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ECONOMIC IMPACTS OF SPORT FISHING IN OTTAWA COUNTY:
A STUDY OF THE LAKE MICHIGAN FISHERIES FROM
OCTOBER 1981 TO OCTOBER 1982

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ECONOMIC IMPACTS OF SPORT FISHING IN OTTAWA COUNTY: A STUDY OF THE LAKE MICHIGAN FISHERIES FROM OCTOBER 1981 TO OCTOBER 1982

By

Scott William Jordan

A THESIS

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Dedicated to my wife
Robin

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ABSTRACT

ECONOMIC IMPACTS OF SPORT FISHING IN OTTAWA COUNTY:
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Great Lakes anglers in Ottawa County were personally interviewed to estimate the angling effort, associated spending and related economic and marketing information for ice, shore, pier, boat and charter fishing. Anglers spent an estimated 237,796 days and almost $4.6 million in Ottawa County angling for Great Lakes and nearby fish. Of this, non-resident anglers spent an estimated 101,931 days and almost $2.5 million, generating total Ottawa County sales of over $6 million.

Shore and ice anglers were primarily lower-income local people, whose major concern was adequate access to the fishing. Pier and boat anglers were a composite of all income levels, and were concerned about facility conditions, unrestricted commercial fishing, fish plantings and the lack of conveniently located bait and tackle stores.

The results showed Ottawa County enjoys a high level of Great Lakes anglers' use and expenditures, and that there is potential for future improvements and growth.

INTRODUCTION

At the time of this study Michigan's manufacturing-based economy was in the throes of an economic recession, and the economic contribution of recreation-tourism industries in Michigan took on increasing significance for many localities. While recreation and tourism dollars will probably never replace all the manufacturing jobs and income lost throughout the state during that recession, the economic problems of those years has continued to focus 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. Anglers' expenditures vary, but the economies of many coastal communities depend heavily on this spending. In a prior study of the economic impacts of Great Lakes sport fishing in Alcona County, Michigan (Jordan and Talhelm, 1982), it was found that the local economy was substantially impacted by angler expenditures. 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 Ottawa County and other subsequent studies in the more populous and industrialized areas of Muskegon, Bay and Macomb counties (Jordan and Talhelm, 1983, 1984a, 1984b), it was found that, whereas the total dollar impacts in some instances were several times greater than they were in Alcona County, they comprised a smaller percentage of the much larger overall economies found in those counties.

The Alcona County study was initiated when local businesses became concerned that local residents and government officials incorrectly perceived that Great Lakes sport fishing was of no benefit to Alcona's economy. The results of that study showed Great Lakes anglers spent over $1.3 million per year in Alcona County, and that those dollars were distributed over a wide spectrum of the local business community. From the results of the Alcona study, communities there were able to document and address those issues and problems which were of particular concern both to area residents and the anglers themselves.

Prior to the Alcona study in 1980-81 several researchers conducted investigations of Great Lakes fishing expenditure impacts in Michigan. One study by Fox (1970) was a statewide analysis of salmon and trout anglers in 1967, the second year (there was some fishing for immature "jack" salmon in 1966) that anglers were able to fish for the newly introduced coho salmon Onchorhynchus kisutch. Fox's sample was almost entirely of boat anglers fishing for coho salmon,

and he estimated they had mean expenditures of $931.00 for durable equipment purchased at home (boats, fishing and camping equipment) and mean trip expenditures of $13.00 per day. He made no attempt to estimate angler use, and therefore did not calculate either statewide or regional gross expenditures.

Talhelm (1973a) and Ellefson (1973) estimated that licensed Michigan residents spent $20 million fishing for salmon and steelhead in 1970. Those estimates were updated for inflation and included in the 1979 Status Report of Great Lakes Fishery Values for the Great Lakes Fishery Commission. Also, the 1975 National Hunting and Fishing Survey estimated angler expenditures, and to some extent are applicable on a regional basis to Michigan.

Another regional Great Lakes study by Kapetsky and Ryckman (1973) investigated the economic impacts of the trout and salmon fishery from 1969-1972 on Grand Traverse Bay. They estimated that anglers spent close to $500,000 in the four counties around Grand Traverse Bay in 1972. Since their investigation in 1972, commercial gillnetting apparently has almost completely eliminated the lake trout fishery in Grand Traverse Bay, which in 1972 was the mainstay of the fishery there. In a study of the Grand Traverse Bay sport fisheries (Jordan and Talhelm, 1984c), current impacts were estimated at only $56,000, or one-tenth of the 1972 levels! If the lake trout fishery had not been decimated, gross expenditures would probably have been on

the order of what was found in similar studies done in the adjacent counties of Benzie and Manistee (Jordan and Talhelm, 1984d, 1984e), where in 1983, nonresident impacts were from 40-50 times greater than those found in Grand Traverse County!

Almost ten years had elapsed between the Grand Traverse and Alcona regional studies. During that time, the salmonid fisheries were providing excellent fishing opportunities all over Michigan. Therefore, it was not surprising that soon after the Alcona report 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 studying their Great Lakes fisheries, it presented an excellent opportunity to analyze an area of the state much different from Alcona County.

Ottawa County 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 resource and cultural attractions. The county has been a leader in the state for promoting and encouraging the use of its Lake Michigan fisheries resources, and has a well developed infrastructure for handling the needs of tourists. While the two major communities, Holland and Grand Haven, in Ottawa County are fairly similar in the structure of their economies and general demographics, this study analyzed angling in Holland and Grand Haven separately because

interest groups from each wanted results specific to their city.

The fishing opportunities available in those two cities are much more varied than the stictly 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 Lake Macatawa, the Pigeon River, and the Grand River bayous. Those same waters, all 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.. 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: 1) estimate the total number of angler days (an angler day is one person fishing any part of one day) spent fishing by anglers in each of the Great Lakes-associated fisheries in Ottawa County, 2) estimate the average daily expenditures and totals by both county resident and county non-resident anglers for each of the above fisheries in Holland and Grand Haven, and 3) solicit subjective responses from anglers as to their perceptions of the adequacy of both public and

privately offered goods and services in the county, along with their overall impressions of the Great Lakes fishing opportunities available in Ottawa 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 overall, fishing success was below normal in the 1981-1982 fishing year.

Ice fishing was not as good as expected in both Holland and Grand Haven, with the fishing being particularly abysmal in the Grand River bayous. In the past the Grand River bayous have provided outstanding winter fishing (Richey, 1978), which according to local reports drew thousands of anglers to the area. However, during the course of the 1981-1982 winter season only about 15% of the interviewed anglers came from outside Ottawa County, and even the majority of those came from adjacent counties. The fishing success in the Bayous simply never reached a sustained level that season which was attractive enough to draw many non-resident anglers.

In the Holland area, anglers fishing on Lake Macatawa at times had good catches, but success was not consistent and the fish were generally small. However, at Port Sheldon, catches of yellow perch on the average were better than those on Lake Macatawa, both in size and number.

On Lake Michigan that year the catch of spring steelhead and brown trout from the piers in both Holland and Grand Haven was very low, and as the summer progressed, the usually good perch fishing on the piers 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 in Holland was particularly dismal because of the late runs. Not until late October did anglers began to consistently catch fish. Although the salmonid fisheries were not generally consistent, at least in Grand Haven the overall catch rate for the season was a respectable one fish per day for pier anglers and almost two fish per day for boat anglers.

In addition to angler success being below par in the study year and having its effects on angler participation (especially non-residents), the fact that the study year was during the time of one of Michigan's worst recessions could also explain the low angler participation rates. In a study of changes in leisure activities among the general population of Greater New Orleans, Louisiana during the 1974 recession, Wagner and Donahue (1976) found that significantly less time was spent in leisure activities away from the home than in previous years for households earning less than $13,000. It could be that for many anglers who used to

travel to Ottawa County to fish, that either inflation or job lay-offs reduced their income to the point where extra-local fishing trips were unaffordable.

