ECONOMICS OF SPORT FISHING IN MUSKEGON COUNTY

A Study of the Lake Michigan Fisheries
from October 1981 to October 1982

by

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September 1983

This publication is a result of work sponsored in part by the Michigan Sea Grant Program under grant number NA-80AA-D-00072, project number R/R-5 from the Office of Sea Grant, National Oceanic and Atmospheric Administration (NOAA), U.S. Department of Commerce; in part through a grant provided by the Coastal Zone Management Act of 1972, administered by the Office of Oceans and Coastal Resources Management, National Oceanic and Atmospheric Administration and the Division of Land Resource Programs, Michigan Department of Natural Resources; and in part through a grant provided by the Muskegon County Board of Commissioners.

ACKNOWLEDGEMENTS

This research was funded by the Federal Coastal Zone Management Program (administered by the Land Resource Programs Division of Michigan's Department of Natural Resources), and the Board of Commissioners of Muskegon County. Also cooperating were the Michigan State University Agricultural Experiment Station, the MSU Cooperative Extension Service and the Michigan Sea Grant College Program.

The following people were of particular assistance during the project: Richard Maher, Muskegon County Planner; Dave Covell and Roy Winnegar, Muskegon Chamber of Commerce; Richard McKeoun and John Mercer, Muskegon Sportfishing Association; Craig Engweiler, Bernie Halvorson, Gary St. Martin, and Ben Cihak, charter boat captains; and interviewers Bob Chancellor, Scott Rogers, Tate King, and Joann Aurich. In the Whitehall/Montague area: Carol Wood, Whitehall/Montague Chamber of Commerce; and interviewers Dr. Ken Linton, Tom Hamilton, V. Donley, D. Patton, J. Luttrull, and L. Krull of the Whitehall Sportfishing Association, and Michael Broadbent.

Our special appreciation is extended to Charles Pistis, Sea Grant District Extension Marine Agent, who acted as a liaison between Michigan State University and all local interested parties. His efforts and support were instrumental in initiating and implementing this study.

SUMMARY

During the one year period from October 1981 through September 1982, anglers spent about $1.8 million in Muskegon County for angling for Great Lakes fish. Of this, non-residents spent about $0.6 million, generating total Muskegon County sales of about $1.2 million and increasing county personal incomes by about $0.4 million. The boat fisheries of Muskegon and Whitehall/Montague were by far the most significant fisheries, contributing 77 percent of the economic impact. See Table 1 for more detail. Apparently these numbers are below normal because anglers were generally less successful than usual in the county in 1982.

This study estimated the angling effort, associated spending and related economic and marketing information for ice, pier, boat and charter fishing in Muskegon and Whitehall/Montague, and foul-hook fishing in the Muskegon area. Each fishery differs from the others, not only in mode, location and season, but also in the type of individuals attracted and their needs and perceptions. By documenting who is attracted to each fishery, and their associated needs and perceptions, we hope to provide insights to public officials and businesses about how to attract more anglers and better meet their needs.

The anglers we encountered in the Muskegon and Whitehall/Montague fisheries were predominantly county residents, although the Whitehall/Montague boat fishery had an edge over Muskegon in drawing non-resident anglers. The economic impact of the fishery is relatively low because so few anglers traveled far to fish there. In contrast a similar study of Ottawa County showed over twice as large a percentage of non-residents. The economic impact attributable to non-resident expenditures in Ottawa County was over four times as great.

Not surprisingly, pier and boat anglers in both Muskegon and Whitehall/Montague brought their spouses and/or families with them

Table 1. Summary of angler use (angler days), expenditures and secondary economic impacts in Muskegon County for all angling for Great Lakes fish and related angling in Muskegon County in 1981-82.

	ALL ANGLERS		NON-RESIDENT	
Fishery	Use	$	Use	$
Muskegon ice	14,781	81,887	3,425	19,660
Muskegon pier	9,015	56,434	634	5,408
Muskegon boat	83,008	708,888	13,281	163,490
Muskegon charter	997	100,453	997	100,453
Muskegon foul-hook	2,151	14,863	322	2,335
Muskegon total	109,952	962,525	18,659	291,346
Whitehall ice	4,827	35,189	1,123	6,513
Whitehall pier	6,812	45,981	736	2,388
Whitehall boat	47,152	740,758	12,944	263,928
Whitehall charter	136	13,703	136	13,703
Whitehall total	58,927	835,631	14,939	286,532
Muskegon County	168,879	1,798,156	33,598	577,878

Secondary Economic Impacts on Muskegon County of Non-resident Angler Expenditures

Angler Expenditures		Multiplier		Gross Revenues
$577,878	X	2.00	=	$1,155,756

Gross Revenues		Income Component		Personal Income
$1,155,756	X	0.35	=	$404,515

more often than did ice anglers. Ice anglers in both areas had far more complaints about government services than did pier and boat anglers. For all the fisheries, relatives and friends were the major sources of information for anglers about fishing in Muskegon County. Almost everyone encountered had fished in Muskegon County before, as might be expected in a local fishery. Details may be found in Table 2.

Table 2. Summary of angler attributes.

	Muskegon				Whitehall/Montague		
Attribute	Ice	Pier	Boat	Foul	Ice	Pier	Boat
1. Percent non-res.	23	7	16	15	23	9	25
2. Percent non-res. who brought the family.	11	71	36	-	30	37	71
3. Percent with needs							
a. from business.	7	8	3	1	10	8	8
b. from government.	49	24	26	0	53	21	30
4. Percent angling for sport.	68	60	63	50	69	53	57
5. Ave. age.	40	41	43	32	42	38	41
6. Information source. (%)							
a. Relative/ friend.	21	7	7	-	16	13	13
b. Media	2	2	4	-	0	0	0
c. Other	5	1	0	-	4	3	4
7. Percent fished area before.	94	97	98	100	99	97	98

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INTRODUCTION

Even as Michigan's manufacturing-based economy is gradually beginning to recover from the current recession, the economic contribution made by recreation-tourism industries in Michigan during those economically bleak years reminds many communities of the significance of the recreationist's dollar . While recreation and tourism dollars will probably never replace all the manufacturing jobs and income lost throughout the state, the current economic problems have focused the attention of public officials and private citizens on the present and potential future contribution of Michigan's tourism resources.

Great Lakes sport fishing has for many years been one of Michigan's major recreational pursuits and tourist attractions. All coastal counties offer attractive fishing. Angler expenditures vary, but the economies of many coastal communities depend heavily on this spending. In a study of the economic impacts of Great Lakes sport fishing in Alcona County, Michigan (Jordan and Talhelm, 1982), we found that angler expenditures are a major component of the local economy. Great Lakes anglers spent over $1.3 million in 1981 in Alcona County, distributed over a wide spectrum of the local business community. Alcona County (population 10,000) is located on Lake Huron in the northeast corner of Michigan's Lower Peninsula. In that rural area the economic base was limited and fishing pressure was great. In the more populous and industrialized areas of Muskegon, Ottawa, Bay, and Macomb counties, we found that whereas the total dollar impacts were several times greater than they were in Alcona County, they comprised a smaller percentage of the much larger overall local economies.

The Alcona County study was initiated when local businesses became concerned that local residents and government officials incorrectly percieved that Great Lakes sport fishing was of no benefit to Alcona's economy. An important aspect of that study was that it surveyed anglers directly, giving added credibility to

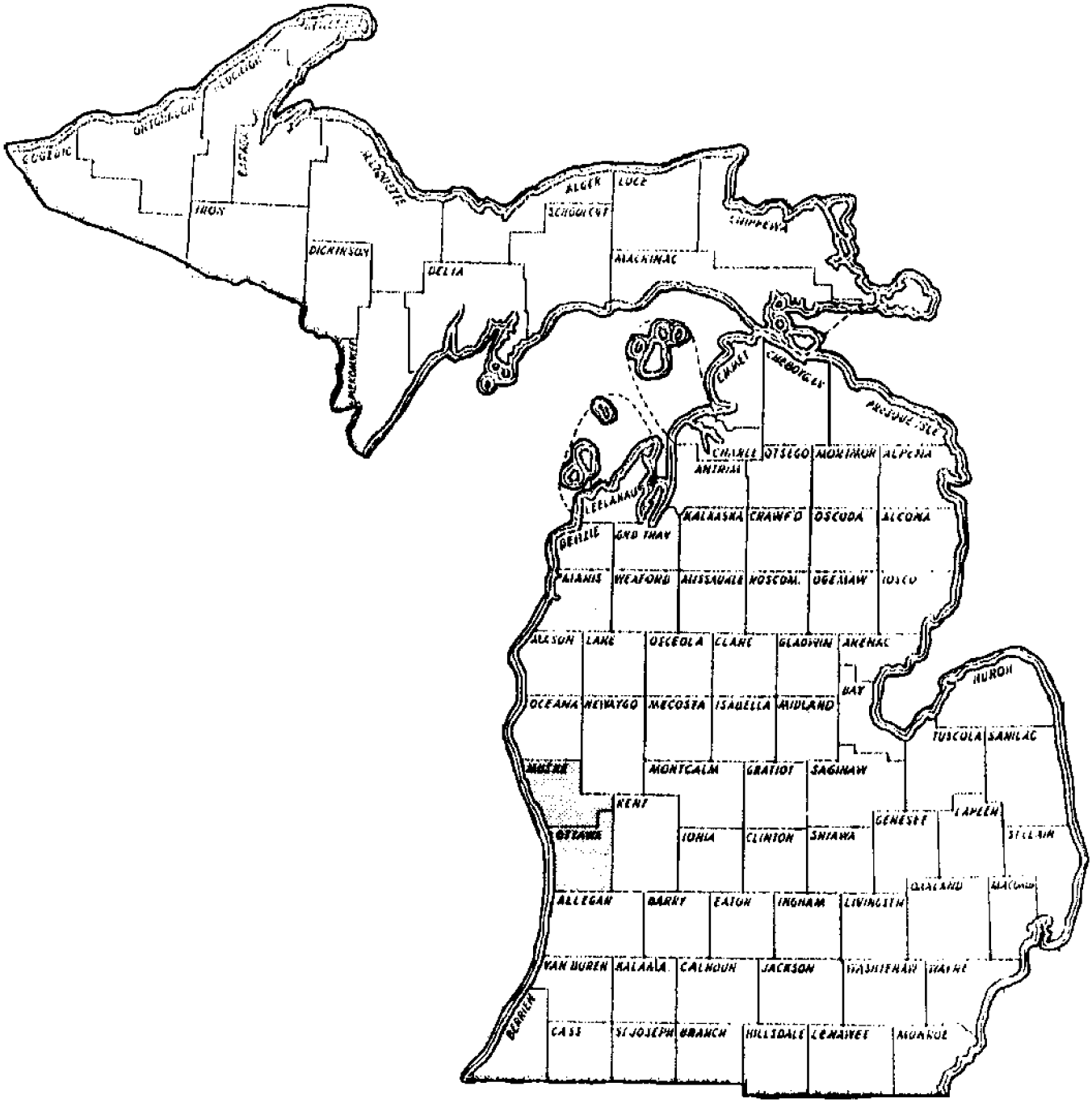
the estimates. We also investigated the interests and needs of anglers, businesses and residents. The communities were able to document and address those issues and problems which were of particular concern to each group. They knew how they could attract and better serve more anglers if they wished.

As the reports of the Alcona study spread throughout the state, other counties realized their need for similar information about their own Great Lakes fishing opportunities. When Muskegon and Ottawa counties expressed interest in having a study done, we saw it as an excellent opportunity to analyze an area of the state much different from Alcona County. Muskegon and Ottawa counties are located midway on the lower peninsula's Lake Michigan shoreline (Figure 1).

The Muskegon-Ottawa region has a varied economy with many light to heavy manufacturing industries, a large farming community, and a well established tourism trade based on a variety of natural resources and cultural attractions. The character of the communities along the Lake Michigan shoreline ranges from the "small town" type represented by Whitehall/Montague to the relatively "modern urban" type represented by Muskegon. Because the communities' economies, needs and concerns differed, we surveyed Muskegon and Whitehall/Montague separately. Throughout this report they will be refered to as distinct sampling areas.

The fishing opportunities available in those two cities are much more varied than the strictly open-water salmonid fishery available in Alcona County. A winter ice fishery offers a variety of gamefish (walleye Stizostedion vitreum, northern pike Esox lucius, yellow perch Perca flavescens, crappie Pomoxis spp., and bluegill Lepomis macrochirus) on Muskegon Lake and White Lake. Those two lakes, both of which are connected to Lake Michigan, also offer warm-weather fishing opportunities for those same species and largemouth bass Micropterus salmoides, smallmouth bass Micropterus dolomieui, and catfish Ictalurus spp.. In addition the two lakes provide opportunities to catch salmonids when conditions are too severe on Lake Michigan, and when salmon and trout make there spawing runs up the Muskegon and White Rivers.

FIGURE 1: Study area.



On Lake Michigan anglers fish for salmon Oncorhynchus spp., lake trout Salvelinus namaycush, steelhead Salmo gairdneri, brown trout Salmo trutta, menominee Prosopium cylindraceum, and yellow perch from boats, piers, and the shore.

The primary goals of this investigation were to estimate: 1) the total number of angler days - an angler day is one person fishing any part of one day - spent fishing by anglers in all the Great Lakes-associated fisheries in Muskegon County, 2) the average daily expenditures by both county resident and county non-resident anglers for each of the different fisheries previously listed in both Muskegon and Whitehall/Montague, and 3) angler perceptions of the adequacy of both public and privately offered goods and services in the study area, along with their overall impressions of the fishing opportunities available in Muskegon County.

A one year study always presents the risk of sampling a time period which does not represent the norm. From conversations with local people and from actual experience through the interviewing process, it appears that fishing success was much below normal in the 1981-1982 fishing year.

Ice fishing on Muskegon Lake was generally poor during our survey. In the northern and eastern areas of Muskegon Lake the winter walleye fishing was not up to expectations after developing nicely in 1980-1981. We recorded very few walleye caught in our survey of winter anglers, and except for some steady activity with northern pike near the Cobb power plant, the winter fishing success in those areas of the lake in 1982 could be considered well below normal. Yellow perch fishing on Muskegon Lake was at times fair, but anglers often complained that the fishing was slow and that most of the perch caught were small.

Yellow perch fishing on White Lake in the Whitehall/Montague area was better than on Muskegon Lake. Although anglers at White Lake complained of the poor fishing, their average catch rate was more than twice that of Muskegon Lake. However, the northern pike fishing on White Lake - both with hook-and-line and spears - was slow throughout the season.

On Lake Michigan the catch of spring steelhead and brown trout from the piers in both sampling areas was very low, and as summer progressed, the usually good perch fishing on the piers and on Muskegon Lake and White Lake never materialized. Offshore salmonid fishing was fair in May, terrible in June, not quite fair in July and August, and because of an unexplainable delay in the salmon run, was only fair in September and the first part of October. The fall pier fishing for salmonids was particularly dismal because of the late runs. Not until late October did anglers begin to consistantly catch fish.

The overall poor fishing in the area during the year of this study is consistantly reflected in our calculated catch rates in the individual fisheries sections through the report. It is likely the poor fishing in many cases restricted the "normal" influx of non-resident (out-of-Muskegon County) anglers. We have found in past studies that non-resident anglers have greater average daily expenditures than county resident anglers. Therefore, we feel that if the "poor" fishing of 1981-82 were to have any effect on the results of this study, it would be to underestimate the sport fishing impacts associated with a "typical" year's fishing in the Muskegon-Ottawa region.

For the entire study year, we estimated that anglers spent about 170,000 days fishing and $1.8 million in Muskegon County, of which about 34,000 days and $578,000 was attributable to non-resident anglers. Those estimates are apportioned by fishery and city in the different fisheries sections of this report.

Anglers expressed a number of opinions and perceptions when interviewers asked if the businesses and government agencies in the area provided adequate services and facilities for their angling needs. Interviewers were very careful not to lead anglers into any particular response, so although fewer anglers expressed concerns, those that were expressed were more significant.

