1-65	23.2
Of the above years, how many did you actually fish?	20.7	13.40	1-55	19.7
Fishing trips over the last twelve months?	24.9	5.38	1-420	4.1
Change in fishing participation over the past five years?			<u>Percent</u>	
Increase			37.3	
Same			32.0	
Decrease			<u>30.7</u>	
			100.0	

TABLE 43. Setting Preferences for Indiana Non-SLM Anglers, n=99.

Type of area fished most often:	<u>Percent</u>
Ocean	0.3
Great Lakes	0.0
Rivers	13.7
Inland lakes (large)	15.4
Small lakes/ponds	61.7
Streams	7.9
Other	<u>1.1</u>
	100.1

Importance of type of area to fishing experience:	<u>Percent</u>
Extremely	14.7
Very	34.1
Moderately	24.8
Somewhat	17.3
Not at all	<u>9.1</u>
	100.0

Has your preference for an area changed the over past 5 years?	<u>Percent</u>
Yes	8.7
No	<u>91.3</u>
	100.0

Why have you never fished SLM?	<u>Percent</u>
Too far	11.3
Not familiar	13.1
No opportunity	25.2
Like it elsewhere	18.4
Don't care to	7.7
Bad surroundings	9.3
Other	<u>15.0</u>
	100.0

TABLE 44. Centrality of Fishing to Lifestyle, Indiana Non-SLM Anglers, n-99.

Is fishing your favorite type of outdoor recreation activity?	<u>Percent</u>
Yes	70.0
No	<u>30.0</u>
	100.0

How important is fishing as a source of satisfaction in your life?	<u>Percent</u>
Extremely	6.1
Very	19.9
Moderately	29.9
Somewhat	28.2
Not at all	<u>15.9</u>
	100.0

Do you plan your vacation so that it will occur during the fishing season?	<u>Percent</u>
Always	13.5
Sometimes	44.3
Not usually	27.4
Never	<u>14.8</u>
	100.0

How much has your job been influenced by your fishing involvement?	<u>Percent</u>
Almost totally	0.5
A large part	5.5
Some	15.6
Almost none	14.1
None	<u>64.3</u>
	100.0

Licensed Anglers and the
Southern Lake Michigan
Sportfishery

Part II: Specialization Model

RECREATION SPECIALIZATION AND THE SOUTHERN LAKE MICHIGAN ANGLER

A second objective of this study was to apply the recreation specialization concept initially proposed by Bryan (1977, 1979). The goal of this classification process was to place southern Lake Michigan (SLM) anglers into analytically distinct subgroups. To apply this concept it was important to distinguish between the conceptual framework, that is, the theoretical foundations and the actual specialization categories proposed and operationalized by Bryan and subsequent researchers. Bryan's conceptual framework proposed that participants in a recreation activity would undergo a developmental process and that distinct behaviors and preferences would accompany each stage of development. Therefore, at any point in time, participants could be placed individually on a continuum pertaining to the activity, ranging from beginner to specialist.

This concept was beneficial because it provided a means to group users of a recreation resource in ways that could be linked to specific management actions. The specialization process ideally should tap social and psychological dimensions that underlie participation in the activity but are often ignored by more traditional species-oriented fisheries-management research. To the extent that this is true, the specialization grouping process should enhance managers' ability to design management regimes that enhance the quality of recreational experiences available to behaviorally distinct subgroups of users. Moreover, because Bryan's conceptual framework has been theoretically grounded, it yields an activity typology with stronger explanatory relevance than other more ad hoc classification schemes.

The specialization concept is not without its critics. Previous researchers have argued that it lacks a concise method to operationalize its domains (Buchanan, 1985; Wellman et al., 1980). As will be made apparent below, we believe that distinguishing the process from the product in previous work will make it clear why some of these criticisms have come about and how we have tried to overcome them in this report.

Recent Studies

In his study of trout anglers, Bryan measured specialization in terms of degree of participation, technique, and three setting preferences. Together these domains produced a four-level progression ranging from the "occasional fishermen," to the "generalist," to the "technique specialist," and finally to the "technique-setting specialist" (Bryan, 1979, p. 33). Based on this typology, Bryan noted differences among the four levels of specialization with respect to fish orientation, management philosophy, social context, and vacation patterns.

On the other hand, Graefe's study of anglers from an eight-county area surrounding Galveston Bay, Texas (1980) used a single measure to operationalize specialization. He simply asked respondents for their fishing participation during the previous twelve months, and from that recreated Bryan's four-level typology. This univariate measure of specialization categorized anglers into "low," "medium," "high," and "very high" groups. He then explored the relationship between specialization and investment in equipment, perceived skills, number of settings fished, making equipment, use of social and communication networks, and expected rewards.

Katz (1981) investigated attitudes towards environmental conservation and employed specialization as an independent variable. His data came from members of a northern U.S. fishing organization. In his analysis he developed

a multidimensional index for operationalizing specialization. The index consisted of 19 items including age, years fished, preferences for conditions, and techniques and methods used for fly fishing. The specialization index stratified anglers into three levels: "ultra-low," "middle," and "ultra-high." There was a positive relationship between these levels and an environmental conservation scale.

Note that these first three studies treat a fly fisherman quite differently. Bryan places such a person at one end of the spectrum, Graefe excludes freshwater fishing altogether, and Katz subdivides fly fishing into three groups. Other studies have gone even further afield from Bryan's original use of the concept. For example, Wellman et al. (1982) constructed a multi-dimensional specialization index that consisted of canoeing investment (three questions), past experience (three questions), and centrality to life (four questions). By eliminating the two middle quartiles, canoeists from nine rivers in Virginia were stratified into "low" and "high" specialization categories. The specialization index showed little relationship with a depreciative behavior scale. It is not clear why it should explain depreciative behavior either. Despite such substantive problems, it is important here because it is not on fishing at all; the specialization concept should be applicable beyond the activity where it was developed.

More to the point here is another study on canoeists by Kauffman (1984). He also developed a multi-dimensional specialization index that consisted of participation, equipment, skill, and centrality to life. Each domain consisted of two measures. Data from canoeists on three eastern U.S. rivers and a national canoeing organization showed a relationship between this three-level specialization index and expected rewards and resource-related attitudes.

Components of Specialization

This review of specialization studies suggests a lack of concensus or uniformity about how to operationalize the concept (see Figure 2). Note that past participation in an activity was the only domain included in all four studies and it was measured as either years of experience and/or number of times over the previous twelve months, depending on the study. In three of the studies, centrality to life was considered a determinant of specialization, while techniques, equipment, setting preferences, age, and skill were used in only one of the studies. Clearly it would be useful to develop more precise and consistent operational definitions for specialization.

In Bryan's initial arguments, he states that the conceptual framework of specialization has advantages over other classification schemes because of its attachment to theoretical principles. Specifically he calls on reinforcement theory in social psychology that explains behavior as part of a learning process (Bryan, 1979, p. 49). In this view, for example, success in an activity, especially if it comes quickly, can lead to a continuation in that activity due to operant conditioning, that is, the perception of rewards salient to the participant.

Although rewards are the major underlying basis proposed for the specialization concept, Bryan adheres to an empirically-oriented behaviorist perspective in that rewards (or motivations) are to be inferred from behavior.

Figure 2. Recent conceptual approaches to specialization.

<u>Author</u>	<u>Date</u>	<u>Specialization categories used</u>
Graefe	1980	Participation (surrogate measure)
Katz	1981	Frequency of participation, conservation attitudes
Wellman, et.al.	1982	Expenditures, experiences, lifestyles
Kauffman	1984	Participation, equipment, skill, lifestyle

Operationally he prefers to record the observable components of human behavior. As a result, rewards, or the observable conditions, can be highly idiosyncratic and situation specific, and operationalization of the theory becomes problematic. The key is to find a way to identify the salient regularized behavioral features. Bryan's basic theory relies on the idea that motives, which are antecedents to the recreational behavior, can be inferred from other previous and observable behaviors. In psychology the idea that motives are established and maintained through experience or expected rewards is generally accepted (e.g., Kleiber and Maehr, 1985). Operationalizing specialization with motives is logically sound and can yield surrogates for the idiosyncratic rewards that, in turn, form generalized, stable representations of Bryan's conceptual domains. To apply specialization across activities, settings, or time, the specific behavioral "reward" measures must be tied to existing motivation theory to assess each specialization component (i.e., cause) in a known, testable, and generalizable form. This approach accepts Bryan's basic theoretical concepts as valid and seeks to redefine the specialization variables in a consistent, logical, and reliable way across applications.

Motivation Theory

Maehr and Braskamp (1986) have developed a classification of motivations they call "investment theory," which offers an internally consistent framework to approach specialization. In this theory, a course of action (activity) is considered a collection of integrated behavior patterns, all of which reflect a degree of attraction (motivation) toward something. This theory is in line with much of Bryan's original conceptualization, although it differs from the applications that have followed. Motivation is an antecedent to behavior and the study of motivation begins and ends with behavior; that is, the observable behavior is a function of the motivation. The causal linkage from past behaviors to present ones is completed through the establishment of rewards, which in turn aggregate into stable motive patterns. In our present context, people want to fish (motive) because of the many reasons (rewards) they expect to gain based on personal preferences and past experience.

Specialization Domains

The relevance of personal investment theory to recreation specialization is the underlying conceptualization it provides. When applied to Bryan's generalized framework it will help sort out the behavior patterns into consistent, grounded domains. It provides an operational link in Bryan's contention that motivational differences are the reason for behavioral and attitudinal variation within a recreation activity (1979, p. 54). Maehr and Braskamp's (1986) domains, or characteristics of motivation, are choice, persistence, continuing motivation, intensity, and performance. All but one are directly applicable to specialization. The first one, choice, implies selection from a set of action possibilities. It is a function of the availability and distribution of time, talent, energy, and money. These same personal resources were alluded to by Bryan (1979, p. 60) as he described a participant's degree of specialization.

Persistence pertains to an individual's choice of the same behavior alternative over a given period of time. For specialization, this behavior pattern seems to reflect past participation in an activity, possibly in terms of the number of years active and annual frequency in that activity. Continuing motivation is a return to the same task, or task area, after an interruption in time. To distinguish this behavior pattern from persistence, it is important to focus on the idea of returning to the task "area." "Area" refers to the activity and its associated behaviors, whether ancillary or supportive in nature. For recreation specialization, this refers to adjunct activities related to the main activity. It can include making equipment, reading more about the activity, participation in clinics related to the activity or membership within the activity's organization. Performance is straightforward in its meaning. It suggests a level of perceived skill, competence, or ability within the activity.