Despite the below normal catch and use rates, Ottawa County enjoyed one of the highest levels of use and expenditures among the Michigan counties recently investigated (Jordan and Talhelm, 1982, 1983, 1984a, 1984b, 1984c, 1984d, and 1984e). For the entire study period, Great Lakes and associated anglers spent an estimated 238,000 days fishing and $4.5 million in Ottawa County, of which 102,000 days and $2.4 million was attributable to non-resident anglers. Those estimates are apportioned by fishery and city in the different sections of this report.

RECREATION ECONOMICS THEORY AND LITERATURE REVIEW

The focus of this investigation was to assess the gross expenditures of Great Lakes and related angling in Ottawa County. The focus was determined by the coastal communities' (who in part funded this investigation) desire to know the impacts anglers' expenditures have in terms of county income and jobs. Their viewpoint was extremely pragmatic in that they wanted to know what the Great Lakes fisheries meant to them, and they had no real concern for the value of the fishing resources to society as a whole. Therefore, the results of this investigation do not reflect any analysis of the value of the Great Lake fishery resource in Ottawa County, but only the impacts of anglers' expenditures in pursuing that resource.

Although few recent studies have focused on angler expenditures, past investigations have explored some of the implications of recreationists' expenditures on local economies. In a study of cottage developments, institutional camps and public parks at Pigeon Lake, Alberta, Canada, Bohlin and Ironside (1976) measured the spatial distribution of capital and trip expenditures by recreationists. Their investigation centered around three hypotheses: 1) that the

major part of the economic impacts attributable to a recreation resource will accrue to the regions where recreationists originate and not to the destination area, 2) that there are major differences in money flows with respect to different recreational pursuits and 3) that the direct effects of recreational expenditures on the economy of the destination area will be negligible in terms of the area's total economy, if any. It was interesting to note that the first and third hypotheses were the general impressions residents and officials in Alcona County had expressed in the study there (Jordan and Talhelm, 1982).

The results of the Pigeon Lake study showed that for: 1) cottage users, 26% of their capital expenditures and 42% of their trip expenditures were made in the local economy, 2) park users, 45% of their trip expenditures were made in the local economy and 3) camp users, 37% of their capital expenditures and 35% of their trip expenditures were made in the local economy. The authors' accepted their hypotheses because in all instances less than half of recreationists' expenditures were made in the destination area. In a study of a state park in New Hampshire, Frick and Ching (1970) found that the local income generated by 125,000 park users was equivalent to that which would be expected from 12 permanent resident families, and also concluded that local income generated by at least park user expenditures is nominal. Other studies have estimated employment impacts ranging from 50 jobs for a state park in Tennessee (Dean,

et. al., 1978) to 350 jobs for a TVA reservoir in Tennessee (Garrison, 1974), while also stressing the levels were nominal.

Although those studies showed that perhaps in many instances the larger share of recreational expenditure impacts go to origin rather than destination economies, the fact still remains that the portion which destination economies do receive may be vital to their economic well-being despite the smaller share and leakages to the outside. Garrison (1974) estimated that direct, indirect and induced employment resulting from recreation expenditures accounted for 5% of the total private nonagricultural employment in the Norris Lake area of Tennessee. While he thought that was insignificant, one could imagine the response if a major city like Detroit were faced with the loss of 5% of its employment base. Therefore, it was not surprising to hear of a change in attitude among businesses and residents in Alcona County after release of that study's results; that sport fishing expenditures are important. The loss of even 12 local jobs would be of vital concern to a community the size of Harrisville in Alcona County, and cities like Grand Haven and Holland in Ottawa County would certainly not be apathetic about the loss of as many as 350 jobs.

Although the value of the resource was not a focus of this investigation, a review of some of the theory in the literature is appropriate. The reason is there is a notion held by many non-economists, and especially many of the

parties encountered in the course of the Ottawa investigation, that gross expenditures is an acceptable measure of the value of a recreational resource. They would argue that expenditures, in this case made by anglers, must represent at least the minimum value anglers place on the activity of fishing, or anglers would not have made them. In other words, they propose that the value of an angling day is worth at least what an angler spends per day for the experience of fishing.

Gross expenditures and analyses of the associated multipliers may be useful from the standpoint of indicating the levels of income and job impacts to a community or region. They also determine the cost of "production" of an angling day. However, they are not a good determinant of the worth or benefit of angling. The reason they are not is because they represent the cost of "producing" the fishing experience. Expenditures made in "producing" the angling experience are not a payment for either the resource or for angling rights to the resource. At least that is the case for most North American fisheries. Many European fisheries, however, are a good example of where a payment is made for the angling rights to the resource. In those fisheries, anglers not only have to pay the costs of "producing" the angling experience, but they must in addition pay a fee for the <u>right</u> to fish on someone's property. That fee is a partial measure (because owners usually charge the same fee to everyone for a particular stretch of water, and cannot or

do not price-discriminate among users) of the value of the resource.

Angler expenditures (costs) should be viewed as the supply function for the angling experience. The supply of angling is the schedule of the minimum prices (expenditures and opportunity cost of time) at which each given quantity of angling is available. The minimum price for any particular angler will always be constant, or perfectly elastic (horizontal supply schedule) because the angler can conceiveably "produce" as little or as many visits to a fishing site as he wants all at the same average cost (Talhelm, 1984).

However, because anglers both produce (supply) and consume (demand) the fishing experience, and because their expenditures do represent a part of their total demand or willingness to pay for the angling experience, it is understandable that many people make the mistake of using gross expenditures as a measure of the value of the experience or of the resource. Another problem of viewing gross expenditures as the value of the resource, is it then implies that the farther recreation areas are located from population centers, the greater the benefits (Smith and Kavanagh, 1969). Such an implication is completely juxtaposed to what would truly maximize benefits - having the resource closer to population centers.

Economists define the actual value of the resource as either the marginal net willingness to pay for or the

marginal net willingness to sell the recreational resource. If anglers have no ownership or rights to the resource, then willingness to pay, or what anglers would give to use the resource, would be the proper definition. If anglers do have ownership or rights to the resource, then willingness to sell, or what anglers would have to be compensated to give up use of the resource, would be the proper perspective. Most empirical work in recreation economics has used the concept of willingness to pay to estimate recreation demand.

In Figure 1 total willingness to pay or the total value of angling would be defined by the area (ACDE) under the demand curve for a recreational resource at some level of use (AE units). That value includes users' expenditures, ABDE, which again represents the cost of "producing" AE number of angler days. The value of the angling resource equals the total value of the angling (ACDE) minus the cost of angling (ABDE), or area BCD (Talhelm, 1984). Area BCD is anglers' marginal willingness to pay over and above their actual expenditures for AE days of fishing, and is the appropriate measure of the value of the resource.