We also estimated angling on the Muskegon artificial reef (Hamilton reef). The reef was constructed during the summer of 1980 in Lake Michigan approximately one mile southwest of the Pere Marquette pier in Muskegon. The United States Army Corps of Engineers constructed the reef under the auspices of the

Department of Natural Resources Fisheries Division and with the cooperation of the Muskegon Sportsfishing Association. In all of our interviewing of boat anglers in Muskegon County, we encountered only one individual who had fished the reef on the day he was interviewed. Close to 25% of the boat anglers we interviewed did say that they had fished the reef at least once in the past. However, they were primarily salmon anglers who had trolled by it for part of their angling day simply because it was one more place to try. Much has been said about the reef's potential as a perch fishing site. However from our conversations with anglers, we concluded there are so many good places to fish for perch around Muskegon Lake during the summer that anglers have little incentive to fish the reef, other than for the fact that it is a "new" location. With so many substitutes - other good places to fish both for salmon and perch - we were not surprised at anglers' incidental attitude toward the reef. We estimated that approximately 215 angler days have been spent fishing the reef since its construction, and that the economic impact has been only about $2,400.

In each of the different fisheries sections of this report the more prevalent angler comments are tabulated. Because we assured all interviewed anglers their comments would be documented, we have tabulated by fishery in Appendix A those viewpoints which only one or two anglers expressed.

SURVEYS

Anglers were interviewed at all fishing access points within the Muskegon and Whitehall/Montague areas. We found access points by either: 1) observing anglers or 2) asking local people to point out fishing areas.

In Muskegon we sampled fishing activity on: (1) Muskegon Lake, (2) the Lake Michigan piers, and (3) Lake Michigan (offshore salmonid) originating from Muskegon Lake. In the Whitehall/Montague area we sampled fishing on: (1) White Lake, (2)

the Lake Michigan piers, and (3) Lake Michigan (offshore salmonid) originating from White Lake.

Anglers were questioned about their trip expenditures, their length of stay, their fishing success, where they were from, where they were staying, their impressions of the fishing in that sample area, whether they had reasons other than fishing for their trip, their perceptions of government and local businesses, if they knew about the artificial reef and had ever fished over it, and personal information.

Ice, pier, and shore fishing

Ice, pier, and shore fishing use was estimated using a roving survey (Hayne, 1966 and 1972; Malvestuto, Davies and Shelton, 1978; and Talhelm, 1972). A roving survey consists of systematic traverses of either sections of shoreline, a pier, or a concentration of ice anglers. In all three instances, anglers are asked how long they plan to fish that day to determine their probability of being encountered by an interviewer. The probability depends on the anglers' length of stay and the number of traverses that day of the fishing site by the interviewer. We estimated the total number of anglers fishing at a site on a sample day by summing the inverse probability for each angler interviewed. We then averaged daily estimates for each site for each season, distinquishing between weekday and weekend/holiday usage, to estimate total use for each identified fishery.

Shore, pier, and ice anglers were usually interviewed before they had finished fishing for the day. Each anglers' total daily catch was projected by multiplying the ratio of the number of hours they planned on fishing that day to the number of hours they had already fished when interviewed, times the number of fish they had caught at the time of the interview.

Boat fishing

Private boat angler use was estimated in two ways. The first method was used for all the offshore salmonid fishing on Lake Michigan and for the fisheries on Muskegon Lake and White Lake. This method was developed to specifically address a problem associated with Muskegon Lake and White Lake, both of which connect with Lake Michigan. The problem is that anglers departing from any of the numerous access sites and marinas on each lake could plan to fish either on Lake Michigan, the connecting lake, or both. Instantaneous counts of effort on either the connecting lakes or Lake Michigan would be biased because: 1) counts on Lake Michigan would assume that all boats originating out of a particular sampling area were within visual range, and 2) the geography of White Lake made it impossible to see the entire lake. Furthermore, the origins of effort on Lake Michigan would be biased if we assumed that all the boats within visual range at a sampling area had originated from that sampling area.

Therefore, from the entrances of Muskegon Lake and White Lake, we counted, on randomly selected hours, the number of positively identified fishing boats heading out onto Lake Michigan. Using those counts, we calculated the average hourly number of fishing boats from each sampling area going out on Lake Michigan. By adding those hourly averages for weekdays and weekend-days repectively, we calculated average daily totals of weekday and weekend-day fishing boat trips onto Lake Michigan for each sampling area. We then multiplied the average daily totals by the number of weekdays and weekend-days in the boating season to estimate the annual number of boat trips onto Lake Michigan.

In our interviews with boat anglers at sampling area launch sites and marinas, we determined how many people on each boat actually fished that day, and whether on that day the party fished either on Lake Michigan, the connecting lake, or both. From that information we calculated the ratio of sampled boat anglers who went out on Lake Michigan to those who did not. Using that ratio and the total estimated number of fishing boats that went out on Lake Michigan, we estimated the number of boat trips made

exclusively to fish on the connecting lakes. Having estimated the total number of daily fishing boat trips on Lake Michigan and the connecting lakes, we multiplied by the average number of anglers per boat to estimate boat angler usage for each sampling area.

Charter boat fishing

A one page questionnaire for the charter boat fishery was specifically designed to be administered by the charter captains. To encourage the captains' cooperation, it was much briefer than the standard questionnaire. Each party was interviewed collectively rather than individually. The questionnaire focused on county expenditures. Even with the simplified form, however, few charter captains cooperated. The notable exception were some captains in the Grand Haven area. Therefore, we were only able to do a thorough analysis of charter fishing impacts in that area. We estimated Muskegon and Whitehall/Montague expenditures by multiplying reported use by expenditure levels observed in Grand Haven. Charter client use was estimated from the captains' logbooks of charters for the 1982 season.

Business survey

A questionnaire was mailed to over 700 businesses in the Muskegon/Ottawa study area for the purpose of estimating the secondary economic impacts of anglers expenditures. In the Alcona study we had used economic multipliers from the literature (Kalter and Lord, 1968; Pearse and Laub, 1969). However, in this investigation we hoped to refine our estimates of the secondary impacts by surveying the study area businesses, and then applying input-output model tables developed by Diamond and Chappelle (1981) for the Manistee County economy to the responses we received from cooperating businesses.

In the questionnaire we asked businesses: 1) their gross annual receipts, 2) their major products and/or services and the percentage of their gross receipts attributable to each, 3) the number of full-time equivalent employees they had, 4) the

percentage of their total revenues attributable to anglers' purchases, 5) for 26 different sectors of the economy, the percentage of their total revenues used for purchases in each sector, and 6) for purchases within each sector, the percentage purchased within the county.

By using a questionnaire of this sort and by applying input-output modeling techniques, we had hoped to derive mutipliers for each category of business establishment patronized by anglers in the study area. In that way the secondary impacts for Muskegon County could be more precisely estimated. However, to our disappointment, too few of the questionnaires were ever returned (approximately 20) for us to reasonably analyze.

We suspect in part this was due to the anti-government and anti-study attitude prevalent in today's business community. Some of the returned questionnaires sported comments colorfully expounding that attitude. We appreciate the time and effort given by those businesses which did respond in a cooperative manner, and hope to incorporate the information they gave us in a future analysis of secondary impacts utilizing different survey techniques. In lieu of the more detailed analysis, we will use multipliers from other studies found in the literature (Diamond and Chappelle, 1981; Marino and Chappelle, 1978).

Copies of the angler, charter, and business questionnaires can be found in Appendix C.

WINTER ICE FISHING

Ice fishing did not begin in the study area until well into January 1982 due to late-forming ice. Muskegon Lake and White Lake had much more consistant fishing through the season than did the ice fishing areas in Ottawa County. Anglers on Muskegon Lake had marginal success, while anglers on White Lake had the best success of any of the sample areas. However, the overall concensus among Muskegon County ice anglers was that the 1981 winter season was below par.

We expected ice fishing to be a local phenomenon, with few out-of-county anglers showing up in our samples. We also expected the overall poor fishing to exacerbate that phenomenon. However, in Muskegon and Whitehall/Montague a surprisingly high 22-23% were non-residents. We found, however, that 78% of the non-resident anglers in Muskegon County came from Ottawa County and vice-versa. Therefore, we still feel the ice fishery is predominantly a local fishery, and that the below-par fishing reduced the level of use by anglers from outside the Muskegon-Ottawa study area.

Two types of ice angler use were sampled differently. Anglers fishing in the open were counted, and their associated use estimated using the roving survey-probability methods described in the Surveys section.

Shanty fishing effort was estimated using a three-step method. First, shanties were counted on each sampling day at each site. These counts were used to calculate the average daily number of shanties for the season at each site. Second, from shanty angler interviews, we calculated the average number of anglers per occupied shanty at each site. Third, interviewed shanty anglers were asked how many times during the ice fishing season they expected to use their shanty. Since shanty anglers who fished more often were more likely to be interviewed, we weighted: 1) the number of anglers per shanty and 2) the number of days the angler

expected to use the shanty during the ice season, by the probability of encountering that angler.

For instance, if an angler told us he was going to fish 10 times that season, and the season was 80 days long, then we weighted his response by a factor of eight. By multiplying the average daily number of shanties by the weighted average of number of anglers in a shanty, and then again by the weighted average of number of times anglers expected to use their shanties, we estimated total shanty angler use at each ice fishing site.

Ice anglers spent a total of 19,608 days and $117,076 in Muskegon County. Of those totals non-residents spent 4,548 angler days and $26,173 in Muskegon County.

Tables 3 and 8 list the average daily expenditures made by ice anglers in Muskegon and Whitehall/Montague for a number of categories of purchases. The averages listed are for the entire population of anglers (resident and non-resident), whereas the figures in parentheses are the average non-resident expenditures. County expenditure statistics are in Appendix B. The non-resident expenditures represent the amounts of "new" money coming into the local economy. We beleive the local nature of the fishery and the apparent below normal participation by anglers from outside the Muskegon-Ottawa study area explain the very low expenditure patterns.

Tables 4 and 9 list anglers' comments about their perceptions of the adequacy of both private and public facilities and services in Muskegon and Whitehall/Montague. These questions were designed to permit anglers to express their mindful concerns, rather than to lead them into particular responses. Therefore, while we obtained few responses, each response represents a conscious concern of an angler.

Muskegon

Muskegon Lake had the most ice fishing activity, 14,781 angler days, of any of the sampling areas during 1982. We believe a major reason for the greater activity is the lake's proximity to

a metropolitan area with many of its residents out of work. Many of the people we interviewed were unemployed local residents.

While angler use was substantial, fishing success was only marginal. Yellow perch fishing, which accounts for most of the winter use, varied from good to poor throughout the season. Most perch were caught in the southwest portion of the lake near the yacht club and sand docks, though anglers complained that the fish were too small. Pike fishing off the Cobb power plant was fair throughout the season. The walleye fishing was spotty most of the season, both off the Cobb power plant and off the North Muskegon shoreline. Two weekend yellow perch tournaments sponsored by local sporting goods stores drew close to 1000 anglers apiece.

Fifty-nine percent of all anglers interviewed had caught fish on the day questioned. The average aggregate catch for all anglers was 6.6 fish per angler day, 94% of which were yellow perch.

Table 3. Muskegon ice anglers' average daily expenditures made at home, en route, and in Muskegon County.

	Other Counties		Muskegon
Type of expenditure	Home	En route	County
Major fishing equip.	--	--	.61
Tackle-small gear	.04 (.16)	--	1.94 (1.90)
Restaurants	--	--	.61 (1.84)
Groceries	--	--	.49 (.21)
Beer	--	--	.59 (.26)
Vehicle gas	.33 (1.42)	--	1.07 (.74)
Miscellaneous	--	--	.23 (.79)
Total	.37	--	5.54
Non-resident total	(1.58)	--	(5.74)

The total estimated gross expenditures in Muskegon County of all Muskegon ice anglers were:

14,781 angler days X $5.54 per angler day = $81,887

The estimated gross expenditures in Muskegon County of Muskegon non-resident ice anglers were:

3,425 angler days X $5.74 per angler day = $19,660

Ninety-three percent of all the anglers interviewed felt the local businesses provided adequate services and facilities. Six percent of all anglers felt prices in general in the Muskegon area were higher than elsewhere (5% for non-residents), 17% felt they were lower (5% for non-residents), and 77% felt they were the same (90% for non-residents).

Fifty-one percent of all the anglers interviewed felt the government agencies involved provided adequate services and facilities.

Table 4. Muskegon ice angler comments.

I. Responses about the local businesses.

Responses	% of interviewed anglers
1. Bait stores should open earlier.	2.4%
2. Bait store prices are too high.	1.2%
3. Need an open restaurant closer to the marina in winter.	1.2%

II. Responses about government agencies.

Responses	% of interviewed anglers
1. Need winter parking at South Marina area.	15.9%
2. DNR should not charge to launch boats in summer.	13.4%
3. Plant more walleye.	7.3%
4. Need more boat launching sites on Muskegon Lake.	4.9%

Table 4 continued:

5. Need more winter parking at Johnson's Point.	3.7%
6. Access sites should be plowed more often in winter.	2.4%

III. General responses.

Response	% of interviewed anglers
1. The fishing is good around Muskegon.	20.7%
2. Muskegon Lake is much cleaner now.	7.3%
3. Likes having the walleyes back in Muskegon Lake.	4.9%
4. Giddings ramp and lot is nice.	3.7%
5. Still thinks Muskegon Lake is polluted.	2.4%
6. Appreciates N. Muskegon plowing the Second Street lot.	2.4%
7. Great Lakes fishing is becoming a rich man's sport.	2.4%
8. Need to promote Muskegon's fishing more vigorously.	2.4%

Non-residents comprised 23% of all the ice anglers interviewed in Muskegon. Only one percent of all the interviewed ice anglers came from another state. Table 5 lists non-resident ice angler origins by percentage and Figure 2 shows the major in-state angler origins. All non-residents were on a one day trip. Eleven percent of the non-residents said that at least once a year their spouse or family accompany them on a fishing trip to the area, and that when they come, they fish also.

Table 5. Muskegon non-resident ice angler origins.

Origin	% of anglers	Origin	% of anglers
1. Muskegon	78%	4. Newaygo	1%
2. Ottawa	14%	5. Hawaii	1%
3. Kent	7%		

FIGURE 2: Muskegon ice angler origins.

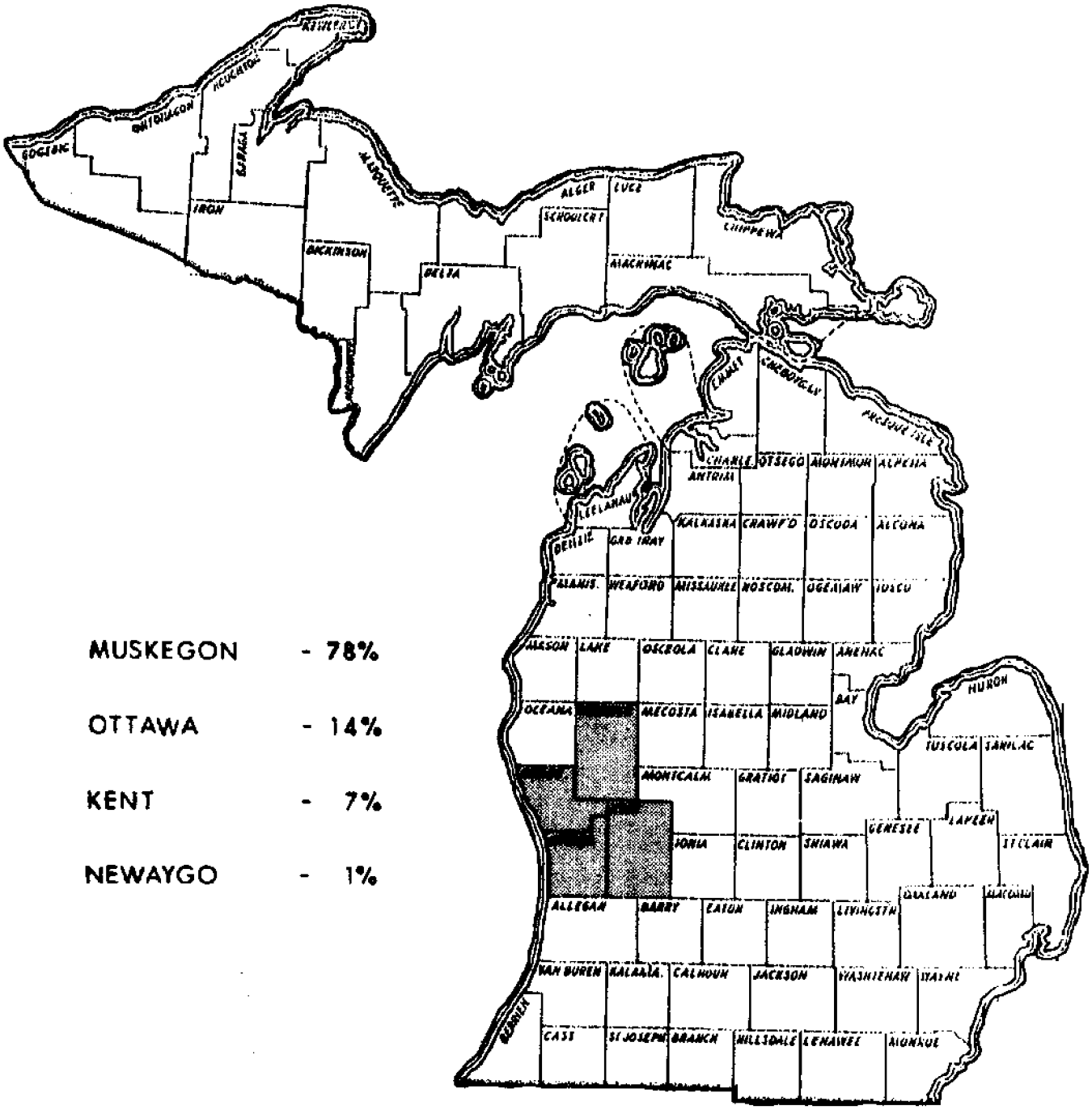


Table 6 lists the means by which Muskegon ice anglers learned about the fishing opportunities in Muskegon, other than by the fact that they have always lived in the area.