The fifth behavior pattern, intensity, is defined as the amount of sheer energy expended. While its relationship to motivation has merit, its inclusion with personal investment theory and cognitive psychology seems misplaced because it is defined by them as a physiological factor. For this study, the focus is on the cognitive aspects of intensity, that is, intensity as commitment or willingness to expend energy on the activity. This is done by examining the role that the activity plays in a person's life or its importance as a personal investment. Therefore, intensity is re-defined as a centrality-to-life dimension. This also implies the relative importance of an activity vis-a-vis other aspects of life. It is meant to be consistent with the centrality measures in three of the five specialization studies previously reviewed (Bryan, 1979, Wellman et al., 1982, and Kauffman, 1984), and was given importance by Bryan in his original study.

In the study by Wellman et al., four measures of centrality to life were used, but little relationship appeared between the specialization index and the depreciative behavior index. (As noted above, it is not clear why this should be so on strictly theoretical grounds.) Kauffman's study (1984) provided the best empirical evidence for including the centrality of life domain with this set of behavior patterns. His centrality to life domain, which incorporated two individual variables, had an item-total correlation of 0.61 and, when eliminated, decreased in the overall specialization scale alpha from 0.80 to 0.76. It was the best of four domains used to detect variation in expected rewards. For Kauffman, centrality includes such measures as the activity's contribution to life satisfaction, influence on career, and vacation planning.

Actually many of the measures used in previous specialization studies correspond to one or another of the five motivation domains operationalized in this study. The lack of consistent measurements across previous specialization studies can be overcome by employing a set of five integrated measures that subsume the previous measures while being true to both Bryan's concepts and motivation theory in general. Once again, these domains are labelled choice, persistence, continuing motivation, centrality-to-life, and performance.

Specialization Index

For this study, a list of variables was developed with a focus on the activity of sportfishing or on fishing southern Lake Michigan (SLM) that would represent each of the five domains. The final items used for each domain are presented in Table 45.

In keeping with the general idea of personal resources, the choice domain consisted of seven measures representing time (one item), money (three items), and opportunity (three items). As a subscale, the choice domain had an alpha of 0.52 with an average item-total correlation of 0.25 (Table 46).

The persistence domain was represented by five items, three dealing with past fishing participation in general and two dealing specifically with past fishing participation on SLM. The persistence subscale had an alpha of 0.74 and an average item-total correlation of 0.51. It is interesting to note that the measurement item concerning the number of fishing trips to SLM over the last twelve months decreased the overall alpha value and was therefore dropped from the subscale.

Four items were selected to scale the continuing motivation domain. It had an alpha of 0.64 for the subscale and an average item-total correlation of 0.43 (Table 46). The centrality-to-life domain, which replaced the intensity domain, was represented by five items that had an average item-total correlation of 0.37 and an alpha of 0.64 for the subscale. The last domain, performance, included two items that had an average item-total correlation of 0.38 and an alpha of 0.56 for the subscale. The specialization scale, which was represented by the five domain subscales, had an average item-total correlation of 0.52 and an alpha of 0.77.

A specialization index score was computed for each angler using a series of calculations. First, the scores on each item within a domain were totaled and divided by the number of items in the domain. Next, each of these average subscale scores was multiplied by a weighting factor to equalize subscale scores by eliminating the discrepancies due to item-measurement ranges. At this point, each "subindex" score had a range of one to five. Finally these adjusted scores for each of the five domains were totaled and divided by five, which created an index ranging from 5 to 25. The actual scores on the specialization index ranged from 8.57 to 22.77. Since the index score was based on 23 items, an angler with a missing value for any one of the items was deleted from further analysis, which put the final number of usable anglers at 279.

The next step involved determining the number of levels of specialization based on the distribution of index scores. A look at Figure 3, which displays scores rounded into the nearest whole or half digit, shows a clumped distribution.

This type of distributional pattern makes intuitive sense. There are a large number of lower scores representing the novice or general angler. Avid anglers are at the upper end of the scale. They are a small subgroup of

TABLE 45. Specialization Measures by Subscales Domains for SLM Anglers.

<u>Subscale</u>	<u>Item wording</u>
CHOICE	<p>SLM is close to where I live.</p> <p>SLM has the type of fish I prefer.</p> <p>SLM is easy to get to.</p> <p>Estimate the number of fishing items you own for fishing SLM.</p> <p>Estimate the total costs for a typical fishing trip to SLM.</p> <p>On the average, how many days of vacation do you take each year excluding weekends.</p> <p>Indicate your total family income, before taxes.</p>
PERSISTENCE	<p>How many years ago did you start fishing?</p> <p>During how many of the above years did you actually fish at least once?</p> <p>Estimate the total number of fishing trips you took over the last 12 months.</p> <p>How many years ago did you begin fishing in SLM?</p> <p>During how many of the above years did you actually fish at least once on SLM?</p>
CONTINUING MOTIVATION	<p>What is the total number of fishing literature to which you subscribe?</p> <p>What is the total number of fishing items you have made to fish SLM?</p> <p>Indicate how many fishing clinics you have attended over the last 5 years.</p> <p>Indicate your level of participation in any fishing club.</p>
CENTRALITY TO LIFE	<p>How important is the type of fishing area to your fishing experience?</p> <p>Compared to other fishing areas, how important is SLM to your fishing experience?</p> <p>How important is fishing as a source of satisfaction in your life?</p> <p>How much has your job been influenced by your fishing involvement?</p> <p>Do you plan your vacation so that it will occur during the fishing season?</p>
PERFORMANCE	<p>Indicate how many SLM fishing derbies you have participated in over the past 5 years.</p> <p>How would you rate your ability to catch fish in SLM?</p>

Items are all ordered categorical variables with 3-5 levels.

TABLE 46. Alpha Reliability Coefficients and Item-Total Correlation for Each Subscale of Specialization Index.

<u>SUBSCALE</u>	<u>AVERAGE ITEM-TOTAL CORRELATION</u>	<u>CRONBACH'S ALPHA</u>
CHOICE	0.25	0.52
PERSISTENCE	0.51	0.74
CONTINUING MOTIVATION	0.43	0.64
CENTRALITY TO LIFE	0.37	0.64
PERFORMANCE	0.38	0.56
SPECIALIZATION INDEX	0.52	0.77

anglers who are deeply committed to and involved in the activity. Even though a close examination of Figure 3 may suggest as many as four or five levels of specialization, three levels of specialization (low, medium, and high) were chosen for this analysis. This was based in part on the ease of handling differences among three groups as opposed to more than three groups. As a result, anglers with an index score of less than 12.5 were put into the low specialization category, those between 12.5 and 16.0 were placed in the medium specialization category, and those having a score greater than 16.0 were put into the high specialization group. This resulted in three groups of roughly equal proportions.

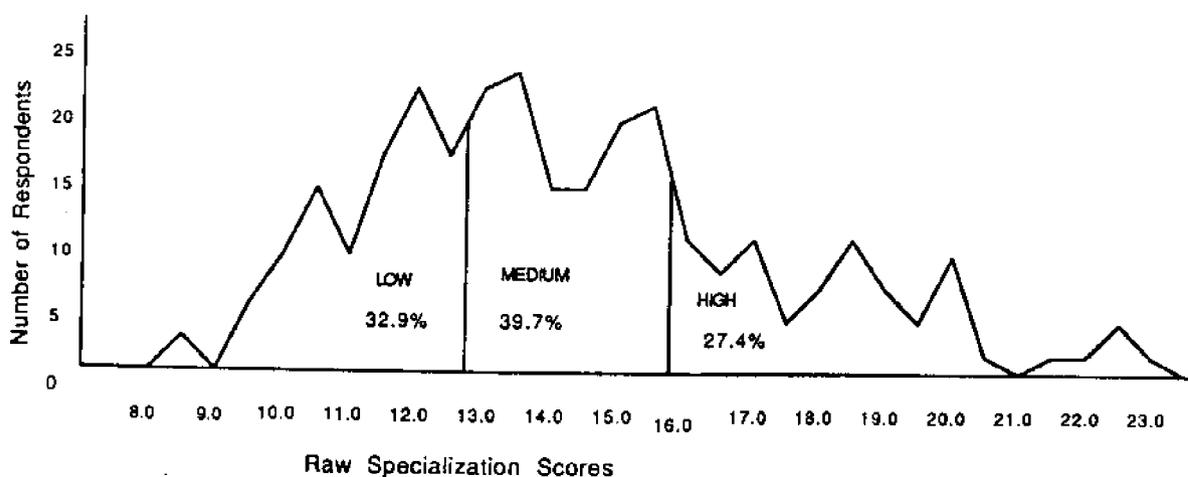


Figure 3. Distribution of raw specialization scores with low, medium, and high groupings.

Discriminant Analysis

Once this sample population of 279 anglers was divided into a three-level user typology, discriminant analysis was used to detect differences among the groups with respect to management preferences, health-related concerns, and Driver's psychological outcomes. Discriminant analysis statistically distinguished among groups of respondents based on a set of predictor (discriminating) variables. It created combinations of those variables that best discriminated among groups statistically, that is, in the sense of being able to tell the groups apart.

There was a total of 22 management variables used in this analysis. Eight items pertained to fisheries management, five items to facility management, and nine items pertained to angler regulations and commercial management. A discriminant analysis was run separately on each of the three areas of management to determine the discriminating items for each area. Then an overall discriminant analysis was run using all of the 22 management items to learn which areas of management (fisheries, facilities, and angler/commercial regulations) were most discriminating.

The eight fisheries management items will be discussed first. The discriminant analysis in Table 47 suggests that only the first discriminant function was significant ($p < .0001$). The function used three of the management variables to maximize separation among the three groups of anglers (Table 48). The variables were considered significant if their function coefficient was more than .40 or less than -.40. Function 1 discriminated between the low specialization group, which had a centroid value of 0.478, and the high specialization group, which had a centroid value of -0.624.

The significant management variables that separated the low specialization group (LSG) from the medium specialization group (MSG) and the high specialization group (HSG) were "preferred fish stocked" and "regulations about the number of fish caught," with coefficients of 0.455 and 0.500, respectively. The first variable represents the variety of fish species, from "1" coho salmon only to "7" salmonids in general. The function coefficient suggests that the LSG generally preferred that perch or salmonids be stocked, while the HSG preferred that individual species such as coho and chinook be stocked.