Dwyer, et. al., (1977) points out that area BCD is actually an approximation of the net willingness to pay, for if the full price for each unit demanded could be collected from each consumer (assuming we start at point C or with the first consumer who enters the market), there would be some effect on consumer incomes which would cause demand to shift

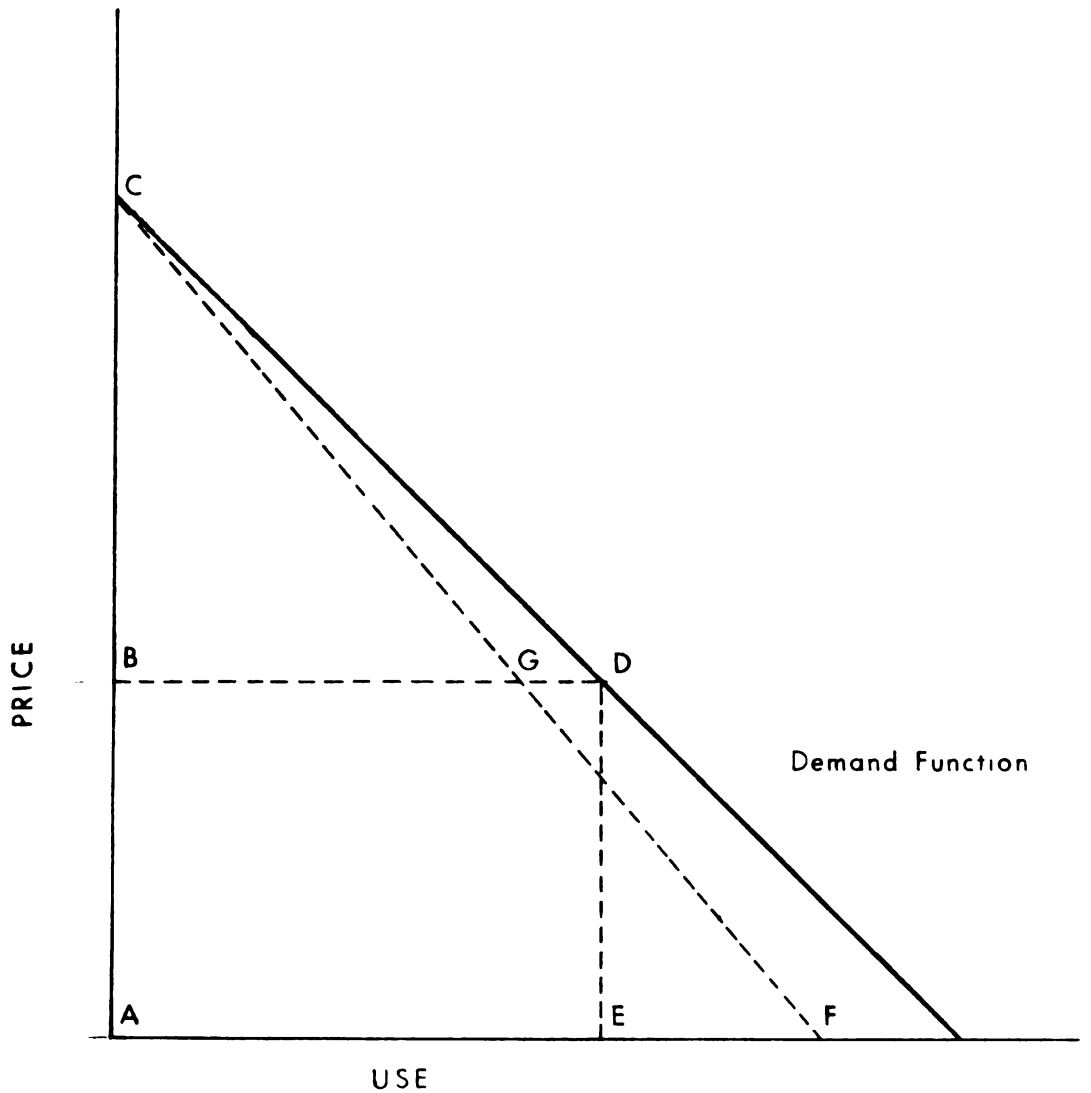

Figure 1. A hypothetical demand function with a supply curve for angling (BD) and an income-compensated demand curve (CF) assuming compensation begins at point C.

to the left. This is known as the "income effect" and CF would be defined as the income-compensated (or Hicksian-compensated after Hicks, 1943) demand curve, making BCG the better approximation of the value of the resource. However, for almost all instances of evaluating recreation opportunities, it is assumed that collecting the full willingness to pay for each unit will not raise expenditures (reduce income) enough to cause a shift in the demand curve. In fact, Bowes and Loomis (1980) have theoretically shown there is an exact relationship between the consumer surplus estimated using the travel-cost methodology (TCM) and the Hicksian compensated demand function for a site, or in other words, consumer surplus measured by the TCM is equivalent to that measured using entry prices.

Two methodologies, the travel-cost method (TCM) and the survey method or contingent-valuation method (CVM), have been widely used to assess recreationists' willingness to pay. The TCM estimates recreationists' demand for a resource by observing their actual behavior (travel) in utilizing the resource, and the CVM estimates recreationists' demand for a resource through a carefully constructed bidding-game survey. Both methodologies have their respective strengths and weaknesses.

The TCM was first suggested by Hotelling (1949) and later popularized by Clawson and Knetsch (1966). The TCM has had widespread empirical application by a host of

researchers, and has undergone perhaps the most scrutiny and modification. The TCM was originally developed for analyzing single site resources (Clawson, 1959; Knetsch, 1964; Clawson and Knetsch, 1966; Merewitz, 1966; Weithman and Haas, 1982; and Palm and Malvestuto, 1983). However, much of the work with the TCM has been to adapt it to multi-site analyses and site quality-change analyses (Brown et.al., 1964; Stevens, 1966; Burt and Brewer, 1971; Talhelm, 1973a, 1976; Cicchetti et.al., 1976; Sutherland, 1982; and Vaughan and Russell, 1982).

There have been many criticisms of the TCM and many modifications and improvements have been made to rectify the model's shortcomings. As was mentioned, the simple TCM estimates the value of a site based on the demand for the site as a function of travel costs and selected demographic variables (e.g., income). Some of the assumptions generally used in the TCM are: 1) recreationists travel solely for the pleasure of traveling and the only purpose of the trip is to visit the specified site, which means their travel expenditures accrue completely to the destination site, and 2) the prices of substitute recreational opportunities to the site are independent of the travel costs to the site, and that the availability of alternative recreational sites does not affect the demand for the site under investigation.

Some researchers (Knetsch and Cesario, 1976; Mendelsohn and Brown, 1983) include only the vehicular costs of travel and the opportunity cost of travel time in their TCM

analyses, arguing that costs for food, lodging and equipment either enroute or on-site should not be included because the use of those items may have utility values to the recreationist separate from that of the resource. They would include those costs only if there is reason to believe that the marginal utility of those inputs is zero. They also argue that costs incurred at the site (including time) should not be included as travel costs, because they are not related to the marginal cost of obtaining the resource - providing the resource is the focus of the valuation and not specific activities. The point they make is that the level of either enroute or on-site expenditures both in money and time for items such as food and accommodations are inputs in the production of either satisfying meals or a relaxing environment. Therefore, they believe the value of those activities is separate from that of the resource, and that only resource-specific prices of non-travel inputs should play a role in the demand for a resource. The problem with that approach is that it is difficult to determine specifically the prices for all the non-travel substitutes which could be used in estimating the demand for a resource.

Talhelm (1984), on the other hand, avoids dfferences in specifying all such substitute prices by including all those enroute and on-site expenditures in the cost of "producing" the angling experience. He argues that if they are not included as part of the price in estimating the demand for the resource under study, then they should also not be

included as part of the prices of any alternatives considered.

In studies that estimate the demand for one site, the problem arises in that as distance traveled increases for a recreationist, there is the likelihood that other sites are being utilized en route. If multiple purposes for an individual's trip can be specified, then travel costs should be allocated accordingly (Talhelm, 1973a, 1981, 1984; Haspel and Johnston, 1982). This will help avoid an overestimate of the value of the site under study.

There is also the problem of determining at what rate to cost travel time. If traveling time accounted for as much disutility as working time, then travel time should be valued at the origin-specific net wage rate. However, Nelson (1977) has shown that even commuting travel time has some utility. Assuming that recreational travel time has even more utility, it seems reasonable that travel time should be costed at less than the wage rate, which Nelson (1977) suggests it should be at about one-third the wage rate.

Researchers have critcized the TCM for: 1) not taking into account substitutes, 2) being an all-or-none evaluation incapable of estimating marginal changes in the resource, and 3) not being able to assess changes in the quality of a site. Burt and Brewer (1971) and Talhelm (1972, 1973a, 1973b) made some of the initial modifications of the TCM by

developing systems of demand schedules which recognized the substitution effects among heterogeneous recreation sites.