Table 6. Means by which Muskegon ice anglers learned about fishing in the Muskegon area.

Source	% of all anglers	% of non-residents
1. Relative	1%	32%
2. Friend	20%	68%
3. Traveling through	5%	
4. Media	2%	

When asked to apportion their purpose for fishing between "sport" or "food", ice anglers' average responses were 68% for "sport" and 32% for "food".

Ninety-four percent of the interviewed ice anglers had fished on Muskegon Lake in the past, and all said they would again, with the non-resident anglers reporting 79% had fished there before and all would fish there again. Ice anglers averaged 19 fishing trips (all trips - ice, pier and boat) to Muskegon per year (12 trips for non-residents). Thirty-five percent of the ice anglers said they fish most in the summer, 20% in the winter, and 38% said they fish all year. All the anglers interviewed were on a one day trip.

Fifty-nine percent of all the ice anglers interviewed were fishing primarily for yellow perch, 21% for walleye, 10% for northern pike, and 11% for anything that would bite.

Males comprised 95% of all the anglers interviewed, with 22% of the anglers saying their spouse accompanied them an average of 8% of the time. The average angler age was 40 years, and the relative percentages for a range of angler incomes are listed in Table 7.

Table 7. Muskegon ice anglers' incomes.

Income Range	% of interviewed anglers
$0 - $4,999	7%
$5,000 - $9,999	24%
$10,000 - $14,999	7%
$15,000 - $19,999	32%
$20,000 - $24,999	10%
$25,000 - $29,999	8%
$30,000 - $34,999	1%
$35,000 - $39,999	3%
$40,000 - up	7%

Whitehall/Montague

White Lake had the best ice fishing, especially for yellow perch, of all the sampling areas. Seventy-one percent of all the anglers interviewed had caught fish on the day questioned, and the average aggregate catch for all anglers was 20.2 fish per day. The catch rate for yellow perch was 19.2 fish per day. Most of the perch fishing activity was concentrated on the eastern end of the lake near the Municipal Yacht Harbor.

A fair number of shanty anglers speared and jigged for northern pike on the south side of the lake. For all of the anglers interviewed, the catch rate for northern pike was 0.3 fish per angler day.

Table 8. Whitehall/Montague ice anglers' average daily expenditures made at home, en route, and in Muskegon County.

	Other Counties		Muskegon
Type of expenditure	Home	En route	County
Major fishing equip.	--	--	.76
Tackle-small gear	.04 (.15)	--	2.22 (2.20)

Table 8 continued:

Type of expenditure	Other Counties: Home	Other Counties: En route	Muskegon County
Restaurants	--	--	.71 (1.10)
Groceries	.12 (.50)	--	.35
Beer	.06 (.25)	--	.76 (.15)
Vehicle gas	.91 (3.90)	--	2.32 (2.00)
Miscellaneous	.04 (.15)	--	.17 (.35)
Total	1.17	--	7.29
Non-resident total	(4.95)	--	(5.80)

The total estimated gross expenditures in Muskegon County of all Whitehall/Montague ice anglers were:

4,827 angler days X $7.29 per angler day = $35,189

The estimated gross expenditures in Muskegon County of Whitehall/Montague non-resident ice anglers were:

1,123 angler days X $5.80 per angler day = $6,513

Ninety percent of all the anglers interviewed felt the local businesses provided adequate services and facilities. Six percent of all anglers felt prices in general in the Muskegon area were higher than elsewhere (10% for non-residents), 30% felt they were lower (15% for non-residents), and 64% felt they were the same (75% for non-residents).

Forty-seven percent of all the anglers interviewed felt the government agencies involved provided adequate services and facilities.

Table 9. Whitehall/Montague ice angler comments.

I. Responses about the local businesses.

Responses	% of interviewed anglers
1. Get rid of Hooker Chemical Co.	8.1%
2. Bait shops need to open earlier.	3.5%
3. Area needs more fishing contests.	1.2%
4. Area needs more boat rentals in summer.	1.2%
5. Area needs more cocktail bars.	1.2%

II. Responses about government agencies.

Responses	% of interviewed anglers
1. Clean the weeds out of the channel.	8.1%
2. Need to plow more parking in winter.	7.0%
3. Stock perch.	4.7%
4. Clean up White Lake.	4.7%
5. Stop the Indian gillnetting.	3.5%
6. Need a public boat launch near the mouth of White Lake.	3.5%
7. Stock more walleye.	3.5%

III. General responses.

Response	% of interviewed anglers
1. Too many small fish.	11.6%
2. The fishing is poor.	9.3%
3. The people in this area are nice.	3.5%
4. The lake water is cloudy.	2.3%
5. The fishing is good.	2.3%
6. The scenery is beautiful.	2.3%

Non-residents comprised 23% of all the ice anglers interviewed. Only one percent of all the interviewed ice anglers came from another state. Table 10 lists non-resident ice angler origins by percentage and Figure 3 shows the major in-state angler origins. All non-residents were on a one day trip. Thirty percent of the non-residents said that at least once a year their spouse or family accompany them on a fishing trip to the area, and that when they come, they fish also.

Table 10. Whitehall/Montague non-resident ice angler origins.

Origin	% of anglers	Origin	% of anglers
1. Muskegon	78%	4. Kent	2%
2. Ottawa	11%	5. Newaygo	1%
3. Oceana	8%	6. Ohio	1%

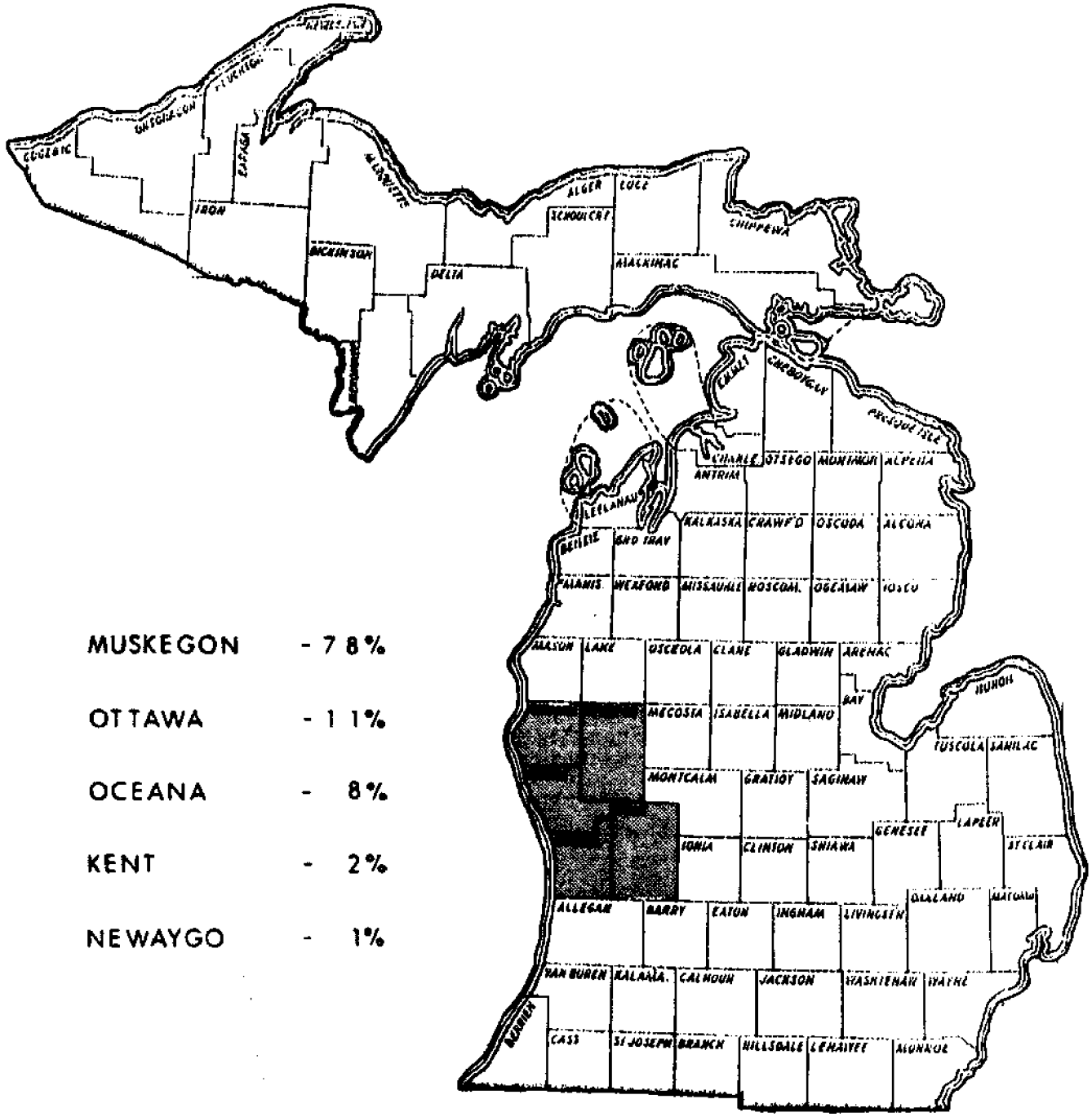
Table 11 lists the means by which Whitehall/Montague ice anglers learned about the fishing opportunities in Whitehall/Montague, other than by the fact that they have always lived in the area.

Table 11. Means by which Whitehall/Montague pier anglers learned about fishing in the Whitehall/Montague area.

Source	% of all anglers	% of non-residents
1. Relative	-	60%
2. Friend	16%	40%
3. Traveling through	3%	-
4. Sports Club meeting	1%	-

When asked to apportion their purpose for fishing between "sport" or "food", ice anglers' average responses were 69% for "sport" and 31% for "food".

FIGURE 3: Whitehall / Montague ice angler origins.



Ninety-nine percent of the interviewed ice anglers had fished on White Lake in the past, and 99% said they would again, with the non-resident anglers reporting 95% had fished there before and all would fish there again. Ice anglers averaged 26 fishing trips (all trips - ice, pier and boat) to Whitehall/Montague per year (non-residents, 18 trips). Thirty-seven percent of the ice anglers said they fish most in the summer, 28% in the winter, 15% in the spring, 5% in the fall, and 15% said they fish all year. All but one of the anglers interviewed were on a one day trip.

Sixty-eight percent of all the ice anglers interviewed were fishing primarily for yellow perch, 30% for northern pike, and 2% for anything that would bite.

Males comprised 97% of all the anglers interviewed, with 47% of the anglers saying their spouse accompanied them an average of 12% of the time. The average angler age was 42 years, and the relative percentages for a range of angler incomes are listed in Table 12.

Table 12. Whitehall/Montague ice anglers' incomes.

Income Range	% of interviewed anglers
$0 - $4,999	10%
$5,000 - $9,999	17%
$10,000 - $14,999	30%
$15,000 - $19,999	17%
$20,000 - $24,999	13%
$25,000 - $29,999	3%
$30,000 - $34,999	3%
$35,000 - $39,999	0%
$40,000 - up	7%

PIER FISHING

Both Muskegon and Whitehall/Montague have pier fishing available. The piers are actually breakwalls built by the United States Army Corps of Engineers to maintain channels for ocean-going ships to enter the ports of the two cities. Anglers fish from the piers from early spring until early winter.

Anglers fish for a variety of species of fish from the piers, the predominant one varying with the season. The general pattern, with some local exceptions, is for anglers to begin by fishing for steelhead, lake trout and brown trout in early spring. In late spring and for most of the summer, anglers fish primarily for yellow perch. Anglers fish for salmon in late summer and into the fall, and then for the steelhead and brown trout which follow the salmon on their migration up the rivers. Anglers also fish for menominee from the piers in the late summer and through the fall. We estimated the length of the Muskegon County pier season to be 244 days (April 1 - November 30).

In Muskegon County we estimated that over 90% of angler use on the piers was by local residents. We believe the close proximity to a large city, especially one with high unemployment, explains the high percentage of local use.

Fishing on the piers was generally poor for the entire year. Salmonid fishing was poor in Muskegon County, with an average aggregate catch rate for all anglers of 0.17 fish per angler day in Muskegon and 0.21 fish per angler day in Whitehall/Montague. Yellow perch fishing on the White Lake pier was very good (15.8 fish per angler day), but the perch fishing was generally poor on the Muskegon pier (2.2 fish per angler day).

Tables 13 and 20 list the average daily expenditures made by pier anglers. County expenditure statistics are in Appendix B. We believe the average expenditures are not higher because much of the use was local, and the majority of non-resident anglers traveled only short distances (many came from Ottawa County), so

they usually stayed for only one day. Daily expenditures usually increase with longer visits, but most of the non-residents in this case did not stay long enough to spend any appreciable amounts of money.

Totals of 15,827 angler days and $103,164 were spent in Muskegon County for pier angling. Of those totals non-residents spent 1,370 angler days and $7,796 in Muskegon County.

Tables 14 and 21 list anglers' comments about their perceptions of the adequacy of both private and public facilities in the Muskegon area. Again, these questions were designed to permit anglers to express their mindful concerns, rather than to lead them into particular responses. Therefore, while in many instances the frequency of any particular response seems low, each response represents the concious concern of an angler.

Muskegon

All the pier interviews in Muskegon were done on the Pere Marquette or south pier. The north pier is not a concrete or capped pier and is not easily accessible. For all anglers interviewed on the south pier, 55% had caught fish on the day questioned. That percentage is an average for all species from the spring through the fall seasons. The average aggregate catch for all interviewed anglers was 2.9 fish per angler day. Yellow perch comprised 75% of the fish we observed caught.

Table 13. Muskegon pier anglers' average daily expenditures made at home, en route, and in Muskegon County.

	Other Counties		Muskegon
Type of expenditure	Home	En route	County
Major fishing equip.	--	--	.26
Tackle-small gear	.03	.03	1.71
	(.45)	(.43)	(.54)
Licenses	.04	.04	1.15
	(.60)	(.57)	(1.07)

Table 13 continued:

Type of expenditure	Other Counties: Home	Other Counties: En route	Muskegon County
Launch fees	--	--	.01 (.18)
Camping	--	--	.02
Lodging	--	--	.15 (2.14)
Restaurants	--	--	.57 (2.26)
Groceries	.03 (.43)	--	.70 (.36)
Beer	--	--	.23 (.54)
Vehicle gas	.02 (.31)	--	2.31 (5.50)
Miscellaneous	.01 (.07)	--	.13 (.54)
Family spending	--	--	.08 (1.07)
Total	.13	.07	6.26
Non-resident total	(1.85)	(1.00)	(8.53)

The total estimated gross expenditures in Muskegon County of all Muskegon pier anglers were:

9,015 angler days X $6.26 per angler day = $56,434

The estimated gross expenditures in Muskegon County of Muskegon non-resident pier anglers were:

634 angler days X $8.53 per angler day = $5,408

Ninety-two percent of all the anglers interviewed felt the local businesses provided adequate services and facilities. Three percent of all pier anglers felt prices in general in the Muskegon area were higher than elsewhere (7% for non-residents), 53% felt they were lower (50% for non-residents), and 44% felt they were the same (43% for non-residents).