Regulations concerning the number of fish one is allowed to catch were considered slightly strict by the LSG and were about right for the HSG. On the other hand, allocating more state monies for SLM fish management was more highly favored by the HSG than the LSG. These fisheries management preferences seem to be in line with the idea that high specialization anglers show more concern for the resource than the low specialization anglers, who tend to be more catch-oriented (Bryan, 1979; Kauffman, 1984). The results also reflect a species-specific orientation for the HSG and a more general fish orientation for the LSG.

The next area of management that was evaluated concerned the physical facilities related to SLM fishing. This included five items (Table 49). The discriminant results produced two significant functions (alphas = .0003 and .0042, respectively) and used four of the five items to separate the three groups (Table 50). For the first function, the HSG exhibited greater support for more harbors/slips and public piers than the LSG, while the LSG favored more public shoreline from which to fish. The second function also shows that

TABLE 47. Fisheries-management Questions.

A. Indicate what type of fish you most prefer to have stocked.

- | | | |
|-------------------|----------------|------------------------|
| 1. Coho Salmon | 4. Lake Trout | 7. Salmonid in general |
| 2. Chinook Salmon | 5. Brown Trout | 8. Other (specify) |
| 3. Steelhead | 6. Perch | |

B. How do you feel the present regulations are on southern Lake Michigan with respect to the total number of fish that can be caught? (circle one)

- | | |
|----------------------|--------------------|
| 1. Not strict enough | 3. Slightly strict |
| 2. About right | 4. Too strict |

C. How do you feel present regulations are for size of fish caught? (circle one)

- | | |
|----------------------|--------------------|
| 1. Not strict enough | 3. Slightly strict |
| 2. About right | 4. Too strict |

D. Should more state monies be applied to fish management for southern Lake Michigan? (circle one)

- | | |
|-------|--------|
| 1. No | 2. Yes |
|-------|--------|

Indicate your degree of support for the following SLM management alternatives as:

- | | | | | |
|---------|-------------|-------------|-----------|----------------|
| 1. None | 2. Somewhat | 3. Moderate | 4. Strong | 5. Very Strong |
|---------|-------------|-------------|-----------|----------------|

E. Make the snagging of salmon illegal

F. Increase the variety of sport fish species

G. Restrict the variety of sport fish species

H. Create more reefs for fish habitat

TABLE 48. Results of the Fisheries-management Variables with the Specialization Index Using Discriminant Analysis.

<u>FUNCTION</u>	<u>N</u>	<u>EIGEN VALUE</u>	<u>PERCENT VARIANCE</u>	<u>CHI SQUARE</u>	<u>DEGREES FREEDOM</u>	<u>SIGNIFI- CANCE</u>	<u>GROUP CENTROIDS</u>		
							<u>LOW</u>	<u>MED</u>	<u>HIGH</u>
1	228	0.17766	84.76	36.52	10	.0001	.478	.087	-.624
2	228	0.03195	15.24	5.89	4	.2075	-.200	.195	-.111

<u>VARIABLES IN ANALYSIS*</u>	<u>FUNCTION 1 COEFFICIENTS</u>	<u>FUNCTION 2 COEFFICIENTS</u>	<u>CLASSIFICATION COEFFICIENTS</u>		
			<u>LOW</u>	<u>MEDIUM</u>	<u>HIGH</u>
Preferred fish stocked	.455	.002	.474	.403	.593
Regulations about # fish caught	.588	.164	5.408	5.150	4.421
More \$ toward fish management	-.733	.008	-.802-01	.677	2.033
Make snagging salmon illegal	.007	-.647	1.275	1.114	1.235
Create reefs for fish habitat	-.155	.808	3.588	3.977	3.837
			(CONSTANT) -17.961	-18.677	-17.593

* See Table 47 for the complete text of each variable.

the HSG supported more harbors/slips than the MSG, while the MSG favored more parking spaces and piers than the HSG. Thus, in terms of facility management, it would appear that the HSG is distinctly different from the other two groups, while the LSG and MSG are relatively similar.

The third set of management alternatives asked for opinions about regulations that restrict recreational anglers and/or commercial users of SLM. Nine items were entered in the analysis (Table 51). The discriminant analysis on these variables produced two significant functions (alphas = .0000 and .0444, respectively). Five items having a function coefficient value greater than 0.39 were selected for interpreting the two functions (Table 52). The first function separated the HSG from the LSG. The HSG favored a decrease in commercial fishing and the creation of a single multi-state fishing license to use on Lake Michigan. On the other hand, the LSG seemed more personally concerned with the high cost of fishing licenses and were less supportive of an increase in the excise tax on fishing goods. The second function separated the HSG from the MSG. The HSG again showed support for decreasing the commercial fishing of SLM and for requiring a permit and license to fish for any of Lake Michigan's species. Again Bryan's (1979) contention that the HSG seems to have a greater resource conservation orientation may be the causal factor in these findings. Also, as has already been shown, the HSG tends to have a specific salmonid orientation, which already requires a license and permit to fish and most likely feels this regulation should be applied to all

TABLE 49. Facility-management Questions.

Indicate your degree of support for the following SLM management alternatives as:

1. None 2. Somewhat 3. Moderate 4. Strong 5. Very Strong

- A. Build more harbors/slips for public use.
- B. Increase the amount of shoreline open to the public for fishing.
- C. Build more public piers.
- D. Increase the number of public boat access ramps.
- E. Increase the number of public parking spaces around public shores.

TABLE 50. Results of the Facility-management Variables with the Specialization Index Using Discriminant Analysis.

FUNCTION	N	EIGEN VALUE	PERCENT VARIANCE	CHI SQUARE	DEGREES FREEDOM	SIGNIFI- CANCE	GROUP CENTROIDS		
							LOW	MED	HIGH
1	262	.08898	54.95	29.23	.8	.0003	-.458	.104	.296
2	262	.07295	45.05	13.22	.4	.0042	.115	-.285	.341

VARIABLES IN ANALYSIS*	FUNCTION 1 COEFFICIENTS	FUNCTION 2 COEFFICIENTS	CLASSIFICATION COEFFICIENTS		
			LOW	MEDIUM	HIGH
More harbor/slips	.546	1.079	1.512	1.412	2.041
More public piers	.552	-.795	1.912	1.535	1.577
More public shoreline	-.670	.292	-.469	.893-03	-.292
More public parking	.298	-.562	.661	.962	.735
		(CONSTANT)	-7.727	-8.669	-9.292

* See Table 49 for the complete text of each variable.

anglers no matter what their fish species preference.

In the next analysis, all 22 management actions were entered in an attempt to find out which of the three areas of management were most discriminating among the three groups of anglers when treated as a group. Of the 22 items, 16 were significant in one or both of the two significant

functions (alphas = .0000 and .0034, respectively). Nine items had a discriminant coefficient greater than 0.39 and were used to interpret the functions (Table 53). The first function discriminated between the HSG and the LSG. It showed that the HSG favored two user-management actions aimed at controlling commercial fishing and offshore dumping, and a fisheries-management action that would increase state monies allocated to fisheries management. It also showed that the LSG group felt the regulation on number of fish caught was too strict and that higher taxes should be assessed on boat fuel. In the second function, the MSG was separated from the other two groups. The MSG showed greater support for more public parking than the HSG and the LSG, which supported more harbor/slips, the present fishing license cost, and a license and permit requirement to fish SLM.

TABLE 51. Angler and Commercial User-management Questions.

-
- A. Do you feel the present cost for a fishing license is...
1. Too low 2. About right 3. Somewhat high 4. Too high
- B. What do you feel is a fair price for the type of fishing license you buy to fish SLM? \$ _____ dollars.

Indicate your degree of support for the following SLM management alternatives as:

1. None 2. Somewhat 3. Moderate 4. Strong 5. Very strong
- C. Restrict offshore dumping by commercial industry.
- D. Create single multi-state license for fishing SLM.
- E. Increase law enforcement by the state.
- F. In addition to a license, require a permit for fishing SLM.
- G. Increase the excise tax on fishing goods.
- H. Increase the motion fuel tax on boats.
- I. Decrease commercial fishing.
-

TABLE 52. Results of the User-management Variables with the Specialization Index Using Discriminant Analysis.

FUNCTION	N	EIGEN VALUE	PERCENT VARIANCE	CHI SQUARE	DEGREES FREEDOM	SIGNIFI- CANCE	GROUP CENTROIDS		
							LOW	MED	HIGH
1	227	.31654	79.70	65.51	16	.0000	-.853	.171	.587
2	227	.08063	20.30	14.41	7	.0444	.139	-.303	.347

VARIABLES IN ANALYSIS*	FUNCTION 1 COEFFICIENTS	FUNCTION 2 COEFFICIENTS	CLASSIFICATION COEFFICIENTS		
			LOW	MEDIUM	HIGH
Present license cost	-.440	.472	9.599	8.509	8.713
Fair price	.305	-.051	.512	.553	.565
Restrict com. dump	.312	.081	44.243	45.097	45.646
Multi license	.476	-.262	.674	1.100	1.120
License & permit	.083	.911	1.770	1.470	2.062
Motor fuel tax	.146	-.379	-.204	.176	-.465
Excise tax	-.588	-.325	-.904	-1.219	-1.532
Commercial fish	.516	.545	.363	.571	.981
		(CONSTANT)	-122.904	-126.482	-131.260

* See Table 47 for the complete text of each variable. Items with a coefficient < .37 are used for interpretation.

With respect to the three areas of management, the user-management area contributed five items that significantly separated the three angler groups; the fisheries- and facilities-management areas contributed two each. The high specialization group was separated from the other two groups through five management items--one from both the fisheries and facility lists and three from the angler/commercial regulations list. The low specialization group was separated from the other groups on three management items--one from the fisheries list and two from the angler/commercial regulations list. The medium specialization group was separated from the other two groups by only one facility management item.

TABLE 53. Results of all Management Variables with the Specialization Index Using Discriminant Analysis.