In a study of three proposed lakes to be developed by the Army Corps of Engineers in Missouri, Burt and Brewer (1971) developed six classes of water-based recreation sites and estimated demand curves for each class using prices for the other classes as substitute prices in each demand equation. Although they addressed the problem of substitutes, they did not make clear qualitative distinctions between their six classes of sites. Basically there were two unique lake groups (Table Rock and Lake of the Ozarks), a "typical" Corps lakes group, an Ozark Mountain's rivers group and all other lakes in two size categories.

One recent study which addresses site quality or characteristics was done by Vaughan and Russell (1982) of fee-fishing sites in the U. S. using a varying parameter model (Maddala, 1977). Their hypothesis was that anglers value some species more than others, and therefore they used major species class as the most distinctive site attribute, breaking out demand into two separate equations - one for trout and one for catfish/roughfish. Within each species equation, they then used as many as 40 site characteristics (some specified from empirical work done by Holman and Bennett, 1973), including catch rates, as explanatory variables. They did include substitute sites in their analysis, but not directly, as Burt and Brewer did. They included them by proxy as dummy variables, reflecting the extent of

competition from other sites perceived by the fee-site owner.

Talhelm (1972, 1973a, 1973b, and 1976) has developed an approach which takes into account both site quality and substitutive effects between different qualities of recreation. He and others using his techniques (Stanford, et al., 1982; Victor, et al., 1983; and Korson, 1979) use a behavioral model to partition sites or geographical units (counties) into having one of a variety of recreational experiences, defined as "products", according to exhibited site characteristics. Each "product" of recreation represents a different quality of recreation analagous to the levels of quality found with any marketable commodity, such as computers or clothes. Talhelm's behavioral model uses a discriminant analysis to select the "best" set of products, the "best" set defining how recreational participants most likely perceive quality differences within a recreational category. Having selected a set of recreational products, Talhelm's methodology then uses the TCM to derive a demand function for each product, using alternative products and some other closely related recreational categories as substitutes in any particular demand function.

One additional variation of the TCM is the hedonic method (Brown and Mendelsohn, 1980; and Mendelsohn and Roberts, 1982). The hedonic approach estimates the demand for different site characteristics, where each site is

analyzed as a set of characteristics. Characteristics refer to such things as size of stream, density of fish, vegetative cover types, etc. In the first of two stages, the hedonic approach regresses travel cost as a function of a set of characteristics for each origin. In a second stage calculation, it then uses the estimated price for a marginal unit of a specified characteristic from the first stage calculation as an independent variable, along with a vector of demand shift variables to estimate the demand for that characteristic. The management implication is that the most valuable characteristics of a site or group of sites can be determined, and those characteristics either be preserved or developed accordingly.

The other major approach in determining willingness to pay is that of the survey or contingent valuation method (CVM). The CVM is often refered to as the "bidding game" approach. In it a respondent, through a survey instrument, is placed in a set of hypothetical situations and asked to respond to a series of questions that elicits bids from him to either: 1) <u>obtain</u> the hypothetical situation if it represents an improvement in his utility level, or 2) <u>prevent</u> the hypothetical situation if it represents a deterioration in his utility level.

The bidding game contains three elements: 1) an instrument by which a respondent's bid is placed in a realistic institutional context of payment; 2) a starting point at which the bidding process is begun; and 3) a set of

information that establishes the context of the hypothetical situation in which the respondent is to formulate his bids (Brookshire et al., 1976, 1978). For an individual respondent, the bids solicited for a particular public good simply represent that individual's indifference curve for that public good, the indifference curve being a locus of points for a given income level where for varying combinations of goods the individual's total level of utility remains the same. The measure of consumer surplus for the public good is then the aggregate bid curve obtained by algebraically summming the individual bids of the relevant population after subtracting all the expenses associated with the public good experience (Randall et.al, 1975).

One critcism of the CVM is the possibility for respondents to get into a gaming strategy with the interviewer. While many researchers believe the problem exists, particularly in the case of public goods, at least one study by Bohm (1972) of the demand for public television broadcasting found little respondent gaming bias, suggesting, perhaps, that the problem is not as significant as believed. The concern with gaming-strategy bias arises from the assumption that respondents may understate their preference for the good, in hopes that they may escape being charged as much as they are actually willing to pay for the amount of the good they actually desire. Conversely, researchers also assume respondents may bid up their apparent willingness to pay if they feel it may help preserve the good in its present

state. Some researchers feel the challenge then is to phrase questions so that the respondent is not put in a position of considering his opinions about the propriety of charging for the use of the good (Knetsch and Davis, 1966).

Some suggestions by Miller et al., (1977) to help prevent respondent gaming strategy are:

1. The less hypothetical the question, the more stable and reliable the response.
2. Questions should be asked while the respondent is engaged in the activity under investigation, to prevent him from having to project himself into hypothetical situations.
3. Consider only one change in conditions at a time.
4. Formulate questions so as to remove opinion.
5. Use test items in the instrument similar to those in the actual situation.
6. Make situations concrete rather than symbolic.

A recent study by Bishop et al., (1983) has helped to show that many of the problems with the CVM stems from its artificial context - people answering CVM questions do not have well developed ideas about how they would actually act in a real market for the good under investigation. Bishop et al., (1983) evaluated Wisconsin permit goose hunting with several contingent valuation mechanisms along with a standard TCM and a "simulated market", where permit holders were offered real money not to hunt (willingness-to-accept compensation or willingness-to-sell (WTS), as opposed to willingness-to-pay (WTP)). Their results showed that WTP

estimated by CVM could be in error (underestimate) by 50 percent or more.

Their results also showed some other interesting relationships. First, as Dwyer et al., (1977) pointed out, estimates of WTS are always greater than estimates of WTP. The question is, where does the actual level of consumer surplus lie between the two measures. Although their "simulated market" was a WTS proposition, they found the average value taken as compensation for a permit ($63) was almost equally spaced between the high CVM-WTS value ($101) and the lower TCM-WTP value ($32). The CVM-WTP value they estimated was even lower ($21) than their estimated TCM-WTP. Again the authors felt the low CVM-WTP is due primarily to the artificiality of the CVM framework, because when people are unclear as to how to act in a hypothetical market, oftentimes their response is no response, or they express zero WTP. The authors noted this was borne out experientially in their study, where they observed respondents giving much more careful consideration in responding to actual money offers in the "simulated market" than to hypothetical offers in the CVM.

Non-market goods evaluation has certainly progressed since the first TCM studies, but even as Bishop et al.'s (1983) study shows, there is still considerable room for minimizing the errors associated with all methodologies.

METHODS

As previously mentioned, the major goals of this study were to estimate Great Lake angler use and expenditures in Ottawa County in order to derive the total gross expenditures in the county by those anglers. In deriving total gross expenditures, however, some considerations must be made in describing or defining the population to be sampled. The findings of a recreation economic investigation would be suspect if: 1) it fails to either define or adequately describe the population being sampled, and 2) the sampling scheme chosen has not adequately considered the bounds of the population under study.

The defined population for this study was all angler use within a year's time at all designated fishing sites within Ottawa County. Therefore, by definition the population encompassed all anglers (men, women, children, licensed and unlicensed), and their use had to be at specific sites and within a specific time frame. With the population so defined, there were implications to consider in selecting a sampling technique.

In general, there are three techniques which have been used in socioeconomic research: personal interviews, mail surveys and telephone interviews. In determining the

appropriate technique, the primary factors to consider are: 1) the spatial distribution of the defined population, 2) the size and representation of the population and 3) the cost of obtaining the sample. If the spatial distribution of the defined population is small and the population is well represented within the geographic area under study, then personal interviews would be the prefered technique. Personal interviews provide the most reliable contact with a respondent because: 1) there is a greater control over the response in terms of identifying and eliminating respondent biases, 2) there is a higher response rate and 3) a more in-depth interview can be given (Kerlinger, 1973, Sellitz, et al, 1962).