Seventy-six percent of all the anglers interviewed felt the government agencies involved provided adequate services and facilities.

Table 14. Muskegon pier angler comments.

I. Responses about the local businesses.

Responses	% of interviewed anglers
1. Bait stores need to open earlier.	1.5%
2. Tackle stores have a limited selection of merchandise.	1.5%
3. Need a bait store closer to the pier.	1.5%
4. Prices in the area are too high.	1.0%

II. Responses about government agencies.

Responses	% of interviewed anglers
1. Stop the Indian gillnetting.	7.0%
2. Muskegon Lake launching ramps need to be better maintained.	3.0%
3. Move the rocks away from the pier.	2.0%
4. Do not charge to launch boats.	1.5%
5. Put a cement walk on the North pier.	1.5%
6. Do something to improve the perch fishing.	1.5%

III. General responses.

Response	% of interviewed anglers
1. The fishing is poor.	3.5%
2. The Muskegon area has good fishing.	3.0%
3. Support snagging.	2.0%
4. The Muskegon area is nice.	1.5%
5. Boats come too close to the pier.	1.5%

Non-residents comprised 7% of all the Muskegon pier anglers interviewed. Table 15 lists non-resident origins by percentages and Figure 4 shows the major in-state origins. Twenty-eight percent of the non-residents stayed overnight in the area on their trip. Their accommodations are listed in Table 16. Seventy-one percent of the non-residents said that at least once a year their spouse or family accompany them on a fishing trip to the area. The range of activities the family members engage in are listed in Table 17.

Table 15. Muskegon non-resident pier angler origins.

Origin	% of anglers	Origin	% of anglers
1. Muskegon	93%	7. Oakland	0.5%
2. Ottawa	1%	8. Huron	0.5%
3. Kent	1%	9. Lenawee	0.5%
4. Newaygo	1%	10. Houghton	0.5%
5. Calhoun	0.5%	11. Illinois	0.5%
6. Montcalm	0.5%	12. Connecticut	0.5%

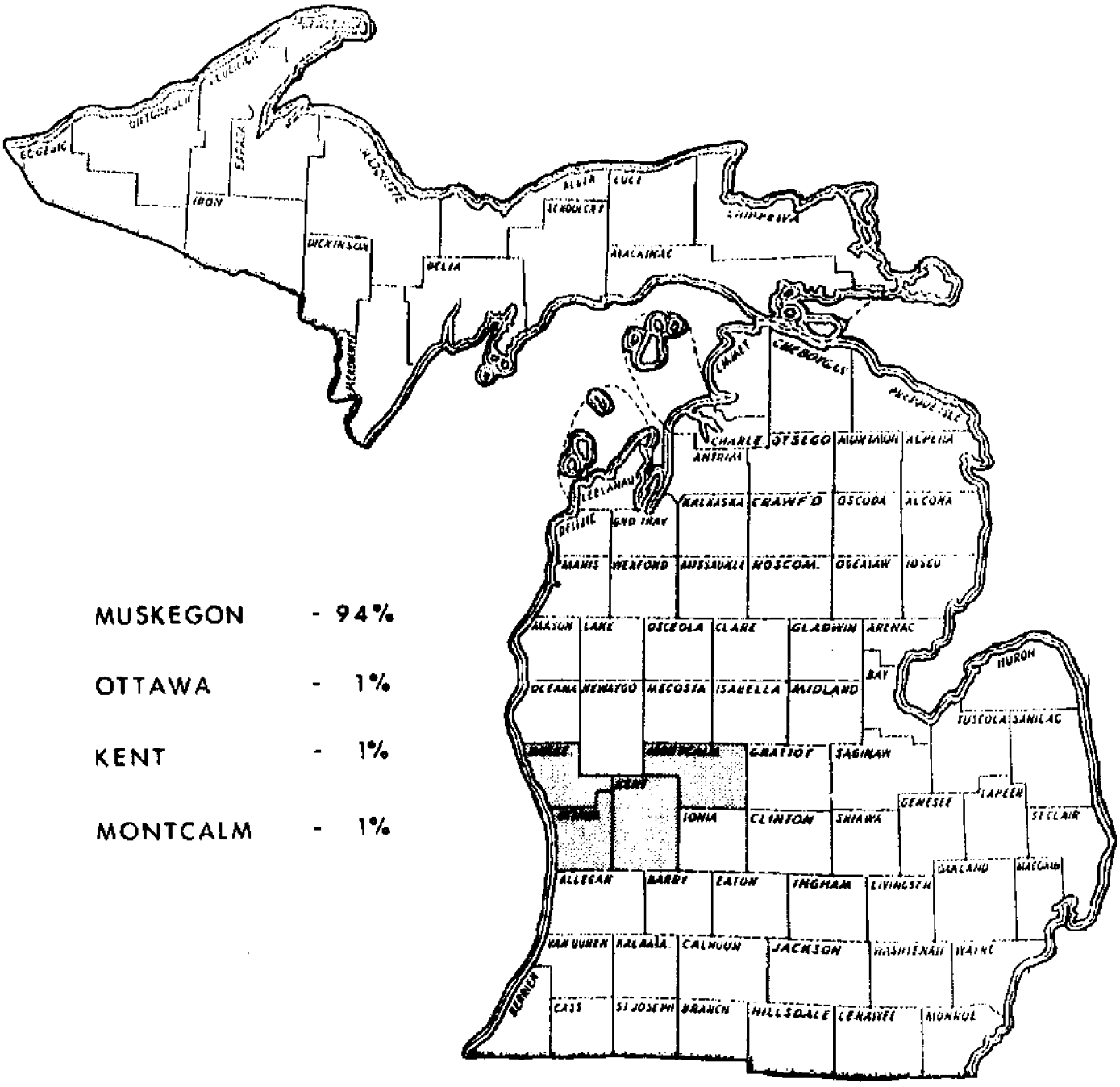
Table 16. Muskegon non-resident pier angler accommodations.

Accommodation	% of non-resident anglers
1. State park	14%
2. Relatives	7%
3. Motel	7%

Table 17. Muskegon non-resident pier angler family activities.

Activity	% of spouse and/or family members engaging in activity
1. Fishing	20%
2. Shopping	20%
3. Visiting relatives	40%
4. Boating	20%

FIGURE 4: Muskegon pier angler origins.



When asked to apportion their purpose for fishing between "sport" or for "food", Muskegon pier anglers' average responses were 60% for "sport" and 40% for "food".

Ninety-seven percent of the interviewed pier anglers had fished in the Muskegon area in the past, and 97% said they would again (2% said maybe), with the non-resident anglers reporting 71% had fished there before and 64% would fish there again (21% said maybe). Pier anglers averaged 33 fishing trips (all trips - pier, boat and ice) to Muskegon per year (4 trips for non-residents). Of these, pier angling trips averaged 1.2 days (1.4 days per non-resident pier trip). Forty-nine percent of the pier anglers said they fish most in the summer, 18% in the spring, 11% in the fall, and 22% said they fish all year. Table 18 lists the means by which Muskegon pier anglers learned about the fishing opportunities in Muskegon, other than by the fact that they have always lived in the area.

Table 18. Means by which Muskegon pier anglers learned about fishing in the Muskegon area.

Source	% of all anglers	% of non-residents
1. Relative	3%	-
2. Friend	4%	42%
3. Traveling through	1%	21%
4. Media	2%	14%

Forty-eight percent of all the anglers interviewed were fishing primarily for yellow perch, 17% for salmon, 17% for steelhead and brown trout, 7% for bass, and 14% for anything that would bite.

Males comprised 91% of all the anglers interviewed, with 34% of the anglers saying their spouse accompanied them an average of 47% of the time. The average angler age was 41 years, and the relative percentages for a range of angler incomes are listed in Table 19.

Table 19. Muskegon pier anglers' incomes.

Income Range	% of interviewed anglers
$0 - $4,999	13%
$5,000 - $9,999	18%
$10,000 - $14,999	27%
$15,000 - $19,999	18%
$20,000 - $24,999	11%
$25,000 - $29,999	9%
$30,000 - $34,999	1%
$35,000 - $39,999	1%
$40,000 - up	2%

Whitehall/Montague

For all anglers interviewed on the Whitehall/Montague piers, 80% had caught fish on the day questioned. That percentage is an average for all angling from the spring through the fall seasons. Anglers caught an average of 8.1 fish per angler day, 79% of which were yellow perch.

Table 20. Whitehall/Montague pier anglers' average daily expenditures made at home, en route, and in Muskegon County.

	Other Counties		Muskegon
Type of expenditure	Home	En route	County
Tackle-small gear	--	--	1.57 (1.14)
Restaurants	--	--	.24 (.02)
Groceries	--	--	1.25 (.76)
Beer	--	.02 (.23)	.27 (1.10)
Vehicle gas	.23 (1.28)	--	3.27 (.11)
Miscellaneous	--	--	.15

Table 20 continued:

Type of expenditure	Other Counties: Home	Other Counties: En route	Muskegon County
Total	.23	.02	6.75
Non-resident total	(1.28)	(.23)	(3.13)

The total estimated gross expenditures in Muskegon County of all Whitehall/Montague pier anglers were:

6812 angler days X $6.75 per angler day = $45,981

The estimated gross expenditures in Muskegon County of Whitehall/Montague non-resident anglers were:

736 angler days X $3.13 per angler day = $2,388

Ninety-two percent of all the anglers interviewed felt the local businesses provided adequate services and facilities. Four percent of all pier anglers felt prices in general in the Whitehall/Montague area were higher than elsewhere (zero percent for non-residents), 12% felt they were lower (50% for non-residents), and 84% felt they were the same (50% for non-residents).

Seventy-nine percent of all the anglers interviewed felt the government agencies involved provided adequate services and facilities.

Table 21. Whitehall/Montague pier angler comments.

I. Responses about the local businesses.

Responses	% of interviewed anglers
1. Need a tackle store near the piers.	3%
2. Need more bait stores.	1%
3. Bait stores need to open earlier.	1%

Table 21 continued:

II. Responses about government agencies.

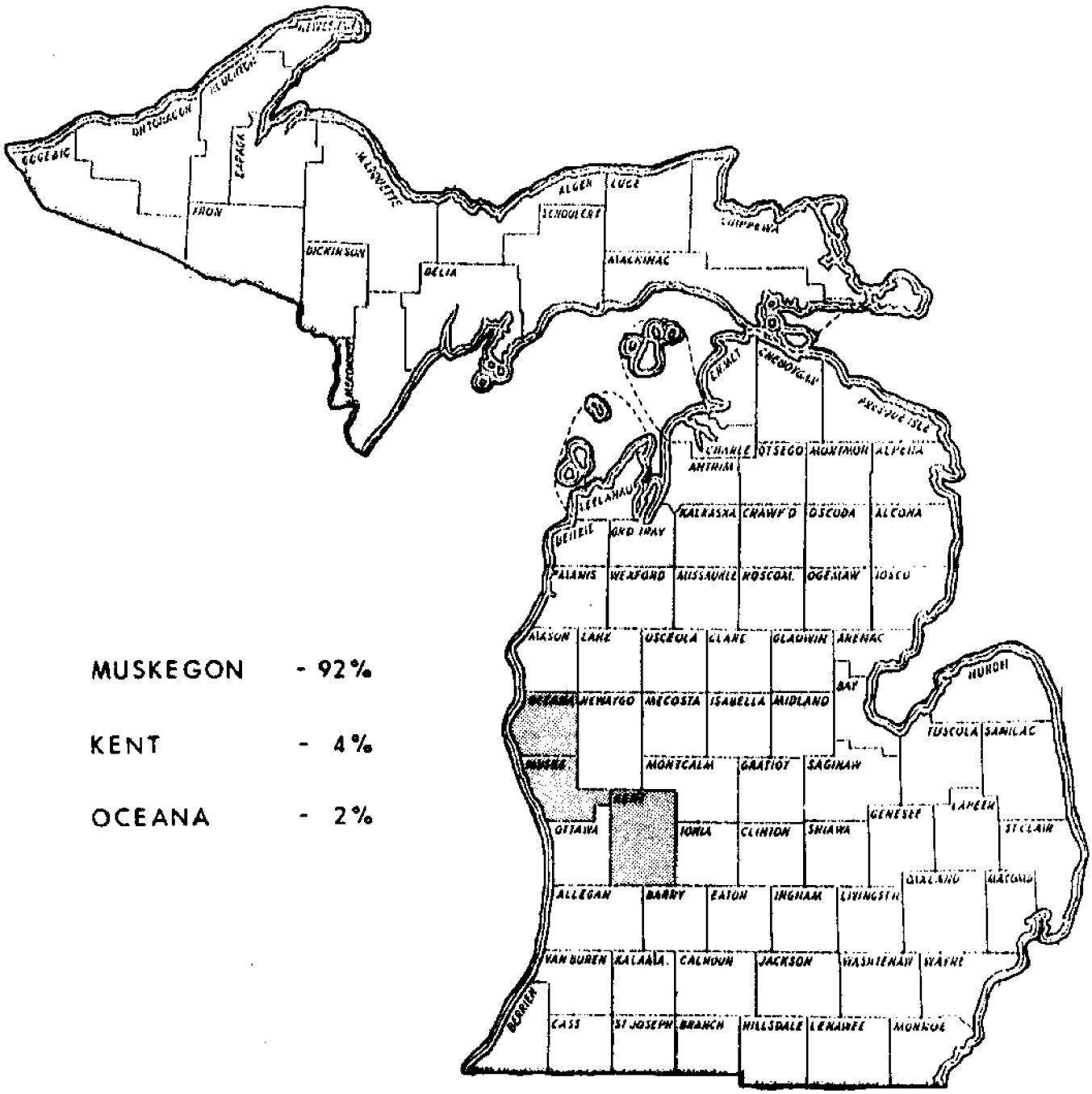
Responses	% of interviewed anglers
1. Need more parking at access sites.	7%
2. Need restrooms on the pier.	5%
3. Enforce boat speed law near the pier and in the channel.	5%
4. Need a boat ramp by the channel.	3%
5. Need to do more about the pollution in White Lake.	3%
6. Need a sidewalk along the pier.	2%
7. Need a free boat launch in the area.	1%
8. Need a lifequard at the pier.	1%
9. Need a fish-cleaning station at the pier.	1%
10. Need to clean the weeds out of the channel.	1%
11. Fill in the pier with more rocks.	1%
12. Stop the gillnetting.	1%

III. General responses.

Response	% of interviewed anglers
1. Too many carp and dogfish.	2%
2. Likes the Whitehall/Montague area.	1%
3. The fishing is poor.	1%

Non-residents comprised 9% of all the pier anglers interviewed. Figure 5 shows the major in-state origins. All of the non-residents were on a one day trip. Thirty-seven percent of the non-residents said that at least once a year their spouse or family accompany them on a fishing trip to the area. They all responded that their spouse or family were strictly fishing while with them on that trip.

FIGURE 5: Whitehall / Montague pier angler origins.



When asked to apportion their purpose for fishing between fishing for "sport" or for "food", Whitehall/Montague pier anglers' average responses were 53% for "sport" and 47% for "food".

Ninety-seven percent of the interviewed pier anglers had fished in the Whitehall/Montague area in the past, and 97% said they would again (3% replied maybe), with the non-resident anglers reporting 63% had fished there before and 63% would fish there again (37% replied maybe). Pier anglers averaged 72 fishing trips (all trips - pier, boat and ice) to Whitehall/Montague per year (10 trips for non-residents). Of these, pier angling trips averaged 1.01 days (1.8 days per non-resident pier trip). Twenty-seven percent of the pier anglers said they fish most in the summer, 5% in the spring, 5% in the fall, and 63% said they fish all year. Table 22 lists the means by which Whitehall/Montague pier anglers learned about the fishing opportunities in Whitehall/Montague, other than by the fact that they have always lived in the area.

Table 22. Means by which Whitehall/Montague pier anglers learned about fishing in the Whitehall/Montague area.

Source	% of all anglers	% of non-residents
1. Relative	7%	24%
2. Friend	6%	38%
3. Traveling through	3%	38%

Fifty-nine percent of all the anglers interviewed were fishing primarily for yellow perch, 11% for lake trout, 5% for steelhead and brown trout, and 24% for anything that would bite.