<u>FUNCTION</u>	<u>N</u>	<u>EIGEN VALUE</u>	<u>PERCENT VARIANCE</u>	<u>CHI SQUARE</u>	<u>DEGREES FREEDOM</u>	<u>SIGNIFI- CANCE</u>	<u>GROUP CENTROIDS</u>		
							<u>LOW</u>	<u>MED</u>	<u>HIGH</u>
1	205	.53747	72.3	112.24	32	.0000	-1.024	.072	.919
2	205	.20592	27.7	34.04	15	.0034	-0.348	.502	-.455

<u>VARIABLES IN ANALYSIS*</u>	<u>FUNCTION 1 COEFFICIENTS</u>	<u>FUNCTION 2 COEFFICIENTS</u>	<u>CLASSIFICATION COEFFICIENTS</u>		
			<u>LOW</u>	<u>MEDIUM</u>	<u>HIGH</u>
Preferred fish caught	-.277	.011	-.107	-.233	-.320
Regs. number caught	-.500	.248	-2.769	-3.295	-4.323
Regs. size caught	.067	.342	7.262	7.927	7.434
Present license cost	-.144	-.466	10.075	9.162	9.697
Fair price license	.357	.259	.648	.723	.730
More \$ fish mgmt.	.437	-.203	8.842	9.644	11.120
Restrict com. dump	.447	-.004	48.229	49.694	50.846
Single multi-state license	.357	.183	-.228-01	.363	.454
More harbor/slips	.280	-.616	.732	.557	1.225
Illegal salmon snag	-.253	-.083	-.479	-.696	-.781
License and permit	.035	-.406	.565	.276	.670
Motorboat fuel tax	-.423	.074	-.680	-.955	-1.250
More public piers	.218	.274	1.214	1.567	1.509
More boat ramps	-.180	.317	1.603	1.654	1.324
Decrease common fish	.415	-.234	-.183	.235-02	.418
More public parking	-.076	.496	-.395	-.136	-.549
		(CONSTANT)	-142.025	-149.043	-155.630

* See Tables 45, 47, and 49 for the complete text of each variable.

TABLE 54. Questions Concerning the Health Risks Associated with SLM.

A. Are you familiar with any information suggesting that eating fish from SLM may be a health hazard?

1. No 2. Yes

B. If Yes, indicate how you became familiar with this information:
(circle all that apply)

1. Newspapers 3. Radio 5. Brochures
2. Television 4. Friends 6. Other

C. To what extent do you feel that eating fish from SLM is a health risk?

1. None 2. Somewhat 3. Moderately 4. Highly 5. Extremely

D. Do you attempt to clean the fish you eat from SLM in a way that will reduce any possible health risks?

1. No 2. Yes

E. Do you limit the amount of fish you eat from SLM in order to reduce any health risks?

1. No 2. Yes

Indicate to what extent you believe that each of the following conditions contributes to pollution of the fish in SLM as:

1. None 2. Somewhat 3. Moderately 4. Highly 5. Extremely

F. Heavy metals (lead, mercury)

G. Pesticides (DDT, etc.)

H. Other toxic chemicals

I. Raw sewage

J. Acid rain

K. Agricultural runoff

L. Have any of the above conditions reduced your fishing SLM?

1. Not at all 2. Somewhat 3. Pretty much 4. A great deal
-

TABLE 55. Results of the Health Risk Items with the Specialization Index Using Discriminant Analysis.

FUNCTION	N	EIGEN VALUE	PERCENT VARIANCE	CHI SQUARE	DEGREES FREEDOM	SIGNIFI- CANCE	GROUP CENTROIDS		
							LOW	MED	HIGH
1	247	.12674	57.9	38.759	12	.0001	.401	-.388	.217
2	247	.09216	42.1	16.468	5	.0056	-.342	-.065	.451

VARIABLES IN ANALYSIS*	FUNCTION 1 COEFFICIENTS	FUNCTION 2 COEFFICIENTS	CLASSIFICATION COEFFICIENTS		
			LOW	MEDIUM	HIGH
Number of sources	.563	.438	1.994	1.726	2.195
Clean fish	-.018	.610	2.233	2.625	3.279
Limit consumption	-.822	.199	.308	1.792	.960
Pesticides	-.495	-.230	1.908	2.239	1.816
Other toxic chemicals	.434	.444	5.880	5.599	6.229
Pollution reduced fishing	.351	-.544	1.814	1.322	1.244
		(CONSTANT)	-23.914	-23.519	-25.956

* See Table 54 for the complete text of each variable.

Another focus of this study was to look at the relationship between the three levels of angler specialization and the perceived health risks and sources of Lake Michigan pollution. Clearly the high specialization group should be more aware and concerned because they are more involved with fishing SLM and apparently are more likely to be at risk from eating SLM fish.

An analysis was done on responses to twelve questions covering information about health risks, beliefs about this information, behaviors taken to reduce any risks involved with eating SLM fish, believed sources of Lake pollution, and the effect of perceived risks on their SLM fishing (Table 54). Of the twelve items used for analysis, six played a significant role in separating the three groups. Table 55 shows that both discriminant functions were significant (alphas = .0001 and 0.0056, respectively). The first function separated the LSG from the MSG based on centroids of 0.401 and -0.388, respectively. The LSG had recorded fewer sources of information regarding health risks related to eating SLM fish and viewed toxic chemicals as a major source of pollution in Lake Michigan. On the other hand, the MSG viewed pesticides as a major source of pollution to the Lake and indicated that they had limited the amount of Lake Michigan fish they consumed.

The second function separated the HSG from the LSG based on group centroids of 0.451 and -0.342, respectively. For the HSG the discriminating items were cleaning fish to reduce any health risks, the belief that toxic chemicals were an important source of pollution, and familiarity with more information sources about the health risks related to eating SLM fish. Yet, the LSG indicated that the pollution of Lake Michigan had reduced their fishing more than it had for the HSG. Apparently, the LSG has cut down on their fishing due to the belief that eating SLM fish is related to health risks, while the MSG and HSG take precautions that reduce health risks and have not reduced their fishing SLM.

The final results examine which of the 44 motives separated the three groups of anglers (Table 56). Twenty-two motives met the criteria for further discriminant analysis. The results produced two significant functions both having alphas of .0000. Of the 22 motives, 13 were strong enough to be used for interpreting the functions (Table 57). The first function separated the HSG from the LSG on the basis of seven motives. The HSG was found to be achievement-oriented, seeking both excitement and escape, and had a desire to help others. The LSG was more motivated by tension release and exploration, along with the desire to (at least temporarily) be in control of things that happen. The second function separated the MSG from the HSG and LSG on the basis of ten motives. For the MSG, being in control and with friends were major motivations along with nostalgia, tension release, and tranquility.

TABLE 56. Angler Motives for Fishing SLM that Are Significantly Related to Specialization Scores.

-
1. Show others I can do it.
 2. Help direct the activity of others.
 3. Be with others who enjoy what I enjoy.
 4. Get away from noise back home.
 5. Learn of what I am capable of.
 6. Have thrills.
 7. Experience tranquility.

 8. Have a change from my daily routine.
 9. Be with friends.
 10. Get away from usual demands of life.
 11. Control things.
 12. Help get rid of some built-up tension.
 13. Be in control of things that happen.
 14. Relax physically.

 15. Use my equipment.
 16. Think about the good times I have had.
 17. Talk to others about my equipment.
 18. Experience new and different things.
 19. Talk to new and varied people.
 20. Think about my personal values.
 21. Rely on my wits and skill.
 22. Get to know the lake better.
-

Responses were recorded: "1", not at all important; to "5", extremely important.

TABLE 57. Discriminant Analysis of Three-group Specialization Typology with Thirteen Significant Motives * (from Driver), =249.

<u>FUNCTION</u>	<u>N</u>	<u>EIGEN VALUE</u>	<u>PERCENT VARIANCE</u>	<u>CHI SQUARE</u>	<u>DEGREES FREEDOM</u>	<u>SIGNIFI- CANCE</u>	<u>GROUP CENTROIDS</u>		
							<u>LOW</u>	<u>MED</u>	<u>HIGH</u>
1	249	.82659	65.32	172.77	44	.0000	-1.233	.039	1.185
2	249	.43878	34.68	65.05	21	.0000	-.533	.735	-.621

<u>VARIABLES IN ANALYSIS**</u>	<u>FUNCTION 1 COEFFICIENTS</u>	<u>FUNCTION 2 COEFFICIENTS</u>	<u>CLASSIFICATION COEFFICIENTS</u>			
			<u>LOW</u>	<u>MEDIUM</u>	<u>HIGH</u>	
Help direct the activity of others	.440	-.507	.476	.374	1.675	
Be with others who enjoy what I enjoy	-.298	-.509	-.428	-1.255	-.976	
Have thrills	.408	.048	1.342	1.872	2.238	
Experience tranquility	.434	.570	.499	1.553	1.327	
Have a change from daily routine	-.034	-.539	.687	.014	.646	
Be with friends	.347	.611	1.837	2.916	2.537	
Control things	.378	-.655	-.801	-1.122	.047	
Help get rid of some built-up tension	-.466	.489	-.806	-.799	-1.663	
Be in control of things that happen	-.430	.647	.614	.853	-.295	
Think about the good times I have had	-.121	.594	-1.137	-.635	-1.409	
Experience new and different	-.448	-.146	.061	-.571	-.833	
Think about my personal values	-.004	-.579	.371	-.293	.397	
Rely on my wits and skill	.592	-.039	-.222	.363	.972	
			(CONSTANT)	-11.680	-16.880	-20.254

* Items listed here are those from Table 56 that had a discriminant function coefficient greater than 0.399 on either Function 1 or 2.

** Motives were chosen if they had a function coefficient > .40.

The HSG and LSG showed a trend towards introspection and a desire for power (to control things), to escape daily routine, to be around similar people and to help others. Clearly, there are motivational differences among specialization groups. As noted above there are also differences among the groups that are related systematically to their management preferences. Each specialist group seeks distinct sets of outcomes and has management preferences along with each set. The implication is that management decisions will be likely to differentially affect both the attainment of any psychological outcome in general but also to affect segments of the angling population differentially.

CONCLUSIONS

Sportfishing is a major pursuit of many people that frequent Lake Michigan. Besides the intangible benefits it affords anglers, it contributes to the economic growth of the Lake region. The importance of Lake Michigan sportfishing is evident in the commercial market served by bait and tackle shops, charterboat operators, and private marinas. All of the states around the Lake have active fisheries management and tourist promotion programs.

Growth and success for many of these providers will be enhanced by a better understanding of southern Lake Michigan (SLM) anglers and their needs. Until now such information about SLM anglers has been largely a matter of speculation. Actually, the only available information has come from creel census surveys. Unfortunately these are not designed to examine anglers and their fishing preferences. Since "comprehensive" fisheries management is mandated by the Fisheries Conservation and Management Act of 1976 (P.L. 94-265), it is desirable to have a fuller understanding of the SLM angler population. Results from this study have begun to develop a profile of the Illinois and Indiana SLM angler and to develop a SLM angler taxonomy useful to many of the Lake's sportfishing providers.