Another factor to consider in choosing the personal interview is whether they will be conducted in households or on-site. Household personal interviews can be very costly. They can cost as much as ten times more per response than a mail interview and five times more than a telephone interview (Wellman et al., 1980). Lansing and Morgan (1971) noted that household personal surveys can range upwards from $25 per completed interview. On-site personal interviews are usually less costly, simply because the sample population is concentrated.

By definition the population for this study was spatially confined and was well represented; therefore, on-site personal interviews were feasible and was the survey instrument chosen. Cost was a consideration in this study.

The average cost per personal interview turned out to be less than $10. However, the chief reason for this was that more than one-half of the interviewer hours for the study came from local people who either volunteered their time or were involved in Michigan's Workfare Program.

As the spatial distribution of the population increases and/or the density of the population decreases, then mail or telephone surveys become the instruments of choice, primarily because of their cost and time efficencies. While the mail survey is oftentimes the survey instrument of choice in fisheries economics research because of population spatial and density considerations (it is the instrument regularly used by MDNR's Fisheries Division for evaluations of use and impacts), there are many reasons why, aside from the fact it was practical to do personal interviews on-site, it was felt a mail survey was not appropriate for this study. They are also reasons which should make angler use and expenditure estimates based on mail surveys suspect, especially when the estimates are based on a sample from a large geographic region and are then applied to specific locations.

Mail survey questionnaires are generally sent to licensed anglers, which in Michigan eliminates most women and all anglers under age 16 from being included in the sample. Also not included are illegal nonlicensed anglers. This could severely bias a sample, especially if nonlicensed anglers or their use comprise a large proportion of the population under study.

Dunning and Hadley (1978) found that in Erie County, New York two-thirds of the angling population was comprised of nonlicensed anglers. Anglers 9 to 15 years of age made up approximately 42% of the angling population and accounted for over 55% of the total angling days. Illegal nonlicensed anglers accounted for 25% of the angling population. Martin (1977) estimated from U.S. Fish and Wildlife Service data that on the average about 40% of each state's anglers were nonlicensed in fiscal year 1975.

Jamsen (1985) reports that the MDNR Fisheries Division investigated the percentage of non-licensed anglers in Michigan in 1973, 1976 and 1983. The Fisheries Division found that almost 50% of all anglers in Michigan are non-licensed. Non-licensed spouses account for 40% of the non-licensed total and anglers under 17 years of age for 60%. However, they did find that approximately 90% of anglers fishing Lake Michigan were licensed. Jamsen (1985) did say the 90% figure was probably biased towards representing salmonid anglers, and likely did not take into account much of the summer perch fishing from Lake Michigan piers.

The point is that if mail surveys sent to licensed Michigan anglers do not sample most women, all children under age 17 and illegal nonlicensed anglers, then all those nonlicensed anglers should not be viewed as part of the population under study. However, when angler use is estimated by direct observation, with no distinction made

between licensed and nonlicensed anglers, the possible result is an overestimate of gross expenditures. That is because the anglers who generally spend the least (women, children and those who feel they cannot afford a license) are not sent a mail survey and consequently are excluded from the average expenditures calculations. However, if the average expenditures of licensed anglers are then expanded by estimates of angler use which included the unlicensed anglers, then the result may be an overestimate of impacts.

Other problems with mail surveys are 1) respondents' inability to recall details of past fishing trips and 2) their desire to be "helpful" in the answering process. Most mail surveys of angler expenditures ask the respondent to give an accounting of expenditures on the angler's most recent fishing trip. However, as the length of time since the last trip increases, the accuracy of the accounting suffers. In addition, there is the tendency to recall the most successful, memorable or expensive trip, which may not have been the most recent trip. With the personal on-site interview it was relatively easy to maintain the bounds of the defined population by asking for expenses incured on the current trip. With mail surveys, it is very easy for individual respondents to violate the bounds of the intended population defined by the investigator.

One problem with the personal interview at this point, is that if the interview is conducted prior to the conclusion of the angler's trip, there is the possibility

the angler may not accurately assess what expenses he may have after the interview. The possible bias could go in either direction, and it is assumed it cancels out.

All anglers in some measure feel that fishing is a worthwhile pursuit, and there is a general bias in their thinking that fishing is positively "valuable" to society. The prevalence of that idea was constantly encountered in conducting interviews for this study, where anglers were always commenting that they spend large amounts of money on their fishing. What they often meant was that they have spent what seems to them a large sum of money on fishing, and that over a number of trips. Even in the personal interview setting, anglers' would: 1) try to include the value of all their equipment in current trip expenditures, 2) have the interviewer document some past expensive trip, or 3) try to give an average per trip for their fishing expenses over a year's time. The point is, that if many of them tried to manipulate the question in the presence of an interviewer who repeatedly had to bring their responses into the constraints of the question, one can imagine the liberty many anglers take in answering such questions in the privacy of their homes. When held within the constraints of preparing for and participating in the trip they were on at the time of the interview, interviewers found anglers usually spent considerably less than what, and with good intentions, they would like to have convinced the interviewer they had spent.

Telephone interviews present some advantages over mail surveys while at the same time having their own sampling problems. Telephone interviews allow for more control over respondent biases and for more in-depth interviews than mail surveys, although still not to the degree attainable with a personal interview. They also have a higher completion or return rate than do mail surveys, although while one-mailing surveys have a rather low average response rate of 48% (Heberlein and Baumgartner, 1978), many mail surveys of recreationists have attained response rates from 70% to 96% using intensive follow-up mailings (e.g., Burch and Wenger, 1967; Lucas and Oltman, 1971; Kennedy, 1974 and Kanuk and Berenson, 1975).

Some of the problems associated with telephone interviews are: 1) the inability to contact respondents who have unlisted numbers or privacy listings and potential respondents without phones, 2) a female response bias due in part to the timing of calls, 3) an inability to maintain a sample representative of the population under study and 4) an inability to gain respondent rapport. It should be noted that in a study done by Field (1973) a telephone sampling design and instrument was developed which alleviated many of those problems and which should be considered as an alternative to a mail survey when a sample is desired from a large heterogenous population within a large geographic region.

Again, the personal interview was chosen because: 1) the spatial distribution of the defined population was small, 2) the defined population was well represented in the geographic area of study, 3) it was at least as cost-effective as either a mail or telephone survey would have been, 4) it afforded the greatest control over respondent biases and 5) was not selective of particular subgroups within the defined population.

Surveys

A total of 2,059 angler interviews were made at Lake Michigan and connecting waterways fishing access points within Ottawa County. Access points were either: 1) observed to have angling usage or 2) were pointed out by local people to be areas of fishing activity.

In the Holland area angler use was sampled on: (1) Lake Macatawa, (2) the Lake Michigan north pier, (3) Lake Michigan (offshore salmonids) off the entrance to Lake Macatawa, (4) the Pigeon River near Port Sheldon, and (5) Lake Michigan (offshore salmonids) off the mouth of the Pigeon River. In the Grand Haven area angler use was sampled on: (1) the Grand River bayous, (2) the Lake Michigan piers, and (3) Lake Michigan (offshore salmonid) off the mouth of the Grand River.

Interviews were conducted by me, undergraduate students hired at MSU, Holland Fire Department personnel, City of

Grand Haven personnel and other Ottawa County residents who were either volunteers or assigned to the project through the Michigan Department of Social Services' "Workfare" Program. All of the interviewers had at least a two-hour "classroom" training session in the proper administration of the questionnaire, along with semi-monthly or monthly checks in the field to assure that the proper regimen and delivery of the interview was maintained.

In the personal interviews, anglers were questioned about their trip expenditures, their fishing success, where they were from, their length of stay, where they were staying, their impressions of the fishing in that sample area, whether they had reasons for their trip other than fishing and personal information. An example of the questionnaire is in Appendix A.