Males comprised 89% of all the anglers interviewed, with 67% of the anglers saying their spouse accompanied them an average of 32% of the time. The average angler age was 38 years, and the relative percentages for a range of angler incomes are listed in Table 23.

Table 23. Whitehall/Montague pier anglers' incomes.

Income Range	% of interviewed anglers
$0 - $4,999	11%
$5,000 - $9,999	22%
$10,000 - $14,999	16%
$15,000 - $19,999	24%
$20,000 - $24,999	16%
$25,000 - $29,999	5%
$30,000 - $34,999	3%
$35,000 - $39,999	0%
$40,000 - up	3%

BOAT FISHING

In Muskegon and Whitehall/Montague boat fishing accounted for the largest proportion of angler use and economic impact. Approximately 80% of the angler days were attributable to boat fishing in both Whitehall/Montague and Muskegon. Boat anglers also had the highest average daily expenditures: $8.54 in Muskegon and $15.63 in Whitehall/Montague, whereas pier anglers averaged $6.61 and ice anglers averaged $6.42 for the county. The predominance of boat fishing is not surprising. Besides having a good fishery on Lake Michigan for salmon and trout, Muskegon Lake and White Lake offer a variety of very productive fishing opportunities for the angler with a boat.

Tables 24 and 31 list the average daily expenditures made by boat anglers in Muskegon and Whitehall/Montague for a number of categories of purchases. The averages are for the entire population of anglers (resident and non-resident), whereas the figures in parentheses are the average non-resident expenditures. Expenditure statistics are in Appendix B.

Boat anglers spent a total of 130,160 angler days and $1,449,646 in Muskegon County. Of those totals non-residents spent 26,225 angler days and $427,418 in Muskegon County.

Tables 25 and 32 list boat anglers' comments about their perceptions of the adequacy of both private and public facilities and services in Muskegon and Whitehall/Montague. Again, these questions were designed to permit anglers to express their mindful concerns, rather than to lead them into particular responses. Therefore, while we obtained few responses, each response represents the conscious concern of an angler.

Muskegon

Muskegon boat anglers were interviewed at the Pere Marquette Park boat launch, the Cottage Grove ramp, the Hartshorn ramp and marina, the Giddings Street ramp, and the two Muskegon State Park boat ramps. Eighty-two percent of the interviewed boaters had, on the day questioned, fished solely on Lake Michigan, 15% solely on Muskegon Lake, and 3% had fished both. For those anglers who said they were fishing for salmonids, the average aggregate salmonid catch was 1.2 fish per angler day, with chinook salmon comprising about 68% of the catch. For those angler who said they were fishing for non-salmonid species, their average aggregate non-salmonid catch was 12 fish per angler day, with yellow perch comprising 69% of the catch.

Table 24. Muskegon boat anglers' average daily expenditures made at home, en route, and in Muskegon County.

	Other Counties		Muskegon
Type of expenditure	Home	En route	County
Major fishing equip.	--	--	.50 (.49)
Tackle-small gear	.02 (.09)	--	.80 (1.02)
Licenses	--	--	.16 (.83)
Slip fees	--	--	.33 (.02)
Launch fees	--	--	.33 (.44)
Boat gas and oil	.10 (.65)	--	3.27 (2.98)
Camping	--	.01 (.06)	.07 (.41)
Lodging	--	--	.12 (.73)
Restaurants	--	.06 (.24)	.22 (.86)
Groceries	.02 (.14)	.02 (.11)	.64 (.04)

Table 24 continued:

Type of expenditure	Other Counties: Home	Other Counties: En route	Muskegon County
Beer	.02 (.14)	.01 (.08)	.54 (.06)
Vehicle gas	.39 (1.99)	.05 (.28)	2.40 (4.38)
Miscellaneous	--	--	.06 (.05)
Family spending	--	.03 (.19)	.01 (.04)
Total	.55	.17	8.54
Non-resident total	(3.00)	(.95)	(12.31)

The total estimated gross expenditures in Muskegon County of all Muskegon boat anglers were:

83,008 angler days X $8.54 per angler day = $708,888

The estimated gross expenditures in Muskegon County of Muskegon non-resident boat anglers were:

13,281 angler days X $12.31 per angler day = $163,490

Ninety-seven percent of all the anglers interviewed felt the local businesses provided adequate services and facilities. Seven percent of all boat anglers felt prices in general in the Muskegon area were higher than elsewhere (16% for non-residents), 25% felt they were lower (23% for non-residents), and 68% felt they were the same (61% for non-residents).

Seventy-four percent of all the anglers interviewed felt the government agencies involved provided adequate services and facilities.

Table 25. Muskegon boat angler comments.

I. Responses about the local businesses.

Responses	% of interviewed anglers
1. Most package stores in town are dirty.	0.8%
2. Businesses do not cater to fishermen.	0.8%
3. Some restaurants need to open earlier.	0.8%

II. Responses about government agencies.

Responses	% of interviewed anglers
1. Need more launch sites on Muskegon Lake.	7.3%
2. Stop the Indian gillnetting.	5.1%
3. Do not charge to launch boats.	4.0%
4. Need longer docks at Hartshorn boat launch.	3.3%
5. Need more parking area at Hartshorn lot.	2.2%
6. Need wider ramps at Hartshorn.	2.2%

III. General responses.

Response	% of interviewed anglers
1. The area has good fishing.	1.8%

Non-residents comprised 16% of all the Muskegon boat anglers interviewed. Table 26 lists non-resident origins by percentages and Figure 6 shows the major in-state origins. Sixteen percent of the non-residents stayed overnight in the area on their trip. Their accommodations are listed in Table 27. Thirty-six percent of the non-residents said that at least once a year their spouse or family accompany them on a fishing trip to the area. The range of activities the family members engage in are listed in Table 28.

FIGURE 6: Muskegon boat angler origins.

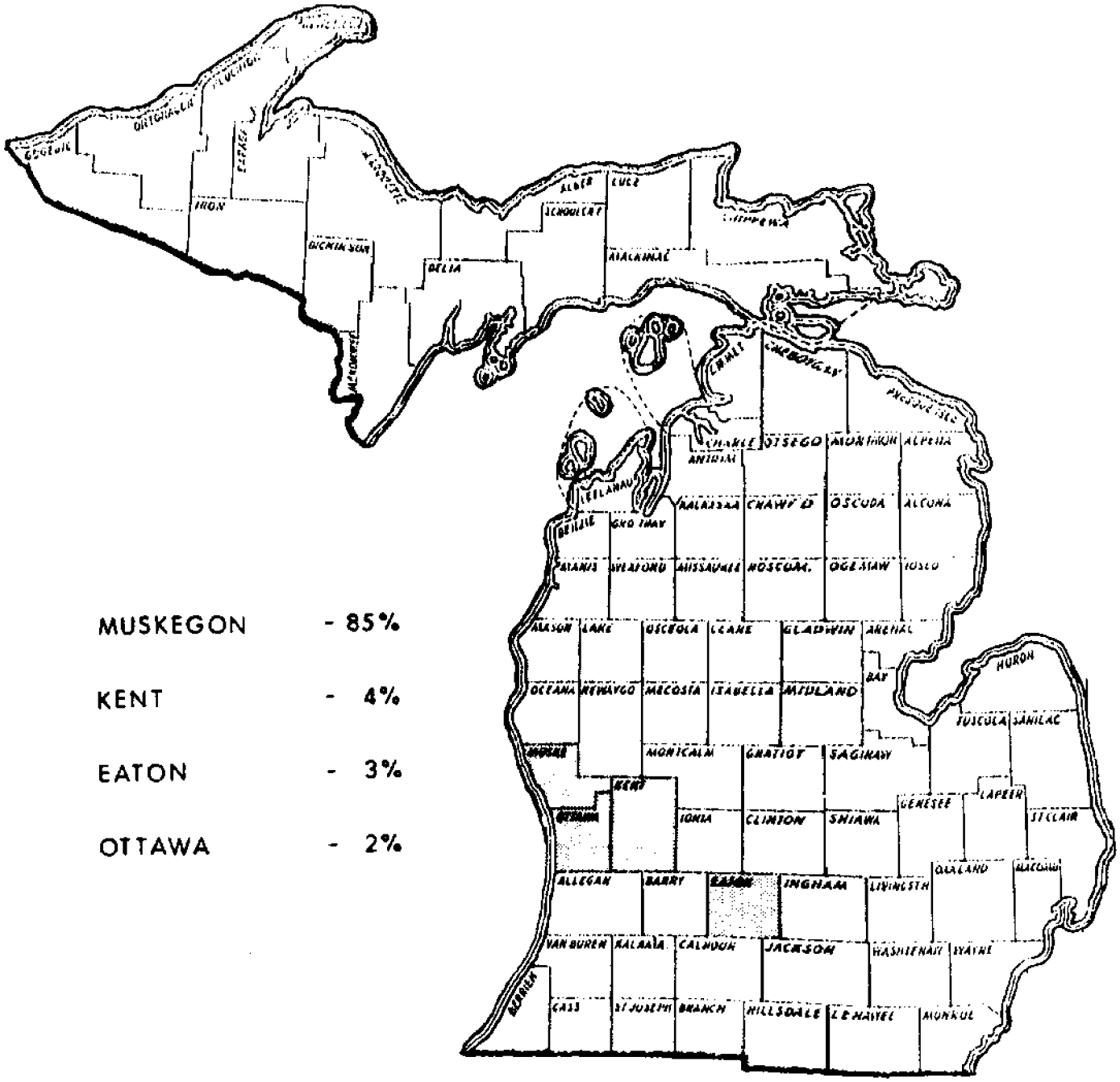


Table 26. Muskegon non-resident boat angler origins.

Origin	% of anglers	Origin	% of anglers
1. Muskegon	85%	7. Newaygo	1%
2. Kent	4%	8. Berrien	1%
3. Eaton	3%	9. Genesee	0.5%
4. Ottawa	2%	10. Indiana	0.5%
5. Wayne	1%	11. Ohio	0.5%
6. Kalamazoo	1%	12. Iowa	0.5%

Table 27. Muskegon non-resident boat angler accommodations.

Accommodation	% of non-resident anglers
1. State park	9%
2. Relatives	5%
3. Friend's house	2%

Table 28. Muskegon non-resident boat angler family activities.

Activity	% of spouse and/or family members engaging in activity
1. Fishing	50%
2. Sunbathing	6%
3. Visiting relatives	25%
4. Boating	19%

When asked to apportion their purpose for fishing between "sport" or "food", Muskegon boat anglers' average responses were 63% for "sport" and 37% for "food".

Ninety-eight percent of the interviewed boat anglers had fished in the Muskegon area in the past, and 96% said they would again (3% said maybe), with the non-resident anglers reporting 89% had fished there before and 80% would fish there again (18% said maybe). Boat anglers averaged 43 fishing trips (all trips - boat, pier and ice) to Muskegon per year (8 trips for non-residents). Of these, boat angling trips averaged 1.1 days (1.7 days per

non-resident boat trip). Forty-five percent of the boat anglers said they fish most in the summer, 15% in the spring, 17% in the fall, and 23% said they fish all year. Table 29 lists the means by which Muskegon boat anglers learned about the fishing opportunities in Muskegon, other than by the fact that they have always lived in the area.

Table 29. Means by which Muskegon boat anglers learned about fishing in the Muskegon area.

Source	% of all anglers	% of non-residents
1. Relative	2%	11%
2. Friend	5%	60%
3. Media	4%	28%

Sixty-one percent of all the anglers interviewed were fishing primarily for salmon, 17% for steelhead and brown trout, 4% for yellow perch, 4% for walleye, 2% for bass, and 17% for anything that would bite.

Males comprised 96% of all the anglers interviewed, with 30% of the anglers saying their spouse accompanied them an average of 54% of the time. The average angler age was 43 years, and the relative percentages for a range of angler incomes are listed in Table 30.

Table 30. Muskegon boat anglers' incomes.

Income Range	% of interviewed anglers
$0 - $4,999	10%
$5,000 - $9,999	12%
$10,000 - $14,999	20%
$15,000 - $19,999	25%
$20,000 - $24,999	15%
$25,000 - $29,999	9%
$30,000 - $34,999	4%
$35,000 - $39,999	3%
$40,000 - up	1%

Whitehall/Montague

Whitehall/Montague boat anglers were interviewed at the Whitehall municipal boat launch, the Montague municipal boat launch, and at the Chalmer's ramp. Sixty-four percent of the boaters interviewed had been fishing solely on Lake Michigan, 35% had been only on White Lake that day, and 1% had fished both Lake Michigan and White Lake on the day interviewed. Anglers who specified they were fishing strictly for salmon or trout had an average aggregate catch rate of 2.5 fish per angler day, with chinook salmon comprising 75% of their catch. Anglers who said they were fishing for non-salmonid species had an average aggregate catch rate of 4.7 fish per angler day, with yellow perch comprising 52% of their catch.

Table 31. Whitehall/Montague boat anglers' average daily expenditures made at home, en route, and in Muskegon County.

	Other Counties		Muskegon
Type of expenditure	Home	En route	County
Major fishing equip.	.26 (.50)	--	.22 (.19)
Tackle-small gear	.01 (.05)	--	.75 (1.50)
Licenses	--	--	.19 (.47)
Slip fees	--	--	.25 (.07)
Launch fees	--	--	2.41 (3.69)
Boat gas and oil	-- (.01)	--	4.06 (4.61)
Lodging	--	--	.11 (.54)
Restaurants	--	--	.53 (1.73)
Groceries	--	--	1.39 (.81)
Beer	.01 (.02)	--	.81 (.70)

Table 31 continued:

Type of expenditure	Other Counties: Home	Other Counties: En route	Muskegon County
Vehicle gas	.02 (.08)	.03 (.10)	4.49 (5.14)
Miscellaneous	--	--	.42 (.94)
Total	.30	.03	15.63
Non-resident total	(.66)	(.10)	(20.39)

The total estimated gross expenditures in Muskegon County of all Whitehall/Montague boat anglers were:

47,152 angler days X $15.63 per angler day = $740,758

The estimated gross expenditures in Muskegon County of Whitehall/Montague non-resident boat anglers were:

12,944 angler days X $20.39 per angler day = $263,928

Ninety-two percent of all the anglers interviewed felt the local businesses provided adequate services and facilities. Three percent of all boat anglers felt prices in general in the Whitehall/Montague area were higher than elsewhere (10% for non-residents), 11% felt they were lower (15% for non-residents), and 86% felt they were the same (75% for non-residents).

Seventy percent of all the anglers interviewed felt the government agencies involved provided adequate services and facilities.

Table 32. Whitehall/Montague boat angler comments.

I. Responses about the local businesses.

Responses	% of interviewed anglers
1. Need better motels.	1.0%
2. Need a place to gas boat on the water.	1.0%
3. Need a better restaurant in the area.	1.0%
4. Gas stations need to have longer hours.	1.0%

Table 32 continued:

II. Responses about government agencies.

Responses	% of interviewed anglers
1. Dredge the Montague boat launch.	16%
2. Need more campgrounds in area.	7%
3. Clean the restrooms at the Montague launch.	7%
4. Need a boat launch by the channel.	5%
5. Enforce NO CAMPING at the Montague launch.	5%
6. Need fish-cleaning facilities.	4%
7. Allow camping at the Montague launch.	3%
8. Need another dock at the Montague launch.	2%
9. Need potable water at the Montague launch.	2%
10. Build more artificial reefs in the area.	2%
11. Post a hydrographic chart of White Lake at the launch sites.	2%
12. Stop the gillnetting.	1%

III. General responses.

Response	% of interviewed anglers
1. This area has good fishing.	11%
2. The fishing was poor.	7%

Non-residents comprised 25% of all the Whitehall/Montague boat anglers interviewed. Table 33 lists non-resident origins by percentages and Figure 7 shows the major in-state origins. Fifty-one percent of the non-residents stayed overnight in the area on their trip. Their accommodations are listed in Table 34. Seventy-one percent of the non-residents said that their spouse or family accompany them on a fishing trip to the area an average of 45% of the time. The range of activities the family members engage in are listed in Table 35.

FIGURE 7: Whitehall / Montague boat angler origins.