With a need for more definitive information about the SLM angler, the first objective of this study was to provide separate profiles for the Illinois and Indiana SLM angler. The profiles consisted of over 220 items covering 13 major areas of inquiry. Each state was treated separately and completely. The results were not easily encapsulated. The reader is referred to the table of contents for specific angler characteristics of interest.

This study also developed an angler taxonomy that was theoretically grounded, and accounted for angler specialization. The results of this task will allow managers to better understand differences in angler motives and preferences, and to predict how the specialization groups might be differentially affected by various management options.

The conceptual framework of recreation specialization (Bryan, 1979) is well known. However, the model has been criticized for a lack of explanatory power. This study reviewed previous studies of specialization and integrated a more theoretical approach for operationalizing this conceptual model. The basic premise of our approach was that motivations were a collection of integrated behavior patterns that reflected one's level of involvement in an activity. These behavior patterns were defined as choice, persistence, continuing motivation, centrality-to-life, and performance. These five behavior patterns were operationally defined into a standard set of specialization measures. Also, because it was a scaled indicator of activity involvement, these five dimensions provided a theoretical basis for testing relationships among different levels of specialization with sets of independent variables.

Subscales were developed to measure each of the five dimensions of specialization using 23 variables. The subscales were composed of two to seven items and had adequate alpha scores ranging from 0.56 to 0.74. The overall specialization index had a reliability of 0.77. Anglers were then placed into low, medium, and high specialist categories based on the observed distribution of the specialization index scores.

This SLM angler typology was then used to compare three levels of angler specialization against a set of 22 SLM management actions, 12 SLM health-risk-related items, and 44 fishing motivation items.

Results from the management variables showed the high specialization group was more supportive of actions aimed at improving the fisheries resource, while the medium and low specialization groups supported actions related to

personal interests. For example, the high specialization group showed greater support for allocating more state monies to fisheries management and for decreasing commercial fishing and dumping. This type of conservational attitude is in line with what one might expect from anglers more involved with their fishing. On the other hand, the medium and low specialists exhibited more support for personal interests such as parking spaces and raising the tax on motorboat fuel (boats were not their major mode of fishing). They also felt the fishing regulations on the number of fish caught were too strict.

A developmental pattern emerges in which the angler first learns how to fish and use the equipment. Then, as involvement increases, knowledge about the fish and about the fisheries resource itself becomes important. However, even the high specialization group exhibited some immediate personal use interests through their support for more harbor/slip facilities and a lack of support for increasing the motorboat fuel tax. This same group also supported a dual license/stamp regulation for all types of SLM anglers. Because most anglers in the high specialization group already purchase both licenses, such a regulation would have no adverse effect on them. These interests were not unexpected because the high specialization group's major mode of fishing was from a boat.

As the level of involvement increases, attitudes shift from a more personal interest to one that includes a fisheries conservation orientation. A possible explanation for this shift in management preferences could be that at lower levels of involvement, there is a greater desire for instant gratification (i.e., catching fish). Therefore, the low specialization group responded with more support for management actions that might enhance this desire. On the other hand, the high specialization group saw the necessity for proper fisheries management and was more willing to support what is best for the sport overall. The discriminant analysis results suggest that implementation of almost any major management alternative would differentially impact the three groups of anglers. This is not simply apparent from the angler profiles alone. Specialization is useful in evaluating potential management actions.

Perceived health risks associated with SLM also revealed differences among the three levels of anglers. Interestingly, the results showed that each group of anglers took a different approach to reducing any possible risks associated with eating fish from SLM. The high specialization group was more likely to clean the fish in a specific way to decrease any risks, while the medium specialization group preferred to limit the amount of fish consumed, and the low specialization group generally fished less often. For this last group, a lack of knowledge about other ways to reduce any potential risks might be one reason for limiting their fishing activity. If so, this leaves the low specialization group with only one option of reducing their fishing activity. This explanation would be consistent with their limited involvement in SLM fishing and would account for their lack of knowledge about other alternatives.

Motives for fishing SLM was the third set of variables used to test for differences among the three levels of anglers. Since the angler taxonomy was based on five characteristics of motivation, these results presumably would be more valid with respect to detecting any motivational differences among the three groups of anglers.

As shown earlier, all three groups of anglers exhibited differences in their motivational structure. Yet, some similarities were also apparent. As a group, the low specialization group was motivated by a sense of escape or, more precisely, freedom from personal and social pressures. This "freedom from" orientation is a major component of many definitions of leisure. At the same time, the low specialization group was seeking new experiences (e.g., a

desire to learn how to fish), as might be expected of someone not too involved with the activity. Still, this quest for learning must not pose too much of a challenge, as this set of anglers also wanted some control or likelihood of success in their effort to fish SLM.

The medium specialization group not only sought to escape personal and social pressures, as the low specialization group did, but also desired freedom from physical pressures or the experience of tranquility. Although they wished to be in control, they did not seek to learn as the low specialization group did. Their motivational structure also included a social dimension--a desire to be with friends, complemented by motives of nostalgia and of reminiscing about good times. Thus, it would seem that the medium specialization group has replaced a learning behavior with a more social component in their fishing motivation. In short, as anglers become more involved with fishing, their learning develops, and they focus more on reliving and sharing their past experiences.

For the high specialization group, there seems to be a shift from being in control to a desire for challenge and excitement. Perhaps it is the challenge of one's learned skill that is stimulating to the involved angler. This self-confidence was also reflected in HSG's desire to teach or help direct the activity of others. Thus, there appears to be a more self-assured set of motives for the high specialization group. However, they also shared the desire for more tranquility with the other two classes of anglers.

Overall, some type of escape motive operates at all levels of specialization. This seems to imply that a "freedom from" element is pursued by all anglers. But as the level of involvement increases, there is a shift from a learning, to a social and finally to an excitement/challenge motivational structure.

This angler taxonomy has provided evidence not only that there is an inherent diversity of behaviors, preferences, and motives within the realm of sportfishing, but that this diversity can be systematically explained in terms of an activity specialization scale based on five characteristics of motivation. The specialization scale can help in managing the SLM angler population. To treat SLM anglers as a homogeneous unit could be misleading and lead to suboptimal decisions. It could also fail to provide optimized benefits for obviously distinct segments of this angler population.

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APPENDICES

Appendix A: Letters to Fishing License Vendors

Illinois - Indiana Sea Grant Marine Extension Project



Office of Sea Grant, NOAA, U.S. Department of Commerce

Illinois Cooperative Extension Service, University of Illinois at Urbana-Champaign

Indiana Cooperative Extension Service, Purdue University

Coordinator - Robert D. Espeseth, University of Illinois at Urbana-Champaign
1206 South Fourth Street, Room 104 Huff Gym, Champaign, IL 61820, (217) 333-1824

Co-Coordinator - James A. Peterson, Specialist in Recreation and Parks, Purdue and
Indiana Universities, 133 HPER Building, Bloomington, IN 47401, (812) 335-8037

July 11, 1984

Dear Fishing License Vendor:

The Illinois-Indiana Sea Grant Program is initiating a research project concerned with people who fish southern Lake Michigan. In order to contact people for the survey portion of the project, we are planning to use fishing license registrations obtained from license vendors like yourself, located in this area. Any assistance you can provide our team in the collection of these fishing license registrations would be greatly appreciated.

If you have any reservations about releasing this information, feel free to contact any of the individuals listed below for confirmation of the project. Thank you for your time and cooperation.

Sincerely,

A handwritten signature in black ink that reads "Robert D. Espeseth". The signature is fluid and cursive.

Robert D. Espeseth
Program Coordinator
Illinois-Indiana Sea Grant Program
(217)333-1824

A handwritten signature in black ink that reads "Richard J. Hess". The signature is fluid and cursive.

Rich Hess
Fisheries Biologist
Illinois Department of Conservation
(312)746-8505

A handwritten signature in black ink that reads "Bob Koch". The signature is fluid and cursive.

Bob Koch
Fisheries Biologist
Indiana Department of Natural Resources
(219)874-6824

RDE:RH:BK:nw

STATE OF INDIANA



INDIANAPOLIS, 46204

DEPARTMENT OF NATURAL RESOURCES

JAMES M. RIDENOUR
DIRECTOR

July 19, 1984

Mr. John Collins
Dept. of Leisure Studies
University of Illinois
104 Huff Gym
1206 South 4th. St.
Champaign, IL 61820

Dear Mr. Collins,

This letter is to acknowledge that the Division of Fish and Wildlife recognizes your research project and the need to obtain certain information about sport license sales in Indiana. Hence, the Division approves of your inspection of license sales records held by Indiana license Vendors; pending, of course, the approval of each vendor.

Sincerely,

Michael Carrier
Michael Carrier
Chief of Operations

MC:kw

Illinois



Department of Conservation

life and land together

605 WM. G. STRATTON BUILDING • 400 SOUTH SPRING STREET • SPRINGFIELD 62706
CHICAGO OFFICE - ROOM 100, 160 NO. LASALLE 60601

David Kenney, Director • James C. Helfrich, Assistant Director

July 16, 1984

Mr. Johnny Collins
104 Huff Gym
Dept. of Leisure Studies
1206 South 4th
Champaign, IL 61820

Dear Mr. Collins:

The Department of Conservation has no objections if you request license vendors to release the addresses of persons buying fishing licenses to pursue fishing in the Lake Michigan area.

Please be advised that this is not to mean that we approve of the release of such information, nor do we wish to advise our license vendors that they are in any way compelled to release the names. Rather, it is simply our department's position that we have no objection to such information being made available to you for the purposes of your research regarding fishing on Lake Michigan.

Sincerely,

Matthew R. Rice
Assistant Counsel

cc: Hale, Oliver, Matsko

Appendix B: Questionnaire

PART A. PLEASE ANSWER THE FOLLOWING QUESTIONS ABOUT YOUR PREVIOUS FISHING PARTICIPATION AS BEST YOU CAN REMEMBER.

1. Is fishing your favorite type of outdoor recreation activity? (circle a number)

1 YES

2 NO >>>> If NO, please indicate your favorite type of outdoor recreation activity. _____

2. How many years ago did you start fishing? _____ years ago

3. During how many of the above years did you actually fish at least once? _____ years

4. How did you first become interested in fishing? (circle all that apply).

1 PARENTS

2 SPOUSE

3 FAMILY (other than parents or spouse)

4 FRIENDS

5 FISHING CLUB

6 YOUTH ORGANIZATION

7 OTHER (specify) _____

5. Over the past five (5) years, has your fishing participation . . . (circle one)

1 INCREASED

2 REMAINED THE SAME

3 DECREASED

6. Estimate the total number of fishing trips you took over the last 12 months. _____ number of trips

THE FOLLOWING QUESTIONS REFER ONLY TO SOUTHERN LAKE MICHIGAN, BY WHICH WE MEAN THAT PART OF THE LAKE ALONG THE ILLINOIS AND INDIANA SHORELINES. PLEASE KEEP ONLY THIS AREA IN MIND WHEN CONSIDERING YOUR RESPONSES.