Anglers' mean expenditures for various categories of goods and services are tabulated in the results for each fishery. Following the table of means in each fishery is a table of sample statistics. In those tables 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.

Since a large proportion of anglers in any particular fishery do not purchase a specific good or service within the time constraints of one trip, most categories of goods

and services in the samples have many observations of zero expenditures. This causes strongly positive estimates of skewness, meaning the frequency curve for most categories of expenditures is asymmetric to the right. The data can be transformed (for a large number of observations of zero, a log transformation is usually appropriate) to reduce the skewness. However, transformtions were not attempted nor were any nonparametric tests performed, as the interest was not in approximating a normal distribution or explaining variable variance, but it was in determining the actual sample means. Therefore, most of the sample statistics show large measures of skewness and variability in anglers' expenditures.

Ice, pier and shore fishing interviews and estimates of use

Ice, pier, and shore fishing use was estimated using a survey method developed by Talhelm (1972). This method is similar to that of other studies using stratified random sampling and roving creel surveys (Hayne, 1966 and 1972; and Malvestuto, Davies and Shelton, 1978). The technique consisted of systematic traverses of either: (1) sections of shoreline, (2) a pier, or (3) a concentration of ice anglers. In using Talhelm's method the following assumptions are made:

1) All anglers either along a stream or lake shore segment or a concentration of ice anglers could be

interviewed at any selected point in time on a sample day.

2. All anglers know how long they would fish in the sample area on the sample day.
3. The composition of the angler population in any sample area did not change significantly, in terms of many anglers coming and going, over the time period of one traverse by an interviewer of a stream or lakeshore segment or concentration of ice anglers.
4. Anglers are distributed throughout the day in a random pattern and arrive and depart from the sample area at random.

A sample area (stream or lakeshore segment or concentration of ice anglers) was sampled at several points in time on a sample day. For each point in time, an interviewer would walk the length of the sample area and interview all anglers encountered. That was defined as a traverse. Traverses were never more than two hours in duration. If there were more anglers in the sample area than could be interviewed in a traverse, the interviewer would do an "instantaneous" count, divide the count by ten and use the resulting quotient to determine how many anglers to skip between interviews. The interviewer would not attempt to interview anglers who left the area "ahead" of him or anglers who would come in "behind" him as he progressed with

his traverse. A sample area would have two or three traverses done on any sample day, and if the interviewer encountered anglers more than once within an area on a sample day, they were not re-interviewed on subsequent traverses.

The probability of encountering any particular angler was proportional to: 1) his length of stay in the sample area, 2) the number of traverses that day of the sample area, and 3) the length of the sample day. Expressed mathematically, the probability of encountering anglers who said, for example, they were going to fish for three hours during a twelve hour fishing day in which three equally spaced traverses were made is:

$$\frac{m_i \cdot h_{ij}}{x_i} = \frac{3 \cdot 3}{12} = \frac{3}{4}$$

where,

m_i = number of traverses on sample day i,

h_{ij} = total fishing hours on sample day i by interviewed angler j,

x_i = length in hours of sample day i.

Therefore, for every three 3-hour anglers encountered on sample day i, one was theoretically missed and should be included in the estimate. The total number of angler days at a sample area on sample day i was estimated by equations (A) and (B):

$$c_i = \sum_{j=1}^{v_i} \frac{x_i}{m_i \cdot h_{ij}} \qquad (A)$$

if for a particular angler j, $m_i \cdot h_{ij} < x_i$

where,

c_i = angler days on sample day i,

v_i = number of different interviews on day i where the probability of encountering these interviewed anglers is less than 1.

$$d_i = \sum_{j=1}^{v_i} \frac{x_i}{m_i \cdot h_{ij}} = n_i \qquad (B)$$

, if for a particular angler j, $m_i \cdot h_{ij} > x_i$

where,

d_i = angler days on sample day i,

n_i = number of different interviews on day i where the probability of encountering these interviewed anglers equals 1.

The summation of equations (A) and (B) gives:

$$AD_i = \sum_{j=1}^{v_i} \frac{x_i}{m_i \cdot h_{ij}} + n_i \qquad (C)$$

where,

AD_i = total angler days on sample day i.

If anglers were skipped on traverses, a correction factor (C.F.) was calculated:

$$C.F. = \frac{b_i + c_i}{c_i} \qquad (D)$$

where,

b_i = number of anglers skipped on sample day i,

c_i = number of anglers interviewed on sample day i.

The correcton factor is introduced into equation (C) as follows:

$$AD_i = \sum_{j=1}^{v_i} \frac{x_i}{m_i \cdot h_{ij}} \ (C.F.) + n_i \ (C.F) \qquad (E)$$

An example of how daily use was estimated at a fishing site is given in Table 1.

Total estimated use for each fishery in Ottawa County was calculated by first averaging daily estimates for each sample area for each season. A distinction was made between weekday and weekend/holiday usage. The second step was to expand the averages by the number of days in each season.

For ice fishing the estimate of use was comprised of two components: the use represented by anglers fishing in the open was considered separate from that of anglers fishing in shanties. Anglers fishing in the open were counted and their associated use estimated using the roving survey-probability methods just described, whereas shanty fishing effort was estimated using the following three-step method.

To begin, interviewers counted shanties on each sampling day at each site. These counts were used to

Table 1. Hypothetical estimate of daily use at a fishing site.

length of day, x = 12; number of traverses, m = 3; anglers skipped, b = 60; anglers interviewed, c = 30.

hours fished, h	number interviewed	X	$\frac{x}{m \cdot h}$	X	$\frac{b + c}{c}$	= Estimate
2	12		4		3	144
3	6		3		3	48
4	9		1		3	27
8	3		1		3	9
Total						228

calculate the average daily number of shanties for the season at each site. Second, from shanty angler interviews, the average number of anglers per occupied shanty at each site was calculated. 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, the following angler responses were weighted by the probability of encountering an angler: 1) the number of anglers per shanty and 2) the number of days the angler expected to use the shanty during the ice season.

For instance, if an angler told the interviewer he/she was going to fish 10 times that season, and the season was 80 days long, then that angler's response was weighted 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, estimates of total shanty angler use at each ice fishing site were made.

Shore, pier, and ice anglers were usually interviewed before they had finished fishing for the day. Because of that, a correction had to be made in estimating an angler's catch for the day. That was done by multiplying the ratio of the number of hours the angler planned on fishing that day to the number of hours the angler had already fished when interviewed, times the number of fish the angler had caught that day up to the time of the interview. The two assumptions made in expanding anglers' catch by those calculations were 1) anglers who had caught fish prior to the interview would continue to catch fish at the same rate for the remainder of their fishing time that day and 2) anglers who had caught nothing prior to the interview, would not catch anything after the interview.

Boat fishing use

Private boat angler use was estimated in two ways. The first method was used for all the offshore salmonid fishing in Lake Michigan and for the fisheries on Lake Macatawa. This method was developed to specifically address a problem associated with Lake Macatawa, which connects with Lake Michigan. The problem is anglers depart from any one of

many access sites and marinas on Lake Macatawa, but may fish either on Lake Michigan, Lake Macatawa, or both. Instantaneous counts of effort on either Lake Macatawa or Lake Michigan would be biased because: 1) the geography of Lake Macatawa made it impossible to see the lake in its entirety, 2) counts on Lake Michigan would assume that all boats originating out of Lake Macatawa or the Grand River were within visual range and 3) that all the boats within visual range on Lake Michigan had originated from Lake Macatawa or the Grand River.