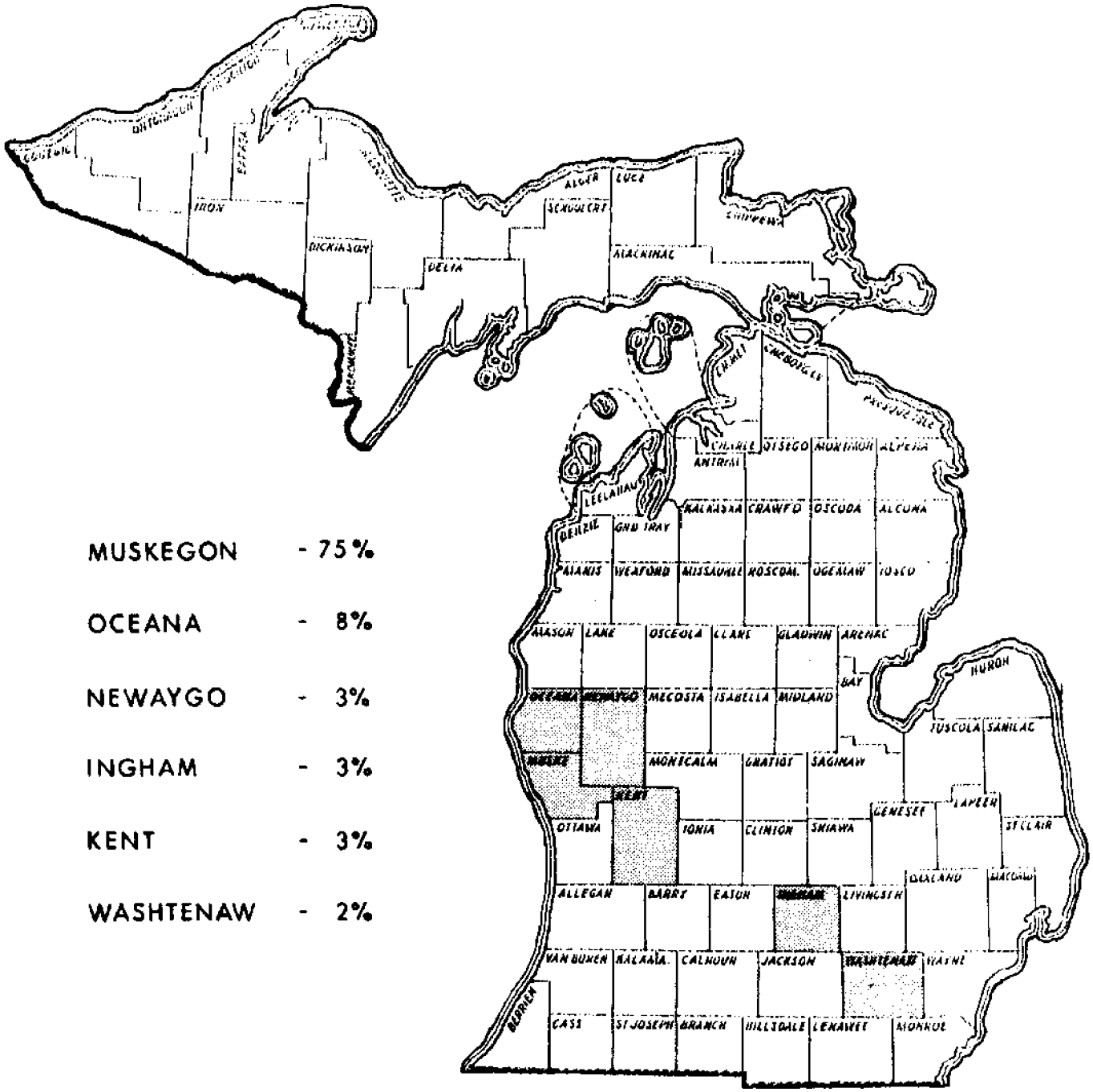


Table 33. Whitehall/Montague non-resident boat angler origins.

Origin	% of anglers	Origin	% of anglers
1. Muskegon	75%	7. Eaton	1%
2. Oceana	7%	8. Calhoun	1%
3. Kent	3%	9. Indiana	1%
4. Newaygo	3%	10. Hawaii	1%
5. Ingham	3%	11. Illinois	1%
6. Washtenaw	2%		

Table 34. Whitehall/Montague non-resident boat angler accommodations.

Accommodation	% of non-resident anglers
1. Parking lots	14%
2. Friends	10%
3. Relatives	8%
4. Motel	6%
5. Rented cottage	6%
6. Own place	5%
7. State park	2%

Table 35. Whitehall/Montague non-resident boat angler family activities.

Activity	% of spouse and/or family members engaging in activity
1. Fishing	90%
2. Shopping	2%
3. Visiting relatives	7%

When asked to apportion their purpose for fishing between "sport" or "food", Whitehall/Montague boat anglers' average responses were 57% for "sport" and 43% for "food".

Ninety-eight percent of the interviewed boat anglers had fished in the Whitehall/Montague area in the past, and 98% said they would again (1% said maybe), with the non-resident anglers reporting 93% had fished there before and 94% would fish there again (1% said maybe). Boat anglers averaged 67 fishing trips (all trips - boat, pier and ice) to Whitehall/Montague per year (24 trips for non-residents). Of these, boat angling trips averaged 2.1 days (5.2 days per non-resident boat trip). Twenty-three percent of the boat anglers said they fish most in the summer, 3% in the spring, 5% in the fall, and 68% said they fish all year. Table 36 lists the means by which Whitehall/Montague boat anglers learned about the fishing opportunities in Whitehall/Montague, other than by the fact that they have always lived in the area.

Table 36. Means by which Whitehall/Montague boat anglers learned about fishing in the Whitehall/Montague area.

Source	% of all anglers	% of non-residents
1. Relative	2%	5%
2. Friend	11%	39%
3. Traveling through	4%	12%
4. Used to live here	-	8%

Seventy-six percent of all the anglers interviewed were fishing primarily for salmon, 2% for steelhead and brown trout, 3% were fishing for bass, 8% for yellow perch, and 11% for anything that would bite.

Males comprised 98% of all the anglers interviewed, with 70% of the anglers saying their spouse accompanied them an average of 43% of the time. The average angler age was 41 years, and the relative percentages for a range of angler incomes are listed in Table 37.

Table 37. Whitehall/Montague boat anglers' incomes.

Income Range	% of interviewed anglers
$0 - $4,999	6%
$5,000 - $9,999	12%
$10,000 - $14,999	24%
$15,000 - $19,999	26%
$20,000 - $24,999	16%
$25,000 - $29,999	7%
$30,000 - $34,999	2%
$35,000 - $39,999	3%
$40,000 - up	5%

FOUL-HOOK FISHING

During the fall chinook salmon run on the Muskegon River it is quite common for a foul-hooking fishery to develop along the lower stretches of the Muskegon River just upstream from Muskegon Lake. It is legal to keep foul-hooked fish taken in that designated area.

We sampled the foul-hooking fishery separately for two reasons. First, it represents a significant portion of the fishing effort found in Muskegon County during the fall season. Second, the controversy continues to rage as to the actual benefits a foul-hook fishery provides communities in proximity to the fishery. We estimated the foul-hook anglers on the lower Muskegon River spent 2,151 angler days and $14,863 in Muskegon County. Expenditure statistics are in Appendix B. We determined from local contacts that the 1982 season lasted approximately 45 days.

Eighty-five percent of the angler days were spent by residents of Muskegon County. All of the other 15% were spent by anglers from Newaygo County. Therefore, we were not surprised to find that the expenditures associated with the fishery were limited in variety and amount. The foul-hook anglers basically bought some gear, groceries and gas. All of the interviewed anglers were on a one day trip, again which usually indicates the liklihood of low expenditures.

There are no expenditures listed in the "Home" and "En route" columns because the particular interviewer we had covering the foul-hook fishery erroneously asked anglers only for their expenditures in Muskegon County.

Table 38. Muskegon foul-hook anglers' average daily expenditures made at home, en route, and in Muskegon County. (n.a. indicates not available)

Type of expenditure	Other Counties		Muskegon
	Home	En route	County
Tackle-small gear	n.a.	n.a.	1.08 (.44)
Groceries	n.a.	n.a.	2.26 (2.56)
Beer	n.a.	n.a.	.79 (1.31)
Vehicle gas	n.a.	n.a.	2.78 (2.94)
Total	n.a.	n.a.	6.91
Non-resident total			(7.25)

The total estimated gross expenditures in Muskegon County of all Muskegon foul-hook anglers were:

2,151 angler days X $6.91 per angler day = $14,863

The estimated gross expenditures in Muskegon County of Muskegon non-resident foul-hook anglers were:

322 angler days X $7.25 per angler day = $2,335

All the anglers interviewed felt the local businesses provided adequate services and facilities. One percent of all foul-hook anglers felt prices in general in the Muskegon area were higher than elsewhere (zero percent for non-residents), 4% felt they were lower (25% for non-residents), and 95% felt they were the same (75% for non-residents). All the anglers interviewed felt the government agencies involved provided adequate services and facilities.

When asked to apportion their purpose for fishing between "sport" or "food", Muskegon foul-hook anglers' average responses were 50% for "sport" and 50% for "food". All of the anglers were

fishing for salmon and their average catch rate was 1.6 fish per angler day. Chinook salmon comprised 95% of the catch.

Males comprised 86% of all the anglers interviewed, with 72% of the anglers saying their spouse accompanied them an average of 59% of the time. The average angler age was 32 years, and the relative percentages for a range of foul-hook angler incomes are listed in Table 39.

Table 39. Muskegon foul-hook anglers' incomes.

Income Range	% of interviewed anglers
$0 - $4,999	5%
$5,000 - $9,999	26%
$10,000 - $14,999	19%
$15,000 - $19,999	28%
$20,000 - $24,999	14%
$25,000 - $29,999	2%
$30,000 - $34,999	2%
$35,000 - $39,999	2%
$40,000 - up	2%

CHARTER FISHING

Charter captains in Muskegon and Ottawa Counties were asked to help gather information for this study. Although many agreed to cooperate, only the captains in Grand Haven actually interviewed enough clients. However, some of the captains in Muskegon and Whitehall/Montague did provide us with estimates of the total number of clients they booked during the 1982 season, which helped us estimate expenditures for that area based on Grand Haven estimates.

Grand Haven's charter boat fleet has conducted surveys of its clientele for the past two fishing seasons. Charter captains used our questionnaire to ask their clients where they were from, how many days they planned to stay in the area, what percentage of their trip was for the purpose of fishing, and what their local expenditures were for a variety of goods and services.

We suggested the captains interview each client separately during the 1981 season. However, the captains were reluctant to interview each client, and in most cases either interviewed the whole party as a unit, or interviewed the person who had spent the most money. Although we were reluctant to interview parties because it would reduce the statistical variance of our sample, we did not want to lose the captains' cooperation. Therefore, we agreed to a party interview for the 1982 season, and assigned the average of party expenditures to each angler in the party for both the 1981 and 1982 samples. Our 1981 sample size was 180 anglers and 1982 sample size was 319 anglers. The 1982 sample was greater because some large corporate charters were included.

Table 40 itemizes the average expenditures of Grand Haven charter clients for a number of goods and services for both seasons. The percentage in parentheses after each estimated expenditure is the statistical confidence interval. Muskegon and Whitehall/Montague estimates are based on 1982 Grand Haven expenditure levels.

Six of Muskegon's charter captains and one Whitehall/Montague charter captain gave us the number of clients they took fishing in 1982. We used only their figures in estimating the impacts of charter fishing in Muskegon County. Muskegon's responding captains had 997 clients, and the cooperative captain in Whitehall/Montague had 136 clients. Although other charter captains did not respond, Charles Pistis, the District Sea Grant agent, informed us that the responding captains book the majority of the area's charter clients.

Table 40. Grand Haven non-resident charter anglers' average daily expenditures in Ottawa County.

Category	1981		1982	
Charter fee	27.90	(12.4%)	31.43	(5.1%)
Licenses	2.15	(20.0%)	1.28	(20.6%)
Lodging	5.40	(23.3%)	6.65	(12.2%)
Restaurants	6.24	(16.3%)	5.35	(7.6%)
Groceries	2.33	(30.6%)	1.42	(15.9%)
Beer and Liqour	--	--	1.39	(15.6%)
Entertainment	1.63	(25.3%)	.74	(25.6%)
Vehicle gas	2.88	(25.6%)	2.16	(10.8%)
Family shopping	2.75	(53.0%)	.53	(33.8%)
Miscellaneous	.68	(57.5%)	.64	(23.2%)
Total	52.13	(10.4%)	51.59	(4.2%)
Average length of stay	2.167 days		1.953 days	

Charter angler expenditures calculations

Muskegon:

$$\frac{51.59}{\text{day}} \times \frac{1.953 \text{ days}}{\text{client}} \times 997 \text{ clients} = \$100,453$$

Whitehall/Montague:

$$\frac{51.59}{\text{day}} \times \frac{1.953 \text{ days}}{\text{client}} \times 136 \text{ clients} = \$13,703$$

ARTIFICIAL REEF FISHING

The Hamilton artificial reef was of particular interest because it presented an opportunity to analyze the impacts of a new fishing site. What we found has shown, at least from an economic impact standpoint, that location with respect to other substitutes can control the economic impacts associated with a fishery resource. The problem with the Hamilton reef is that the best fishery it will ever provide might be no better than that which is already available within a mile of it. Salmon anglers will always regard it as just another area to troll by and the majority of perch anglers will never fish the reef because fishing is just as good and oftentimes much safer within the confines of Muskegon Lake. Unless the reef stimulates an even better fishery, it will be useless to anglers. Its main value might be to help plan for possible reefs elsewhere.

Of all the boat anglers we interviewed in Muskegon County, only one had fished the reef on the day we interviewed him. That represents only 0.165% of the boat angler days we sampled. Although 25% of the boat anglers we talked to said they had fished the reef in the past, we could not estimate reef use from this information. We knew from our interviewers that many of the anglers had been interviewed multiple times, and this would have upwardly biased our estimate of use. Since angler days are our sample unit, our only option was to base our estimate on the one interview as a proportion of our total sample.

As a proportion of the total boat angler use and expenditures from Muskegon and Whitehall/Montague, we estimate the Hamilton reef accounted for 215 angler days and $2,392. Those figures are not in addition to the total boat figures, but are simply a portion of them. That is why the impacts from the reef were not listed in the Summary.

SECONDARY IMPACTS

The economic impact of angling is not limited to the direct expenditures of anglers. The money they spend has a multiplying effect as it circulates through the local economy. Money initially spent by anglers adds to the gross revenue received by local merchants. The merchants in turn spend some of their revenue locally and some elsewhere. That local respending becomes part of other merchants' gross revenue, and so on. Successive rounds of spending, beginning with the anglers and continuing with community merchants will in effect multiply the impact of anglers' original expenditures.

The scale of this multiplier effect depends on a number of factors, including the mix of businesses (i.e., manufacturing-service-retail ratios), their integration (i.e., manufacturing-distributing-retailing-servicing linkages), and the distribution of the original spending across area businesses. Depending on the scale of those factors, successive proportions of the income the counties receive as angler expenditures will leave the area as payment for imported goods and services.

Since we were not able to empirically estimate multipliers for Muskegon County, we will use a multiplier from the literature. Kalter and Lord (1968) estimated a multiplier of 1.5 for a rural area in Wisconsin. Because Muskegon County is not strictly rural, and because it resembles in its basic industry mix the situation in Manistee county, we will use a multiplier of 2.0, which is conservatively less than all the multipliers estimated by Diamond and Chappelle (1981) for the Manistee economy. In Table 41 we first multiply non-resident anglers' expenditures by 2.0 to estimate total direct and indirect gross revenue in Muskegon County attributable to non-resident angling.

Personal income can be estimated from gross revenue. Pearse and Laub (1969) and Kalter and Lord (1968) found personal income

to range from 28% to 51% of gross revenue. We selected an intermediate value of 35%.

Table 41. Estimated gross revenue and personal income attributable to non-resident angler expenditures in Muskegon County.

Angler Expenditures		Multiplier		Gross Revenue
$577,878	X	2.00	=	$1,155,756

Gross Revenue		Personal Income Component		Personal Income
$1,155,756	X	0.35	=	$404,515

RECOMMENDATIONS

One of our most notable findings in Muskegon County was that so few of the anglers were non-residents. We found the largest proportion of non-residents among boat anglers in Whitehall/Montague (25%). Of those, 60% came from adjacent counties (Oceana, Newaygo and Kent). This contrasts with our findings in Ottawa County, where in Grand Haven alone, over 50% of the pier, boat and bayou anglers were non-residents.