7. Have you ever fished Southern Lake Michigan? (circle one)

1 YES

2 NO >>>> If NO, please indicate why you have never fished Southern Lake Michigan. _____

<<<< NOW SKIP TO PART B, NEXT PAGE >>>>

8. How many years ago did you begin fishing Southern Lake Michigan? _____ years ago

9. During how many of those years did you actually fish at least once on Southern Lake Michigan? _____ years

10. Over the past five (5) years, has your fishing at Southern Lake Michigan . . . (circle one)

1 INCREASED

2 REMAINED THE SAME

3 DECREASED

11. Estimate the total number of fishing trips you made to Southern Lake Michigan over the last 12 months. _____ number of trips

PART B. THE FOLLOWING QUESTIONS CONCERN YOUR PREFERENCES TOWARD FISHING AREAS.

1. Which of the following types of fishing areas have you used in the past?
(circle all that apply)

- 1 OCEAN
- 2 GREAT LAKES
- 3 RIVERS
- 4 LARGE INLAND LAKES OR RESERVOIRS
- 5 SMALL LAKES OR PONDS
- 6 STREAMS
- 7 FEE FISHING AREAS (private ponds, etc.)
- 8 OTHER (specify) _____

2. Which one of the ABOVE places do you actually fish most often? (write in the number associated with the appropriate place from above) _____

3. Has your present preference for a fishing place changed from what it was five (5) years ago? (circle one)

- 1 NO
- 2 YES >>>> If YES, indicate what your preference use to be.

4. How important is the type of fishing area to your fishing experience?
(circle one)

- 1 EXTREMELY IMPORTANT
- 2 VERY IMPORTANT
- 3 MODERATELY IMPORTANT
- 4 SOMEWHAT IMPORTANT
- 5 NOT AT ALL IMPORTANT

5. Compared to other fishing areas, how important is Southern Lake Michigan to your fishing experience? (circle one)

- 1 EXTREMELY IMPORTANT
- 2 VERY IMPORTANT
- 3 MODERATELY IMPORTANT
- 4 SOMEWHAT IMPORTANT
- 5 NOT AT ALL IMPORTANT

HOW IMPORTANT ARE EACH OF THE FOLLOWING ASPECTS IN YOUR DECISION TO FISH SOUTHERN LAKE MICHIGAN?

IF YOU HAVE NEVER FISHED SOUTHERN LAKE MICHIGAN, CHECK THE BOX BELOW AND ANSWER THE REST OF THE QUESTIONS WITH RESPECT TO THE TYPE OF FISHING AREA THAT YOU INDICATED YOU USE MOST OFTEN IN QUESTION 2 ABOVE.

I have never fished Southern Lake Michigan.

6. Southern Lake Michigan . . .

IMPORTANCE OF CHOOSING A PLACE TO FISH (circle a number)				
EX- TREME	VERY	MOD- ERATE	SOME- WHAT	NOT AT ALL

a. is close to where I live.	1	2	3	4	5
b. has the type of fish I prefer to catch.	1	2	3	4	5
c. has good fishing.	1	2	3	4	5
d. is not crowded.	1	2	3	4	5
e. has enjoyable scenery.	1	2	3	4	5
f. is easy to get to.	1	2	3	4	5

7. Suppose you had learned that Southern Lake Michigan was closed to fishing right before you planned to go fishing there; would you then choose another fishing area? (circle a number)

1 NO

2 YES >>>> If YES, indicate the type of place you would select next (use the choices from Question 1, PART B above). _____ (type of place)

Also, indicate how many miles this place is from your home.
_____ miles

PART C. IN THIS SECTION, WE WOULD LIKE TO KNOW ABOUT THE TYPES OF FISH YOU WANT TO CATCH WHEN YOU FISH SOUTHERN LAKE MICHIGAN.

1. Indicate all the types of fish you usually try to catch while fishing Southern Lake Michigan. (circle all that apply)

- | | | |
|--------------------------|----|-----|
| a. COHO SALMON . . . | NO | YES |
| b. CHINOOK SALMON . . . | NO | YES |
| c. STEELHEAD . . . | NO | YES |
| d. LAKE TROUT . . . | NO | YES |
| e. BROWN TROUT . . . | NO | YES |
| f. PERCH . . . | NO | YES |
| g. OTHER (specify) _____ | | |
| h. OTHER (specify) _____ | | |

2. What type of fish do you catch most often from Southern Lake Michigan?

3. What type of fish do you prefer to catch from Southern Lake Michigan?

4. How important are each of the following items with respect to your fishing Southern Lake Michigan?

ITEM IMPORTANCE (circle one)					
------------------------------	--	--	--	--	--

- | | | | | | |
|-------------------------|-----------|------|----------|----------|------------|
| a. type of fish . . . | EXTREMELY | VERY | MODERATE | SOMEWHAT | NOT AT ALL |
| b. number of fish . . . | EXTREMELY | VERY | MODERATE | SOMEWHAT | NOT AT ALL |
| c. size of fish . . . | EXTREMELY | VERY | MODERATE | SOMEWHAT | NOT AT ALL |

5. Do you subscribe to any fishing literature (magazines, newsletters, books, etc.) in order to learn more about fishing on Southern Lake Michigan? (circle one)

1 NO

2 YES >>>> If YES, what is the total number of literature items that you read?
_____ number of items

6. Has the type of fish you caught most often during your first two (2) years of fishing changed from the type you catch most often now? (circle one)

1 NO, I have been fishing less than two (2) years

2 NO

3 YES >>>> If YES, indicate the type of fish you caught most often during your first two (2) years of fishing Southern Lake Michigan. _____

7. Do you put most of your effort into fishing for one particular kind of fish on Southern Lake Michigan? (circle one)

1 NO

2 YES >>>> If YES, indicate the type of fish that you seek.

PART D. NOW WE WOULD LIKE TO KNOW WHY YOU CHOOSE TO GO FISHING. PLEASE INDICATE HOW IMPORTANT EACH OF THE FOLLOWING REASONS ARE TO YOUR FISHING SOUTHERN LAKE MICHIGAN. NOTE, THERE ARE NO WRONG ANSWERS AND SOME REASONS ARE PURPOSELY QUITE SIMILAR.

1. Sometimes I fish Southern Lake Michigan to . . .

	DEGREE OF IMPORTANCE (circle one)				
	EX- TREME	VERY	MOD- ERATE	SOME- WHAT	NOT AT ALL
gain a sense of self confidence . . .	1	2	3	4	5
have others think highly of me . . .	1	2	3	4	5
show others I can do it . . .	1	2	3	4	5
become better at it . . .	1	2	3	4	5
bring my family closer together . . .	1	2	3	4	5
be away from the family for a while . . .	1	2	3	4	5
help direct the activities of others . . .	1	2	3	4	5
be with others who enjoy what I enjoy . . .	1	2	3	4	5
develop my skills and abilities . . .	1	2	3	4	5
get away from noise back home . . .	1	2	3	4	5
test my abilities . . .	1	2	3	4	5
learn what I am capable of . . .	1	2	3	4	5
have thrills . . .	1	2	3	4	5
experience tranquility . . .	1	2	3	4	5
experience excitement . . .	1	2	3	4	5
have a change from my daily routine . . .	1	2	3	4	5
be with friends . . .	1	2	3	4	5
be on my own . . .	1	2	3	4	5
get away from the usual demands of life . . .	1	2	3	4	5
be free to make my own choices . . .	1	2	3	4	5
have my mind move at a slower pace . . .	1	2	3	4	5
be with people having similar values . . .	1	2	3	4	5
control things . . .	1	2	3	4	5
help get rid of some built-up tension . . .	1	2	3	4	5
be in control of things that happen . . .	1	2	3	4	5
relax physically . . .	1	2	3	4	5
be near considerate people . . .	1	2	3	4	5
use my equipment . . .	1	2	3	4	5
think about the good times I have had . . .	1	2	3	4	5
talk to others about my equipment . . .	1	2	3	4	5
experience new and different things . . .	1	2	3	4	5
do something with my family . . .	1	2	3	4	5
talk to new and varied people . . .	1	2	3	4	5
think about my personal values . . .	1	2	3	4	5
be creative . . .	1	2	3	4	5
develop a sense of self pride . . .	1	2	3	4	5
experience more elbow room . . .	1	2	3	4	5
teach my outdoor skills to others . . .	1	2	3	4	5
catch fish . . .	1	2	3	4	5
suppliment my food . . .	1	2	3	4	5
rely on my wits and skill . . .	1	2	3	4	5
be with members of my group . . .	1	2	3	4	5
get to know the Lake better . . .	1	2	3	4	5
be with respectful people . . .	1	2	3	4	5

PART E. NOW WE WOULD LIKE TO KNOW MORE ABOUT THE SKILLS AND ABILITIES YOU HAVE DEVELOPED FROM FISHING.

1. Have you ever made any of the fishing gear you use for fishing Southern Lake Michigan? (circle one)

1 NO

2 YES >>>> If YES, indicate what items you have made that you use for fishing Southern Lake Michigan. _____

2. Have you ever attended a fishing clinic? (circle one)

1 NO

2 YES >>>> If YES, Indicate how many fishing clinics you have attended in each of the following years:

_____ (1980); _____ (1981); _____ (1982); _____ (1983); _____ (1984)

3. Have you ever participated in any fishing derbies held on Lake Michigan? (circle one)

1 NO

2 YES >>>> If YES, indicate how many derbies you have entered in each of the following years:

_____ (1980); _____ (1981); _____ (1982); _____ (1983); _____ (1984)

4. How would you rate your ability to catch fish on Southern Lake Michigan? (circle one)

1 BEGINNER

2 INTERMEDIATE

3 ADVANCED

4 EXPERT

PART F. THIS SET OF QUESTIONS WILL HELP IDENTIFY THE SOCIAL CONTEXT OF YOUR FISHING PARTICIPATION. PLEASE ANSWER EACH QUESTION AS ACCURATELY AS YOU CAN.