First, from the outlet of Lake Macatawa and from the mouth of the Grand River, the number of positively identified fishing boats heading out onto Lake Michigan were counted on randomly selected hours. Those counts were used to calculate the average hourly number of fishing boats from Holland and Grand Haven going out on Lake Michigan. By adding those hourly averages for weekdays and weekend-days repectively, average daily totals of weekday and weekend-day fishing boat trips onto Lake Michigan were calculated for each area. The average daily totals were then multiplied by the number of weekdays and weekend-days in the boating season to estimate the annual number of boat trips onto Lake Michigan from both Holland and Grand Haven.

Second, in interviews with boat anglers at Lake Macatawa launch sites and marinas, interviewers determined how many people on each boat actually fished that day, and whether on that day the party fished either on Lake

Michigan, Lake Macatawa, or both. From that information a ratio was calculated of sampled boat anglers who went out exclusively on Lake Michigan to those who in combination either did not go out on Lake Michigan or who fished both on Lake Macatawa and Lake Michigan. Using that ratio and the total estimated number of fishing boats that went out on Lake Michigan from the Holland area, the number of boat trips made to fish on Lake Macatawa, either exclusively or in conjunction with going out on Lake Michigan was estimated. Multiplying the total number of daily fishing boat trips on Lake Michigan and Lake Macatawa by the average number of anglers per boat, Holland boat angler usage for both lakes was estimated.

The second method was used for estimating boat angler usage on the Grand River bayous and at Port Sheldon in the Holland area. On randomly selected days at each of the various access sites, boat launchings were estimated by counting boat trailers early in the morning and tallying all subsequent launchings that day. Those daily totals were averaged and then multiplied by the number of days in the boating season to calculate the total number of fishing boat trips made from that access site. That estimate was then multiplied by the average number of anglers per boat fishing the Grand River bayous or at Port Sheldon to arrive at an estimate of total boat angler usage for those sample areas.

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, and was done on a party basis rather than for each individual client. The questionnaire's main focus was county expenditures. Even with the simplified form, however, the charter captains were not very cooperative. The notable exception were some captains in the Grand Haven area. Therefore, charter fishing impacts were analyzed only in that area. Holland charter impacts were estimated using the Grand Haven expenditure estimates and expanding them by the level of client use reported by the Holland captains. The estimates of charter client use for both Holland and Grand Haven came from the captains' logbooks of charters for the 1982 season. An example of the charter questionnaire is found in Appendix A.

Business survey

A questionnaire was mailed to over 400 businesses in Ottawa County for the purpose of estimating the secondary economic impacts of anglers expenditures. In the Alcona study economic multipliers from the literature (Kalter and Lord, 1968; Pearse and Laub, 1969) were used. However, in this investigation an attempt was made to refine estimates

of the secondary impacts by surveying county businesses, and then applying input-output model tables developed by Diamond and Chappelle (1981) for the Manistee County economy to the responses received from cooperating Ottawa County businesses.

In the questionnaire businesses were asked for: 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) what percentage of their total revenues they would attribute to anglers' purchases, 5) in 26 different sectors of the economy, what percentage of their total revenues they used for purchases in each sector, and 6) regarding their purchases within each sector, what percentage did they purchase within the county. An example of the business questionnaire is in Appendix A.

By using a questionnaire of this sort and by applying input-output modeling techniques, it was hoped that mutipliers could be estimated for each category of business establishment anglers patronized in the county. In that way the secondary impacts for Ottawa County could be more precisely estimated. However, too few of the questionnaires were ever returned (less than 20) for any reasonable analysis.

This may have been due in part to the anti-government and anti-study attitude prevalent in the business community at that time. Many businesses were blaming the government

for the recession, and some of the returned questionnaires sported comments colorfully expounding that attitude. Therefore, in lieu of the more detailed analysis, multipliers were selected from other Michigan-specific studies found in the literature (Diamond and Chappelle, 1981; Marino and Chappelle, 1978).

ICE FISHING

Ice fishing did not begin in Ottawa County until well into January 1982. The ice was unsafe until then, except on the Grand River bayous, where safe ice formed soon after Christmas. Fishing was best the first few weeks after the ice formed, and then was generally poor for the rest of the season. The overall concensus among anglers was that the 1981-82 winter season was below par.

Ice fishing was expected to be a local phenomenon, with few out-of-county anglers, and there was a concern that the overall poor fishing would compound that phenomenon. The concern was substantiated in the Holland area where only 9% of the anglers sampled were non-residents. On the Grand Haven bayous, though, a surprisingly high 22-23% of the ice anglers were non-residents. However, 78% of them came from adjacent Muskegon County. Therefore, the ice fishery on the bayous was still a predominantly local fishery that winter, and the generally below par fishing may be what caused the reduced level of use by non-residents from more distant origins. In total, ice anglers spent an estimated 18,499 days fishing and $82,347 in Ottawa County. Of that, non-resident ice anglers spent an estimated 3,271 days fishing and $5,197.

A word of caution is in order about the significance of the estimates of gross expenditures calculated for ice fishing. The low levels of use that winter made it difficult to obtain sizeable samples. On more than two-thirds of randomly scheduled sampling days no ice anglers (either outside or in shanties) were encountered by interviewers. There are two implications arising from that.

First, the largest proportion of the estimates for ice angler use is attributable to calculations for shanty use. As described in the Methods section, those calculations are based on the individual projections of interviewed ice anglers about their expected use over the course of the ice fishing season. What happened is that anglers encountered early in the season made projections of use with the expectation of a normal season, but in actuality, beyond the first few weeks of the season, use was virtually non-existent due to the poor fishing. Therefore, the estimates of total use are in large measure based on projections of use which never occured.

Second, because of the small samples, the estimates of average daily expenditures (especially for non-residents) represent more of an academic exercise than an attempt to calculate a representative value. Therefore, with the combination of those two factors, the level of confidence one can place in the calculated estimates of gross expenditures for ice anglers is at best limited. One consolation is that the ice fishing expenditures represent only a small

fraction of the overall gross expenditures for Great Lakes fishing in Ottawa County.

Holland

Ice fishing in the Holland area was concentrated off the State Park campground on Lake Macatawa. In the Holland area ice anglers were interviewed on Lake Macatawa and on the Pigeon River at Port Sheldon. For all anglers interviewed at both sites, 61% had caught fish on the day questioned. Anglers caught an average of 15 fish per day, 92% of which were yellow perch.

Table 2 lists the average daily expenditures made by ice anglers in Holland 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.

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

7,243 angler days X $7.80 per angler day = $51,280

The total estimated gross expenditures in Ottawa County of Holland non-resident ice anglers were:

630 angler days X $1.75 per angler day = $1,103

Statistics for ice angler expenditures made in Holland are in Table 3. Statistics for all anglers are listed

Table 2. Holland ice anglers' average daily expenditures made at home, en route, and in Ottawa County.

Type of expenditure	Other Counties		Ottawa County
	Home	En route	
Major fishing equip.	--	--	4.11
Tackle-small gear	--	--	.67
	--	--	(.25)
Licenses	--	--	.48
Restaurants	--	--	.54
Groceries	--	--	.04
Beer	.07	--	.13
	(.80)	--	--
Vehicle gas	.16	--	1.00
	(1.84)	--	(1.25)
Miscellaneous	--	--	.11
	--	--	(.25)
All anglers' total	.23	--	7.80
Non-residents' total	(2.64)	--	(1.75)

first, followed by non-resident angler statistics in parentheses.

Seventy-eight percent of all the anglers interviewed felt the local businesses provided adequate services and facilities. Sixty-one percent of the anglers felt prices in general in Ottawa County were the same as elsewhere in the state (100% for non-residents), 2% thought they were higher than average and 37% felt they were lower than average. Fifty-four percent of all the ice anglers interviewed in Holland felt the government agencies involved provided adequate services and facilities.

Table 3. County expenditure statistics for Holland ice angling. Sample size = 46 (non-resident = 4).