As we mentioned earlier, a large percentage of resident anglers implies short trips and low expenditures. That translates into a smaller economic impact - $0.6 million in Muskegon County as compared to $2.5 million in Ottawa County. A county could expand its economy relatively quickly by attracting anglers from farther away, and encouraging them to stay longer and come more often.

Alcona and Ottawa Counties were characterized by large non-resident angler expenditures. Many factors in both counties account for the large numbers of non-resident anglers. Muskegon County could develop some of these same attributes, although some other attributes are controlled by other authorities, such as DNR control of fish stocking. Other attributes cannot be easily changed, such as county location, the current layout of infrastructure and the amount and quality of natural resources.

Tourists have long been attracted to Alcona County. Many tourists prefer Alcona's "small town" coastal communities to more urban areas. When salmon fishing became available, non-residents readily participated. Great Lakes fishing opportunities are never more than three blocks off the main thoroughfare. The ease of discovery and convenient access more than made up for the earlier lack of sophisticated facilities. Consistant annual plantings of large numbers of chinook salmon (250 to 300 thousand) and lake trout have also maintained an attractive fishery.

Ottawa County also benefits from some factors not easily duplicated in Muskegon County, and specifically in Muskegon. First, the Grand River, which empties into Lake Michigan at Grand Haven, flows through Grand Rapids and Lansing. Close to one million salmon and steelhead are planted there each year to serve these urban areas. Anglers in Grand Rapids, Lansing and other areas are aware of these fish, and logically assume that one of the better places to catch them is downstream at Grand Haven.

Second, Ottawa County has historically attracted Great Lakes boaters. Many boaters are non-residents, and they easily took up salmon and trout fishing. Especially in Grand Haven, a visitor almost cannot help but be exposed to Great Lakes fishing. The main street in town ends at the municipal marina, and from there a short drive along the Grand River leads to the beach and pier.

All of these factors attract non-resident anglers to Ottawa and Alcona Counties. These would be difficult or impossible to duplicate in Muskegon County, except in the Whitehall/Montague area. The Whitehall/Montague area represents a latent opportunity. It had a significant tourist clientele in the recent past. However, Whitehall/Montague's past toxic waste problem is a serious "black-eye". Apparently the fish available there are now as safe to eat as fish caught anywhere else on Lake Michigan, but the stigma remains. It is simply a matter of working hard to rebuild a credible reputation.

Muskegon could easily implement several features we observed in Alcona and Ottawa, at the same time realizing it should emphasize its own uniqueness rather than trying to duplicate other areas. First they could identify and aggressively market out-of-state their most productive fisheries. In Alcona County we found that over 16% of all the fall salmon anglers came from a three-county region around Toledo, Ohio. Apparently in 1975 an outdoor sports writer from that area of Ohio was so impressed with the fishing in Harrisville that he wrote a series of full page articles with very convincing pictures in the local newspaper. Many anglers from that area have returned each year for the fall fishery. What happened in Harrisville by chance, could happen by design in Muskegon. The most promising fisheries to market would

be Muskegon's fall salmon fishery and, possibly soon, the walleye fishery on Muskegon Lake.

Second, better directional signs would help accomodate visitors. Muskegon was obviously not designed with fishing in mind. Consider the following extreme scenario. A person coming in from the south might first of all be lured by Mona Lake, which would lead him into a large residential area. If he is fortunate, he may be able to extricate himself from that area within an hour. If he were oblivious or wise enough to have missed Mona Lake and made it into downtown Muskegon, he would not know Laketon Street would take him to the Pere Marquette pier, or that Southern Street would take him to the Hartshorn launch and marina. As he roars out the north end of town at 45 MPH he might be lucky enough to notice the Giddings Street launch in that "picturesque" end of town. If he misses that, the looming Cobb power plant will almost certainly scare him back out onto US-31 where he will certainly be wondering, "they fish in this town?". All levity aside, a few well placed signs along Seaway Drive would eliminate countless frustrations (we know from personal experience).

Third, Muskegon could develop additional events and facilities to augment an angler's (and family) experience on a fishing trip to Muskegon. Attractions along the lines of the Seaway Festival and the causeway improvements will more firmly establish a unique marketable identity for Muskegon. Attractions which bring the public near the area's fishing sites are most likely to encourage angling. Again, the Seaway Festival and the causeway improvements are good examples, as are the Coast Guard Festival and the Singing Fountain in Grand Haven.

Therefore, we believe the two key elements for increasing sport fishing's economic impact on the Muskegon economy are developing unique fishing-related attributes which appeal both to an angler and his/her family, and aggressively marketing (primarily out-of-state) those attributes.

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APPENDIX A

Angler Comments

Table A1. Additional Muskegon ice angler comments.

1. Stop the gillnetting.
2. Continue to improve the water quality.
3. Conservation officers should patrol fishing areas more.
4. Establish weed beds around the yacht harbor.
5. Area needs more artificial reefs.
6. City of Muskegon is not concerned about fishermen.
7. DNR should sell the sportsman's license again.
8. Need wider launching ramps at Hartshorn Marina.
9. Need more access along the south shore.
10. Need longer docks at Hartshorn launching ramps.

Table A2. Additional Whitehall/Montague ice angler comments.

1. Need more fish habitat improvement.
2. Need an artificial reef.
3. DNR should enforce dumping regulations.
4. Need more campgrounds in area.
5. Stop the camping at the public launch site.
6. Need fish cleaning facilities at the launch site.
7. Conservation officers should patrol more often.
8. Enforce the boat speed limit in the channel.
9. Licenses cost too much.
10. Plant more steelhead.
11. DNR should spend more money on inland lakes management.
12. Need a restroom on the pier.
13. Fill in the pier with rocks.
14. Keep boats away from the channel wall.

Table A3. Additional Muskegon pier angler comments.

1. An open restaurant is needed close to the yacht harbor.
2. Muskegon needs more good restaurants.
3. Need more boat rentals.
4. Does not like the commercial exploitation of salmon eggs.

Table A3 continued:

5. Fix up Pere Marquette Park and add lifeguards.
6. Need a marina near the pier.
7. Need a creel limit on perch.
8. Allow beer in Pere Marquette Park.
9. Fishing reef should have been closer to the pier.
10. Need winter parking at yacht harbor.
11. Need longer docks at Hartshorn launch.
12. Should close the pier during foul weather.
13. Unnecessary to install fence on pier every year.
14. Continue to improve the water quality.
15. Parking enforcement is too strict at Pere Marquette Park.
16. Widen the pier.
17. Do not dump sand by the pier.
18. Put better bathrooms near the pier.
19. Need more public access for shore fishermen.
20. Keep bicyclists off the pier.
21. Need more trash cans near the pier.
22. Need police to patrol pier at times.
23. Need more parking at Hartshorn launch ramp.
24. Licenses cost too much.
25. City of Muskegon needs to provide more outdoor facilities.
26. Need more access on Muskegon River.

Table A4. Additional Whitehall/Montague pier angler comments.

1. Keep boats away from the pier.
2. Establish more legal snagging areas.
3. Promote tourism.
4. Plant more walleye.
5. People in the area are nice.
6. The fishing is good in Whitehall/Montague.
7. DNR sold out to Hooker Chemical.

Table A5. Additional Muskegon boat angler comments.

1. Need a bait shop close to Hartshorn Marina.
2. No restaurants were open Labor Day morning.
3. Pave Hartshorn launch road.
4. Need rocks on both sides of the Pere Marquette pier.
5. Need more parking at Cottage Grove ramp.
6. Need more dockage at all launch sites.
7. Improve the ramp at Second St.
8. Need fish cleaning facilities at the launch sites.
9. Launch areas need to be lighted at night.
10. Artificial reef should be farther from shore.
11. Mark the reef better.
12. Need better bathrooms at launch sites.
13. Allow beer in Pere Marquette Park.
14. Muskegon does not maintain Giddings launch very well.
15. Allow snagging along the whole length of Muskegon River.
16. Parking enforcement too strict at Pere Marquette Park.
17. The area has poor fishing.
18. The best downriggers in the nation are made in Muskegon.
19. Likes the Hartshorn facility.

Table A6. Additional Whitehall/Montague boat angler comments.

1. Bait shops need to open earlier.
2. Need better security at the Montague launch.
3. Need more activities for the family.
4. Keep restrooms unlocked at Montague launch.
5. Restock perch.
6. Get rid of Hooker Chemical.
7. Too many carp and dogfish.
8. Have a $1 annual launch fee for senior citizens.
9. DNR should spend more money on inland lakes management.
10. Need electrical outlets at Montague launch.
11. Need a fish carcass disposal similar to Ludington's.
12. The fish were smaller this year.

APPENDIX B

The following sample statistics describe angler expenditures in Muskegon County. Statistics for all anglers are listed first, followed by non-resident angler statistics in parenthesis. Listed are the sample mean, the standard deviation, the standard error of the mean, the 95% confidence interval of the mean and the measure of skewness of the distribution.

A large proportion of anglers do not purchase any particular good or service within the time constraints of one trip. Therefore, most categories of goods and services have many observations of zero expenditures. This causes strongly positive estimates of skewness, meaning the frequency curve of most expenditures is asymmetric to the right. Often, researchers transform data (for a large number of observations of zero, a log transformation is usually appropriate) to reduce the skewness. We did not transform our data however, because we were not so much interested in approximating a normal distribution as we were in determining the actual sample means. Therefore, most of our sample statistics show large measures of skewness and variability in anglers' expenditures.

Table B1. County expenditure statistics for Muskegon ice angling. Sample size = 82 (non-resident = 19).

Expenditure	Mean	Std. Dev.	Std. Err.	95% C.I.	Skew.
1. Major equip.	0.61	5.52	0.61	-.60 - 1.82	9.06
2. Small equip.	1.94 (1.90)	2.32 (2.18)	0.26 (0.50)	1.43 - 2.45 (.84 - 2.95)	1.1 (0.94)
3. Restaurants	0.61 (1.84)	2.14 (3.93)	0.24 (0.90)	.14 - 1.08 (-.05 - 3.74)	4.75 (2.54)
4. Groceries	0.49 (0.21)	1.53 (0.92)	0.17 (0.21)	.15 - .83 (-.23 - .65)	3.99 (4.36)
5. Beer	0.59 (0.26)	2.07 (1.15)	0.23 (0.26)	.13 - 1.04 (-.29 - .82)	4.97 (4.36)
6. Vehicle gas	1.07 (0.74)	1.58 (1.88)	0.17 (0.43)	.72 - 1.42 (-.17 - 1.64)	2.20 (2.67)
7. Misc.	0.23 (0.79)	0.96 (1.87)	0.11 (0.43)	.02 - .44 (-.11 - 1.69)	4.67 (2.04)
Total	5.54 (5.74)	8.27 (8.11)	0.91 (1.86)	3.26 - 6.89 (1.61 - 9.44)	4.55 (2.66)

Table B2. County expenditure statistics for Whitehall/Montague ice angling. Sample size = 86 (non-resident = 20).

Expenditure	Mean	Std. Dev.	Std. Err.	95% C.I.	Skew.
1. Major equip.	0.76	7.01	0.76	-.80 - 2.32	9.11
2. Small equip.	2.22 (2.20)	2.16 (2.02)	0.23 (0.45)	1.75 - 2.71 (1.27 - 3.13)	1.5 (1.10)
3. Restaurants	0.71 (1.10)	2.23 (2.49)	0.24 (0.56)	.23 - 1.22 (-.05 - 2.25)	3.59 (2.63)
4. Groceries	0.35	1.32	0.14	.06 - .64	4.06
5. Beer	0.76 (0.15)	1.98 (0.67)	0.21 (0.15)	.33 - 1.21 (-.16 - .46)	2.68 (4.13)
6. Vehicle gas	2.32 (2.00)	2.18 (2.15)	0.24 (0.48)	1.84 - 2.81 (1.01 - 2.99)	1.13 (0.39)
7. Misc.	0.17 (0.35)	0.54 (0.81)	0.32 (0.13)	.06 - .29 (-.03 - .73)	3.37 (2.31)
Total	7.29 (5.80)	11.80 (5.08)	1.27 (1.14)	4.70 - 9.95 (3.45 - 8.15)	4.45 (1.24)

Table B3. County expenditure statistics for Muskegon pier angling. Sample size = 199 (non-resident = 14).

Expenditure	Mean	Std. Dev.	Std. Err.	95% C.I.	Skew.
1. Major equip.	0.26	2.79	0.20	-.13 - .65	11.67
2. Small equip.	1.71	2.80	0.20	1.32 - 2.10	5.82
	(0.54)	(1.01)	(0.27)	(-.04 - 1.12)	(3.73)
3. Licenses	1.15	3.62	0.26	.64 - 1.66	3.14
	(1.07)	(4.01)	(1.07)	(-1.24 - 3.37)	(3.74)
4. Launch fees	0.01	0.18	0.01	-.01 - .04	14.11
	(0.18)	(0.67)	(0.18)	(-.21 - .56)	(3.74)
5. Camping	0.02	0.28	0.02	-.02 - .06	14.11
6. Lodging	0.15	2.13	0.15	-.15 - .45	14.11
	(2.14)	(8.02)	(2.14)	(-2.49 - 6.77)	(3.74)
7. Restaurants	0.57	2.80	0.20	.18 - .96	8.01
	(2.26)	(4.51)	(1.21)	(-.20 - 4.78)	(2.10)
8. Groceries	0.70	6.01	0.43	.23 - 1.91	10.69
	(0.36)	(1.08)	(0.29)	(-.24 - .95)	(3.03)
9. Beer	0.23	1.20	0.09	.07 - .40	6.79
	(0.54)	(2.00)	(0.54)	(-.62 - 1.69)	(3.74)
10. Vehicle gas	2.31	3.16	0.22	1.87 - 2.75	3.86
	(5.50)	(7.66)	(2.05)	(1.07 - 9.92)	(1.16)
11. Misc.	0.13	0.63	0.05	.05 - .22	8.64
	(0.54)	(2.00)	(0.54)	(-.62 - 1.69)	(3.74)
12. Fam. spend.	0.08	0.79	0.06	-.04 - .19	11.31
	(1.07)	(2.90)	(0.77)	(-.60 - 2.74)	(2.80)
Total	6.26	9.99	0.71	5.23 - 8.02	4.01
	(8.53)	(11.57)	(3.09)	(2.26 - 15.02)	(1.53)

Table B4. County expenditure statistics for Whitehall/Montague pier angling. Sample size = 91 (non-resident = 8).

Expenditure	Mean	Std. Dev.	Std. Err.	95% C.I.	Skew.
1. Small equip.	1.57	1.74	0.18	1.21 - 1.94	1.35
	(1.14)	(1.54)	(0.54)	(-.14 - 2.43)	(0.64)
2. Restaurants	0.24	1.09	0.11	.14 - .47	4.70
	(0.02)	(0.05)	(0.02)	(-.02 - .06)	(2.83)
3. Groceries	1.25	1.33	0.14	.98 - 1.53	0.70
	(0.76)	(1.75)	(0.62)	(-.70 - 2.22)	(2.63)

Table B4 continued:

Expenditure	Mean	Std. Dev.	Std. Err.	95% C.I.	Skew.
4. Beer	0.27 (1.10)	0.99 (2.16)	0.09 (0.76)	.07 - .48 (-.71 - 2.91)	3.91 (2.14)
5. Vehicle gas	3.27 (0.11)	3.97 (0.23)	0.42 (0.08)	2.44 - 4.09 (-.08 - .30)	1.39 (2.04)
6. Misc.	0.15	0.79	0.08	-.01 - .32	7.67
Total	6.75 (3.13)	6.17 (3.37)	0.54 (1.19)	5.67 - 7.83 (-.48 - 5.20)	0.68 (1.33)

Table B5. County expenditure statistics for Muskegon boat angling. Sample size = 275 (non-resident = 44).