1. How many of your close friends fish? (circle one)

1 NONE

2 SOME

3 MOST

4 EVERYONE

2. Which type of group do you fish with most often when fishing Southern Lake Michigan. (circle one)

1 FAMILY

2 CLUB MEMBERS ONLY (no outside friends)

3 BUSINESS ASSOCIATES ONLY (no club members or friends)

4 FRIENDS ONLY (no club members or business associates)

5 ALONE

3. Are you currently a member of a fishing club? (circle one)

1 NO

2 YES >>>> If YES, how often do you participate in club events? (circle one)

1 ALMOST ALL

2 SEVERAL

3 FEW

4 ALMOST NONE

4. Including yourself, how many people do you usually fish with when you fish Southern Lake Michigan? _____ people in fishing group

PART G. NEXT WE WOULD LIKE TO KNOW ABOUT YOUR STYLE OF FISHING.

1. Indicate your usual style of fishing on Southern Lake Michigan. (circle one)

- 1 FROM THE SHORELINE >>>> NOW SKIP TO QUESTION 5
- 2 FROM A PIER OR RIP-RAP >>>> NOW SKIP TO QUESTION 5
- 3 FROM A BOAT

2. Do you own the boat you use for fishing? (circle one)

- 1 YES
- 2 NO >>>> NOW SKIP TO QUESTION 4

3. Do you keep your boat moored in Lake Michigan? (circle one)

- 1 YES >>>> NOW SKIP TO QUESTION 5
- 2 NO >>>> NOW SKIP TO QUESTION 5

4. Indicate how you are able to fish from a boat. (circle one)

- 1 RENT A BOAT
- 2 BORROW A BOAT
- 3 CHARTER A BOAT
- 4 GO WITH SOMEONE WHO OWNS A BOAT

5. Have you ever chartered a boat for fishing Southern Lake Michigan? (circle one)

- 1 NO
- 2 YES >>>> If YES, indicate how many times you have chartered a boat for each of the following years:

_____ (1980); _____ (1981); _____ (1982); _____ (1983); _____ (1984)

6. Indicate how many of each item you use for fishing Southern Lake Michigan and estimate its current value

ITEMS	(circle one)		QUANTITY	PRICE
DOWNRIGGERS	NO	YES (if yes)	_____	\$ _____
RODS	NO	YES (if yes)	_____	\$ _____
REELS	NO	YES (if yes)	_____	\$ _____
SONAR	NO	YES (if yes)	_____	\$ _____
TEMPERATURE GAUGE	NO	YES (if yes)	_____	\$ _____
MARINE RADIO	NO	YES (if yes)	_____	\$ _____
FISHING TACKLE	NO	YES (if yes)	_____	\$ _____
BOATS	NO	YES (if yes)	_____	\$ _____
MOTORS	NO	YES (if yes)	_____	\$ _____
BOAT TRAILERS	NO	YES (if yes)	_____	\$ _____
OTHER (specify) _____			_____	\$ _____

PART H. NOW WE WOULD LIKE TO KNOW HOW CENTRAL FISHING IS TO YOUR LIFE.

1. How important is fishing as a source of satisfaction in your life? (circle one)

- 1 EXTREMELY IMPORTANT
- 2 VERY IMPORTANT
- 3 MODERATELY IMPORTANT
- 4 SOMEWHAT IMPORTANT
- 5 NOT AT ALL IMPORTANT

2. How much has your job been influenced by your fishing involvement?
(circle one)

- 1 ALMOST TOTALLY
- 2 A LARGE PART
- 3 SOME
- 4 ALMOST NONE
- 5 NONE

3. Indicate how much you agree with the following STATEMENTS.

ITEM AGREEMENT (circle one)				
VERY STRONG	STRONG	MOD-ERATE	SOME-WHAT	NONE

I am good at almost all the fishing I do	1	2	3	4	5
It is easy for me to pick a recreation activity to do	1	2	3	4	5
I am good enough to do all the fishing I want to	1	2	3	4	5
I can make good things happen when I fish	1	2	3	4	5
I can do things during fishing that will make everyone have more fun	1	2	3	4	5
I can do things during fishing that will make other people like me more	1	2	3	4	5
My fishing helps me feel important	1	2	3	4	5
Fishing helps me make new friends	1	2	3	4	5
When I am restless I can go fishing to calm down	1	2	3	4	5
Sometimes during my fishing there are short periods of time when I feel I can do anything	1	2	3	4	5
During my fishing there are often moments when everything goes right	1	2	3	4	5
There are times when I really feel powerful and in control while fishing	1	2	3	4	5

4. Do you plan your vacation so that it will occur during the fishing season?
(circle one)

- 1 ALWAYS
- 2 SOMETIMES
- 3 NOT USUALLY
- 4 NEVER

PART I. THE FOLLOWING QUESTIONS CONCERN THE AMOUNT OF TIME AND MONEY YOU SPEND ON FISHING TRIPS TO SOUTHERN LAKE MICHIGAN.

1. How many miles do you travel, one way, from your home to Southern Lake Michigan?
(if less than a mile indicate to the nearest tenth of a mile) _____ miles
2. For your most typical fishing trip to Southern Lake Michigan, indicate how many days your fishing trip lasts? (consider any part of a day as one full day)
_____ day(s)

3. For your most typical fishing trip to Southern Lake Michigan, estimate your . . .

transportation costs (gas, oil, maintenance)	\$ _____
food and refreshment costs	\$ _____
lodging, motel, or camping fees	\$ _____
fees for entrance, access or parking	\$ _____
other costs (bait, gear repair, equipment rental)	\$ _____

SUPPOSE THAT THE TOTAL COST FOR YOUR TYPICAL SOUTHERN LAKE MICHIGAN FISHING TRIP BECAME MORE EXPENSIVE, PERHAPS DUE TO INCREASED TRAVEL COSTS, YET THE GENERAL FISHING CONDITIONS REMAINED THE SAME.

4. Would you still take a fishing trip to Southern Lake Michigan if the total costs of the trip increased by \$10.00? (circle one)

- 1 YES
- 2 NO >>>> NOW SKIP TO QUESTION 7

5. What if the total cost increased by \$20.00? (circle one)

- 1 YES
- 2 NO >>>> NOW SKIP TO QUESTION 7

6. What if the total cost increased by \$30.00? (circle one)

- 1 YES
- 2 NO

7. Exactly how much more would you be willing to pay in order to fish Southern Lake Michigan? \$ _____ dollars

PART J. THE FOLLOWING QUESTIONS ASK FOR YOUR EVALUATION OF PRESENT AS WELL AS POSSIBLE FUTURE CONDITIONS AND MANAGEMENT PRACTICES RELATED TO SOUTHERN LAKE MICHIGAN.

Skip to PART K last page if you have NEVER fished Southern Lake Michigan.

1. In general, over the past five (5) years, do you feel that fishing on Southern Lake Michigan has . . . (circle one)

- 1 IMPROVED
- 2 REMAINED THE SAME
- 3 BECAME WORSE

PRESENTLY A STOCKING PROGRAM IS USED FOR MANAGING MOST TYPES OF FISH IN SOUTHERN LAKE MICHIGAN.

2. Indicate what type of game fish you most prefer to have stocked. _____

3. Indicate what type of game fish you least prefer to have stocked. _____

4. How do you feel the present regulations are on Southern Lake Michigan with respect to the total number of fish that can be caught? (circle one)

- 1 TOO STRICT
- 2 SLIGHTLY STRICT
- 3 ABOUT RIGHT
- 4 NOT STRICT ENOUGH

5. How do you feel present regulations are for size of fish caught? (circle one)

- 1 TOO STRICT
- 2 SLIGHTLY STRICT
- 3 ABOUT RIGHT
- 4 NOT STRICT ENOUGH

6. Do you feel the present cost for a fishing license is . . . (circle one)

- 1 TOO HIGH
- 2 SOMEWHAT HIGH
- 3 ABOUT RIGHT
- 4 TOO LOW

7. What do you feel is a "FAIR PRICE" for the type of fishing license you buy to fish Southern Lake Michigan? \$ _____ dollars

8. Should more STATE monies be applied to fish management on Southern Lake Michigan? (circle one)

- 1 YES
- 2 NO

9. INDICATE YOUR DEGREE OF SUPPORT FOR THE FOLLOWING HYPOTHETICAL MANAGEMENT ALTERNATIVES CONCERNING SOUTHERN LAKE MICHIGAN.

MANAGEMENT ALTERNATIVES	DEGREE OF SUPPORT (circle one)				
	VERY STRONG	STRONG	MOD-ERATE	SOME-WHAT	NONE
Restrict offshore dumping by commercial industry	1	2	3	4	5
Create a single multi-state license for fishing Lake Michigan	1	2	3	4	5
Increase law enforcement by the State	1	2	3	4	5
Build more harbors/slips for public use	1	2	3	4	5
Make the snagging of Salmon illegal	1	2	3	4	5
In addition to a license, require a permit for fishing Lake Michigan	1	2	3	4	5
Increase the variety of sport fish species	1	2	3	4	5
Restrict the fishing season	1	2	3	4	5
Increase the excise tax on fishing goods	1	2	3	4	5
Increase the amount of shoreline open to the public	1	2	3	4	5
Create more reefs for fish habitat	1	2	3	4	5
Increase the motor fuel tax on boats	1	2	3	4	5
Build more public piers	1	2	3	4	5
Increase the number of public boat access ramps	1	2	3	4	5
Decrease commercial fishing	1	2	3	4	5
Increase the number of public parking spaces around public shores	1	2	3	4	5

10. Are you familiar with any information suggesting that eating fish from Lake Michigan may be a health hazard? (circle one)

- 1 NO
- 2 YES >>>> If YES, indicate how you became familiar with this information?
(circle all that apply)

- 1 NEWS PAPER
- 2 TELEVISION NEWS
- 3 RADIO NEWS
- 4 FRIENDS
- 5 SPECIAL BROCHURES
- 6 OTHER (specify) _____

11. To what extent do you feel that eating fish from Lake Michigan is a risk to your health? (circle one)

- 1 EXTREMELY RISKY
- 2 HIGHLY RISKY
- 3 MODERATELY RISKY
- 4 SOMEWHAT RISKY
- 5 NOT AT ALL RISKY

12. Do you attempt to clean the fish you eat from Lake Michigan in a way that will reduce any possible health risks? (circle one)

- 1 NO
- 2 YES

13. Do you limit the amount of fish you eat from Lake Michigan in order to reduce any health risks? (circle one)

- 1 NO
- 2 YES

14. Indicate to what extent you believe that each of the following conditions contributes to pollution of the fish in Southern Lake Michigan.

CONDITIONS	CONTRIBUTION TO POLLUTION (circle one)				
	EX- TREME	VERY	MOD- ERATE	SOME- WHAT	NONE
Heavy Metals (lead, mercury)	1	2	3	4	5
Pesticides (DDT, etc.)	1	2	3	4	5
Other Toxic Chemicals	1	2	3	4	5
Raw Sewage	1	2	3	4	5
Acid Rain	1	2	3	4	5
Agricultural Runoff	1	2	3	4	5

15. Have any of the ABOVE conditions reduced your fishing Southern Lake Michigan? (circle one)

- 1 NOT AT ALL
- 2 SOMEWHAT
- 3 PRETTY MUCH
- 4 A GREAT DEAL

16. How SATISFIED are you with fishing Southern Lake Michigan? (circle one)

- 1 EXTREMELY SATISFIED
- 2 VERY SATISFIED
- 3 MODERATELY SATISFIED
- 4 SOMEWHAT SATISFIED
- 5 NOT AT ALL SATISFIED

PART K. FINALLY, WE WOULD LIKE TO KNOW A LITTLE ABOUT YOURSELF. REMEMBER, ALL ANSWERS WILL BE KEPT CONFIDENTIAL AND NOT ASSOCIATED WITH ANYONE.

1. Indicate your sex. (circle one)

- 1 MALE
- 2 FEMALE

2. What year were you born? _____

3. Indicate how much education you have completed. (circle one)

- | | |
|-------------------------------|--------------------------|
| 1 GRADE SCHOOL | 6 ASSOCIATE DEGREE |
| 2 SOME HIGH SCHOOL | 7 BACHELOR'S DEGREE |
| 3 GRADUATED HIGH SCHOOL | 8 MASTER'S DEGREE |
| 4 TECHNICAL/VOCATIONAL SCHOOL | 9 DOCTORATE DEGREE |
| 5 SOME COLLEGE | 10 OTHER (specify) _____ |

4. Indicate your marital status. (circle one)

- | | |
|----------------------------|-------------------------|
| 1 SINGLE WITHOUT CHILDREN | 3 SINGLE WITH CHILDREN |
| 2 MARRIED WITHOUT CHILDREN | 4 MARRIED WITH CHILDREN |

5. Indicate which of the following best describes the area where you now live. (circle one)

- 1 RURAL
- 2 CITY UNDER 20,000 PEOPLE
- 3 CITY OF 20,000 to 99,999 PEOPLE
- 4 URBAN AREA OF 100,000 to 250,000 PEOPLE
- 5 METROPOLITIAN AREA OVER 250,000 PEOPLE

6. Which of the ABOVE areas best describes where you grew up? (write the number associated with the appropriate area) _____

7. On the average, how many hours do you work a week? _____ hours

8. On the average, how many days of vacation (not including weekends) do you take each year? _____ days

9. Indicate in what month(s) of the year you normally take your vacation. _____ (month)

10. What is your occupation? _____

11. Indicate your total family income before taxes? (circle one)

- | | |
|------------------------|------------------------|
| 1 UNDER \$10,000 | 5 \$40,000 TO \$49,999 |
| 2 \$10,000 TO \$19,999 | 6 \$50,000 TO \$59,999 |
| 3 \$20,000 TO \$29,999 | 7 \$60,000 TO 69,999 |
| 4 \$30,000 TO \$39,999 | 8 \$70,000 AND ABOVE |

PLEASE FEEL FREE TO GIVE ANY ADDITIONAL COMMENTS YOU DESIRE.

THANK YOU FOR YOUR ASSISTANCE!

PLEASE PUT YOUR COMPLETED QUESTIONNAIRE IN THE ENCLOSED, SELF-ADDRESSED, STAMPED ENVELOPE AND PLACE IT IN A MAILBOX.

Appendix C: Cover Letter Used in First Mailing



Illinois-Indiana Sea Grant Program

Office of Sea Grant, NOAA
U.S. Department of Commerce

Illinois Cooperative Extension Service
University of Illinois at Urbana-Champaign

Indiana Cooperative Extension Service
Purdue University

Coordinator - Robert D. Espeseth
University of Illinois at Urbana-Champaign
104 Huff Hall, 1206 South Fourth Street
Champaign, IL 61820, (217)333-1824

Co-Coordinator - James A. Peterson
Purdue and Indiana Universities
133 HPER Building, Bloomington, IN 47401
(812)335-8037

Area Adviser, Marine Extension -
Christine C. Hagerman
Suite 206, 17500 Oak Park Ave
Tinley Park, IL 60477, (312)532-4369

Communicator - Robin G. Goettel
University of Illinois at Urbana-Champaign
51 Mumford Hall, 1301 W. Gregory Dr
Urbana, IL 61801, (217)333-9448

Dear Angler:

Fishing Lake Michigan is a popular and important sport. Participation is steadily increasing and issues which affect your fishing activity are receiving increasing attention. We recognize that the people who use the area are one of our most important sources of information concerning fishing on Lake Michigan. Because your assistance will aid resource managers in serving the needs of Lake Michigan anglers, this study has been endorsed and funded by the Illinois-Indiana Sea Grant Program.

Whether or not you fish Lake Michigan, you are one of a randomly selected sample of persons who purchased a fishing license in Illinois or Indiana in 1984. Your answers to our questions represent not only yourself, but thousands of anglers with views similar to yours. For this reason, your answers are extremely important to ensure the completeness and accuracy of the final results.

Please take a few minutes to complete this questionnaire to the best of your ability. If you have trouble answering any questions, give the most accurate information you can recall. Your name will not be associated in any way with the answers you give and absolute confidentiality is assured. We do not ask you to put your name anywhere on the questionnaire and the numbers at the top of this page are for coding purposes only.

If you have any further questions, please write to or call one of the contacts listed above or John R. Collins, 1206 S. Fourth St., 104 Huff Hall, Univ. of Illinois, Champaign, IL 61820, phone: (217) 333-3224.

Thank you very much.

Sincerely,

Robert D. Espeseth
Robert D. Espeseth
Coordinator,
Illinois-Indiana

Sea Grant Program

James D. Absher
James D. Absher
Assistant Professor

Appendix D: Follow-up Postcard Reminder

Dear Angler:

About a week ago you should have received a questionnaire requesting information about your fishing behavior and preferences. At the time this postcard was mailed, we had not yet received your response. Your answers are very important since they will be used to represent the responses of many other anglers with views similar to yours.

We would greatly appreciate it if you would take a few minutes to complete the questionnaire and return it in the postpaid envelope provided. If you have misplaced the questionnaire or did not receive one, we will be sending you another one if we do not hear from you soon.

If you have already returned the questionnaire, please disregard this reminder and thank you for your cooperation. We appreciate your help in our efforts to improve the quality of Lake Michigan fishing.

Sincerely,

John R. Collins, Jr.
University of Illinois

Appendix E: Cover Letter Used in Phase Three of Mail Survey



Illinois-Indiana Sea Grant Program

Office of Sea Grant, NOAA
U.S. Department of Commerce

Illinois Cooperative Extension Service
University of Illinois at Urbana-Champaign

Indiana Cooperative Extension Service
Purdue University

Coordinator - Robert D. Espeseth
University of Illinois at Urbana-Champaign
104 Huff Hall, 1206 South Fourth Street
Champaign, IL 61820, (217)333-1824

Co-Coordinator - James A. Peterson
Purdue and Indiana Universities
133 HPER Building, Bloomington, IN 47401
(812)335-8037

Area Adviser, Marine Extension -
Christine C. Hagerman
Suite 206, 17500 Oak Park Ave
Tinley Park, IL 60477, (312)532-4369

Communicator - Robin G. Goetter
University of Illinois at Urbana-Champaign
51 Mumford Hall, 1301 W. Gregory Dr.
Urbana, IL 61801, (217)333-9448

Dear Angler:

About three weeks ago you were sent a questionnaire which is part of a study of anglers in Illinois and Indiana. If you have already returned the questionnaire, we thank you for your prompt reply. If you have not completed the questionnaire, would you please take the time to do so today?

The information you provide helps to increase the accuracy of the study. It will assist in our efforts to respond to your fishing needs. Remember, all responses will be summarized and handled in strict confidentiality.

A questionnaire and postage paid envelope are enclosed in case you did not receive one or no longer have the first one we sent you.

Thank you again for your interest and cooperation.

Sincerely,

Robert D. Espeseth
Coordinator,
Illinois-Indiana Sea Grant Program

John R. Collins, Jr.
Graduate Research Assistant

enclosure

Appendix F: Non-respondent Follow-up Phone Survey Questionnaires

7/85

Study #3300

Sport Fishing Study
Phone Followup*

Hello, may I speak to _____? My name is _____ and I'm calling from the University of Illinois (Survey Research Laboratory). Recently you were sent a questionnaire about recreational fishing in southern Lake Michigan (by the Illinois-Indiana Sea Grant Program).

Since we've not yet received your questionnaire, I'd like to get the information very quickly over the telephone.

*Conducted by the Survey Research Laboratory, University of Illinois.

7/85

Study #3300
Sport Fishing Study

Phone Followup

1. About how many years ago did you start fishing?

Don't know 98

2. Over the last five years, would you say the time you spend fishing has . . .

Increased, 1

Remained the same, or . . . 2

Decreased? 3

Don't know 8

3. During the past 12 months, how many fishing trips have you taken?

Don't know 98

4. How important is fishing as a source of satisfaction in your life? Would you say . . .

Extremely important, 1

Very important, 2

Moderately important, . . . 3

Somewhat important, or . . . 4

Not at all important? . . . 5

Don't know 8

5. Have you ever fished southern Lake Michigan? (That part of Lake Michigan bonded by the Illinois and Indiana shorelines.)

Yes 1

No (*Skip to Q.7*) 2

Don't know 8

6a. When fishing Southern Lake Michigan, do you usually try to catch . . .

	<u>Yes</u>	<u>No</u>	<u>Don't know</u>
Salmon?	1	2	8
Trout?	1	2	8
Perch?	1	2	8
Some other type of fish? (Specify) _____			
_____	1	2	8

b. During the past 12 months, how many fishing trips have you made to Southern Lake Michigan?

c. How would you rate your ability to catch fish on southern Lake Michigan? Do you consider yourself a . . .

- Beginner, 1
- Intermediate, 2
- Advanced, or 3
- Expert? 4
- Don't know 8

7. In what year were you born? 19 _____

8. Do not ask, but record sex of respondent.

- Male 1
- Female 2

Interviewer ID# _____