Expenditure	Mean	Std. Dev.	Std. Error	95% C.I.	Skew.
1. Major equip.	0.50 (0.49)	4.28 (3.27)	0.26 (0.49)	-.01 - 1.01 (-.50 - 1.49)	9.24 (6.63)
2. Small equip.	0.80 (1.02)	2.39 (4.28)	0.14 (0.65)	.52 - 1.09 (-.28 - 2.32)	5.62 (4.79)
3. Licenses	0.16 (0.83)	1.29 (3.08)	0.08 (0.46)	.00 - .31 (-.11 - 1.77)	10.50 (4.29)
4. Slip fees	0.33 (0.02)	8.35 (0.08)	0.50 (0.01)	-.23 - 1.76 (.00 - .04)	15.34 (3.55)
5. Launch fees	0.33 (0.44)	1.86 (2.30)	0.11 (0.35)	.11 - .55 (-.26 - 1.14)	7.28 (6.22)
6. Boat gas	3.27 (2.98)	4.50 (5.14)	0.27 (0.78)	2.74 - 3.80 (1.42 - 4.55)	1.12 (2.43)
7. Camping	0.07 (0.41)	1.52 (2.37)	0.09 (0.36)	-.11 - .25 (-.29 - 1.11)	9.43 (6.53)
8. Lodging	0.12 (0.73)	1.93 (4.82)	0.12 (0.73)	-.11 - .35 (-.74 - 2.19)	16.58 (6.63)
9. Restaurants	0.22 (0.86)	1.14 (1.98)	0.07 (0.30)	.08 - .36 (.25 - 1.46)	6.23 (2.73)
10. Groceries	0.64 (0.04)	1.43 (0.14)	0.09 (0.02)	.47 - .81 (.00 - .08)	3.91 (4.46)
11. Beer	0.54 (0.06)	3.57 (0.23)	0.22 (0.04)	.11 - .96 (-.01 - .14)	12.72 (4.36)
12. Vehicle gas	2.40 (4.38)	4.14 (6.82)	0.25 (1.03)	1.91 - 2.89 (2.30 - 6.45)	2.90 (1.58)

Table B5 continued:

Expenditure	Mean	Std. Dev.	Std. Error	95% C.I.	Skew.
13. Misc.	0.06 (0.05)	0.31 (0.30)	0.02 (0.05)	.02 - .10 (-.05 - .14)	6.30 (6.63)
14. Fam. spend.	0.01 (0.04)	0.12 (0.25)	0.01 (0.04)	-.01 - .02 (-.04 - .11)	12.67 (6.63)
Total	8.54 (12.31)	11.28 (15.73)	0.68 (2.37)	7.21 - 9.87 (7.12 - 16.68)	4.41 (1.90)

Table B6. County expenditure statistics for Whitehall/Montague boat angling. Sample size = 332 (non-resident = 84).

Expenditure	Mean	Std. Dev.	Std. Error	95% C.I.	Skew.
1. Major equip.	0.22 (0.19)	2.30 (1.40)	0.13 (0.15)	-.03 - .46 (-.12 - .49)	11.86 (8.52)
2. Small equip.	0.75 (1.50)	2.94 (4.09)	0.16 (0.45)	.43 - 1.07 (.61 - 2.39)	5.69 (2.71)
3. Licenses	0.19 (0.47)	0.93 (1.50)	0.05 (0.16)	.09 - .29 (.14 - .79)	5.11 (3.23)
4. Slip fees	0.25 (0.07)	1.34 (0.28)	0.07 (0.03)	.11 - .39 (.01 - .13)	7.14 (6.51)
5. Launch fees	2.41 (3.69)	4.02 (4.29)	0.22 (0.47)	1.97 - 2.84 (2.75 - 4.62)	1.29 (0.70)
6. Boat gas	4.06 (4.61)	6.11 (6.12)	0.34 (0.67)	3.40 - 4.72 (3.28 - 5.94)	3.36 (2.63)
7. Lodging	0.11 (0.54)	1.36 (2.69)	0.07 (0.29)	-.04 - .25 (-.03 - 1.11)	13.28 (6.60)
9. Restaurants	0.53 (1.73)	2.58 (4.72)	0.14 (0.52)	.25 - .81 (.71 - 2.76)	5.95 (3.01)
10. Groceries	1.39 (0.81)	2.44 (2.70)	0.13 (0.29)	1.12 - 1.65 (.23 - 1.40)	2.62 (4.08)
11. Beer	0.81 (0.70)	2.12 (1.89)	0.12 (0.21)	.58 - 1.04 (.29 - 1.11)	3.01 (3.30)
12. Vehicle gas	4.49 (5.14)	9.01 (5.47)	0.49 (0.60)	3.51 - 5.46 (3.97 - 6.31)	5.21 (3.14)

Table B6 continued:

Expenditure	Mean	Std. Dev.	Std. Error	95% C.I.	Skew.
13. Misc.	0.42 (0.94)	1.30 (2.08)	0.07 (0.23)	.28 - .56 (.49 - 1.39)	4.88 (3.27)
Total	15.63 (20.39)	17.17 (22.81)	0.94 (2.50)	13.79 - 17.47 (15.49 - 25.29)	3.29 (2.32)

Table B7. County expenditure statistics for Muskegon foul-hook angling. Sample size = 107 (non-resident = 16).

Expenditure	Mean	Std. Dev.	Std. Error	95% C.I.	Skew.
1. Small equip.	1.08 (0.44)	2.01 (0.96)	0.19 (0.24)	.70 - 1.47 (-.08 - .95)	3.87 (1.99)
2. Groceries	2.26 (2.56)	2.09 (1.71)	0.20 (0.43)	1.86 - 2.66 (1.65 - 3.47)	2.27 (0.33)
3. Beer	0.79 (1.31)	1.93 (2.55)	0.19 (0.64)	.43 - 1.16 (-.05 - 2.67)	2.60 (1.84)
4. Vehicle gas	2.78 (2.94)	3.68 (3.66)	0.36 (0.92)	2.08 - 3.48 (1.14 - 4.74)	2.37 (1.07)
Total	6.91 (7.25)	4.80 (4.56)	0.46 (1.14)	6.00 - 7.82 (5.02 - 9.48)	2.01 (1.02)

APPENDIX C

Survey Questionnaires

ANGLER QUESTIONNAIRE

Keypunch number _____

For shore, pier, or ice fishing:
If first interview write "start", if last interview, note number of anglers left _____

Number of anglers skipped _____

1. Site _____ (1) (2)

2. Type of fishing _____ (ice,pier,boat,marina,shore) (3) (4)

3. Day of week (weekday = 1, weekend or holiday = 2) (5)

4. Month/Day (6) (7) / (8) (9)

5. How many fish have you caught today? (10) (11)
Number of each species:

Coho ___ (12) Chinook ___ (13) Lake trout ___ (14) Steelhead ___ (15) Brown trout ___ (16) LM Bass ___ (17)

SMBass ___ (18) N.Pike ___ (19) Musky ___ (20) Walleye ___ (21) Perch ___ (22) (23) Bluegill ___ (24) (25)

Panfish ___ (26) (27) Other _____ (28) (29)

6. How many hours do you plan on fishing today? (30) (31)
(Do not ask boat fishermen this question.)

7. Where are you from? County _____ (32) (33)

State _____ (34) (35)

8. How many miles is it from your home to here? (36) (37) (38) (39)
(Double the miles answered and enter)

9. Is this strictly a fishing trip from home? If "yes", enter 100, if not ask, "Percentage-wise, how much is the purpose of your trip for fishing?" (40) (41) (42)

10. Are you in this county only to fish? If "yes", enter 100, if not ask, "Percentage-wise, how much is your purpose in this county to fish?" (43) (44) (45)

11. If you could split the purpose of your fishing between doing it "for the sport", or for the food, what % would you assign sport? (46) (47) (48)

12. How did you learn about the fishing here? _____ (49) (50)

13. Have you fished in this county before? (yes = 1, no = blank) (51)

14. Will you fish here again? (maybe=2) (52)

15. How many times in a year do you fish in this county? (53) (54) (55)
For shanty anglers, "How many times do you plan to use the shanty?

16. What time or season of the year do you do most of your fishing? _____ (56)

17. If angler is not here just to fish, "What are two other purposes for this trip"? _____ _____ (57) (58)

(59) (60)

18. What species of fish are you particularly trying to catch today? ____61____62

19. For one interview in a boat group, " How long is the boat?" ____63____64

20. For boat and shanty groups, " How many in the party fished?" ____65____66

21. How many days will you be fishing in this county on this trip? ____67____68

22. If staying overnight, " What accomodations do you have?" ____69____70

---

23. Is the angler snagging? ___71___ % of fishing devoted to snagging? ____72____73____74

24. How many days will this trip last? ___75___76 Shanty angler? ___74 2nd card

25. How many hours have you already fished today? ____75____76 2nd card

26. For one interview in a boat group, "What body of water did you just fish on? ___71___

EXPENDITURES - For this trip	Home			En route			This county		
A Major fishing equipment (rods, reels downriggers)	1	2	3	4	5	6	7	8	9
B Small fishing equipment (line lures, bait)	10	11	12	13	14	15	16	17	18
C Fishing license	19	20	21	22	23	24	25	26	27
D Boat rentals	28	29	30	31	32	33	34	35	36
E Slip fees	37	38	39	40	41	42	43	44	45
F Launching fees	55	56	57	58	59	60	61	62	63
G Boat gas, oil, etc	64	65	66	67	68	69	70	71	72
H Camping and parking fees	1	2	3	4	5	6	7	8	9
I Lodging	10	11	12	13	14	15	16	17	18
J Restaurants	19	20	21	22	23	24	25	26	27
K Grocery food and snacks	28	29	30	31	32	33	34	35	36
L Beer	37	38	39	40	41	42	43	44	45
M Vehicle gas, oil etc	46	47	48	49	50	51	52	53	54
N Miscellaneous cigs, sundries, entertainment, etc)	55	56	57	58	59	60	61	62	63
O Family spending	64	65	66	67	68	69	70	71	72

24 Are the prices businesses charge in this county on the average more, less or the same as you would expect to pay elsewhere? (more = 1, less = 2, same = 3)

25. Do you think the businesses here provide adequate services and facilities for you? (yes = 1, no = blank)

26. If no, list your suggestions for improvement?

1 _____

2 _____

3 _____

4 _____

5 _____

27 Do you think the government agencies here provide adequate facilities and services for you?

28 If no, list your suggestions for improvement?

1 _____

2 _____

3 _____

4 _____

5 _____

29 Was there any information you needed about this area, but could not find? _____

30 Any other comments about what you either like or don't like about fishing here?

1 _____

2 _____

3 _____

4 _____

5 _____

31 Are you married?

32 If so, what percentage of the time does your spouse accompany you?

33 When spouse or family are here with you, what are they doing while you fish? _____

34 Age _____

35. Sex (M=1, F=2) _____

36 Income $ _____

CHARTER ANGLER QUESTIONNAIRE

Month Day Year

1 2 3 4 5 6

If this interveiw is for a party, number in party. 7 8

1. What state and county are you from?

State_____ County_____ 9 10 11 12

2. How many miles is it from your home to here? 13 14 15 16

3. How many days do you plan on staying in this area? 17 18

4. Percentage-wise, how much is the purpose of your trip for fishing in this area? 19 20 21

5. How many fish did you/the party catch today? 22 23

EXPENDITURES FOR THIS TRIP AND IN THIS AREA

A. Charter fee and tips. 24 25 26 27

B. Fishing licenses. 28 29 30 31

C. Camping fees. 32 33 34 35

D. Lodging. 36 37 38 39

E. Restaurants. 40 41 42 43

F. Grocery food and snacks. 44 45 46 47

G Beer, liquor, and bar. 48 49 50 51

H. Vehicle gas, oil, and etc. 52 53 54 55

I. Entertainment. 56 57 58 59

J. Fishing equipment 60 61 62 63

K Family shopping. 64 65 66 67

L. Miscellaneous. 68 69 70 71

6. Port where interview conducted?

_____ 73 74 75

7. Interview number (do not fill in) 77 77 79 80

Muskegon-Ottawa Sport Fishing Economic Impact Business Survey

The counties of Muskegon and Ottawa in conjunction with Michigan State University have been conducting a year-long investigation of the economic impacts of sport fishing in this area. Teams of interviewers have been making personal surveys of anglers, questioning them about their fishing trip expenditures and the perceptions they have of their fishing experience in the two counties. From the angler interviews MSU researchers expect to estimate the total gross expenditures of Great Lakes sport fishermen in this area for various categories of purchases.

An important aspect of the analysis is to estimate the economic impacts of the subsequent respending of angler dollars by businesses in Muskegon and Ottawa counties. While anglers' initial purchases generate income and employment for the local economy, the local goods and services businesses purchase with angler dollars translates into additional income and employment. Depending on the type of business, the secondary income and employment effects oftentimes exceed the impacts associated with the initial expenditures. Therefore, to ignore the secondary effects would be to grossly underestimate the economic impacts of sport fishing in the two counties.

If you believe your business is never patronized by anglers, please *do not* complete or mail in this questionnaire. However, if anglers represent all or part of your clientele, your cooperation in fully answering the following questions will help give Muskegon and Ottawa counties the best available information on the importance of Great Lakes sport fishing to the area's economy. At no time will the confidentiality of an individual be compromised. A copy of all the findings will be available to anyone interested through the Muskegon and Ottawa Cooperative Extension offices after the first of next year.

1. Circle the county your business is in: MUSKEGON OTTAWA
   If your business is in neither, please disregard this questionnaire. If you have business operations in both counties, please circle the county where the business offices are to which this questionnaire was sent.

   The following questions should be answered in regard to your business operations which occur solely within the above circled county.

2. What were your total sales of all your products in 1981 from your business operations? $ _____

3. Please list your major products and/or services and what percentage each was of total sales in 1981.

Product or Service	Percentage of Total Sales
1. _____	_____%
2. _____	_____%
3. _____	_____%
4. _____	_____%
5. _____	_____%

4. What was your total average monthly employment during 1981? Please estimate in terms of "full-time equivalents", e.g., two half-time employees would equal one full-time employee. _____ employees.

5. What percentage of your total sales would you attribute to anglers' purchases? _____%

6. What were your purchases and expenditures from the industry groups listed below?
   Please write your answers as a percentage of total sales from your business operations. If your purchases are from wholesalers or retailers who bought the products from others, please write the percentages of total sales under the industry group that acutally made the product. Please put an "X" next to purchases which passed through a wholesaler or retailer. Purchases from a wholesaler or retailer which cannot be traced to an industry of origin should be placed under group 21, Wholesale and Retail Trade. In addition, it is important to identify the portion of your purchases from industry groups in your county. If you do not provide an estimate, we will assume all your purchases from that group are imported into the county. The only purchases we would have you exclude are capital expenditures, therefore, the percentages need not add up to 100.

EXAMPLE

Industry Group	Purchases as a Percent of Total Sales	Percent from County Industries
1. Food and Kindred Products	X54%	76%
2. Transportation and Communication	10%	90%

In this example, your business spends 54% of its total sales on Food and Kindred Products, of which 76% is from producers within the county. The "X" indicates these products are mainly bought from a wholesaler. Ten percent of your total sales went for transportation and communication purchases, of which 90% were supplied by industries in your county.

Group	Purchases as a Percentage of Total Sales	Percent from County Industries
1. Agricultural Products and Services	____%	____%
2. Construction	____%	____%
3. Food and Kindred Products	____%	____%
4. Textiles and Apparel	____%	____%
5. Veneer and Plywood	____%	____%
6. Other Lumber and Wood Products	____%	____%
7. Paperboard Containers and Products	____%	____%
8. Converted Paper and Paper Products	____%	____%
9. Other Paper Products	____%	____%
10. Printing, Publishing and Allied Industries	____%	____%
11. Chemicals and Allied Products (Plastics, Synthetics, Drugs, Organics)	____%	____%
12. Petroleum Refined Products	____%	____%
13. Rubber and Leather Products	____%	____%
14. Stone, Clay, Glass & Concrete	____%	____%
15. Fabricated Metal Products	____%	____%
16. Primary Raw Metal Products	____%	____%
17. Miscellaneous Manufacturing Products	____%	____%
18. Transportation and Communication	____%	____%
19. Electrical and Gas Utilities	____%	____%
20. Water and Sanitary Service	____%	____%
21. Wholesale and Retail Trade	____%	____%
22. Finance, Insurance and Real Estate	____%	____%
23. Other Services (Please Specify: _____)	____%	____%
24. Local Government, including taxes	____%	____%
25. Households (labor costs, including fringe benefits)	____%	____%
26. Other Payments (Rent and Profit)	____%	____%

We wish to thank you for completing this questionnaire. Your cooperation has significantly helped in providing a reliable data base for the analysis of the economic impacts of sport fishing in Muskegon and Ottawa counties. Please fold and staple the questionnaire so the return address is showing and mail it at your earliest convenience.

21-2665

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