Expenditure	Mean	Std. Dev.	Std. Err.	95% C.I.	Skew.
1. Major equip.	4.11	26.40	3.89	-3.73 - 11.95	6.75
2. Small equip.	0.67	1.12	0.17	0.34 - 1.01	1.89
	(0.25)	(0.50)	(0.25)	(-0.55 - 1.05)	(2.00)
3. Licenses	0.48	3.24	0.48	-0.49 - 1.44	6.78
4. Restaurants	0.54	1.43	0.21	0.12 - 0.97	2.32
5. Groceries	0.04	0.30	0.04	-0.04 - 0.13	6.78
6. Beer	0.13	0.89	0.13	-0.13 - 0.39	6.78
7. Vehicle gas	1.00	1.28	0.19	0.62 - 1.38	1.12
	(1.25)	(2.50)	(1.25)	(-2.73 - 5.23)	(2.00)
8. Misc.	0.11	0.61	0.09	-0.07 - 0.29	6.26
	(0.25)	(0.50)	(0.25)	(-0.55 - 1.05)	(2.00)
All anglers' total	7.08	26.77	3.94	-0.86 - 15.04	6.29
Non-residents' total	(1.75)	(2.36)	(1.18)	(-2.01 - 5.51)	(1.19)

Table 4 lists ice anglers' comments about their perceptions of the adequacy of both private and public facilities and services in Holland in addition to general comments about their fishing experience in the county. The responses represent the percentage of all interviewed ice anglers who made that comment.

Non-residents comprised 9% of all the ice anglers interviewed. Seven percent came from Allegan County and 2% came from Kent County (Figure 2). No out-of-state anglers were encountered. All non-residents were on a one day trip. Twenty-five percent of the non-residents said that at least

Table 4. Holland ice angler comments.

I. Responses about the local businesses.	
Responses	% of interviewed anglers
1. Bait stores need a wider selection of baits.	13.0%
2. Bait stores need to open earlier in the day.	6.5%
3. Need a place that will cash out of town checks.	4.3%

II. Responses about government agencies.	
Responses	% of interviewed anglers
1. DNR should not charge to launch boats during the summer.	30.4%
2. The Indian gillnetting must be stopped.	10.9%
3. More walleye should be stocked.	4.3%
4. More muskies should be stocked.	4.3%

III. General responses.	
Responses	% of interviewed anglers
1. The yellow perch are small.	10.9%
2. Agree with salmon snagging.	4.3%
3. Holland Fish and Game Club has a good program.	2.2%
4. Enjoys the fishing here.	2.2%

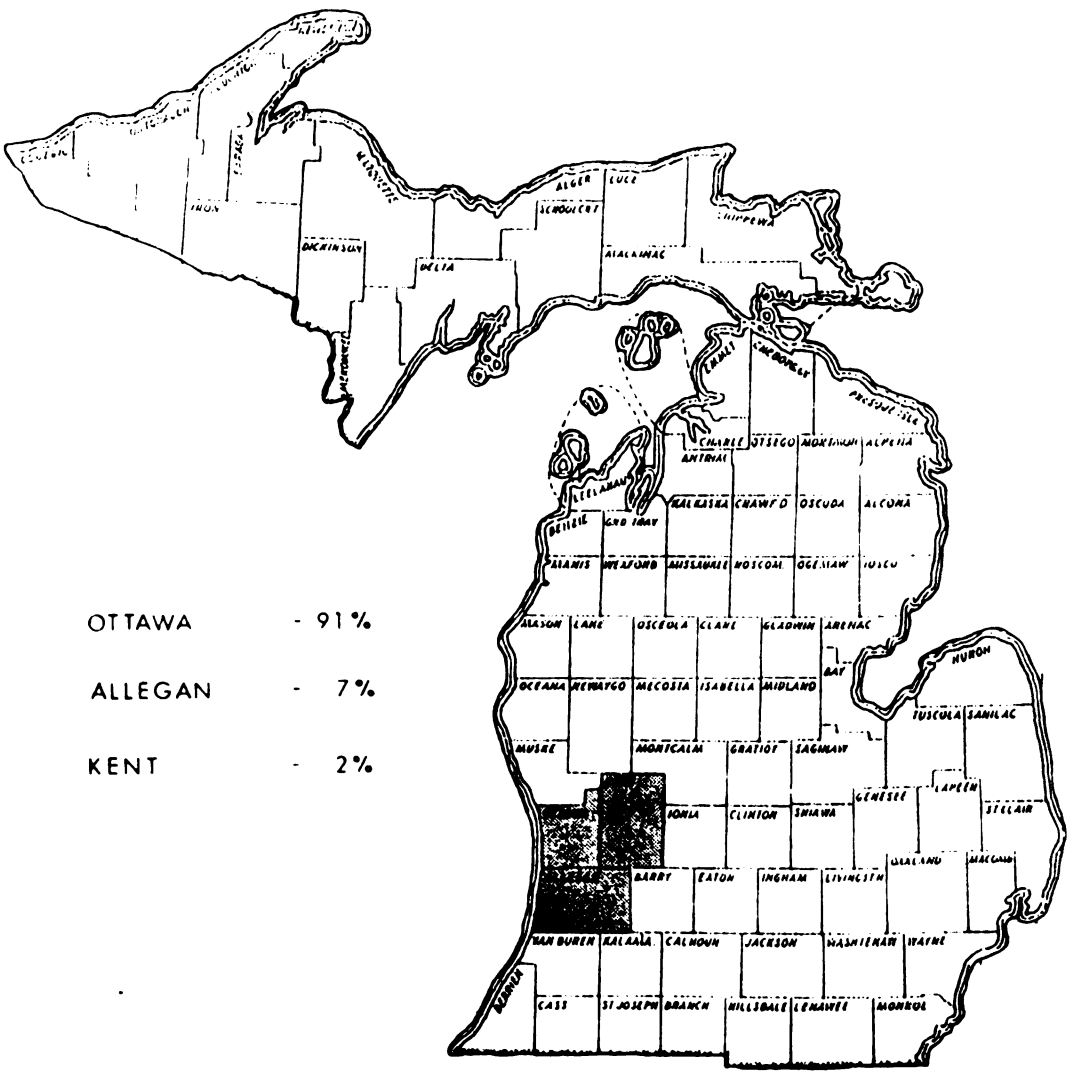

Figure 2. Holland ice angler major in-state origins.

once a year their spouse or family accompanied them on a fishing trip to the area, and that when they come, they fish also.

When asked to apportion their purpose for fishing between fishing for the "sport" or for the "food", ice anglers' average responses were 67% for the "sport" and 33% for the "food".

Ninety-one percent of the interviewed ice anglers had fished the Holland area in the past, and 100% said they would again, with the non-resident anglers reporting 100% had fished there before and 100% would fish there again. Ice anglers averaged 19 fishing trips (all trips - ice, shore, pier and boat) to Holland per year (non-residents, 3 trips). Sixty-five percent of the ice anglers said they do most of their fishing in the summer, 17% in the spring, 11% in the winter, and 7% said they fish all year. Ninety-three percent of all the ice anglers interviewed were primarily interested in catching yellow perch, with the other 7% interested in catching crappie.

Thirty percent of the anglers had learned about fishing in the Holland area from a friend (50% of the non-residents had learned from a friend), while the rest expressed they knew about fishing there because they had lived in the area all their life.

Males comprised 96% of all the anglers interviewed, with 24% of the anglers saying their spouse accompanied them

an average of 35% of the time. The average angler age was 45 years. The relative percentages for a range of ice anglers' household incomes are listed in Table 5.

Table 5. Holland ice anglers' household incomes.

Income Range	% of interviewed anglers
$0 - $4,999	14%
$5,000 - $9,999	8%
$10,000 - $14,999	0%
$15,000 - $19,999	19%
$20,000 - $24,999	16%
$25,000 - $29,999	24%
$30,000 - $34,999	5%
$35,000 - $39,999	5%
$40,000 - up	0%

Grand Haven

The ice fishing in the Grand Haven area occurs on a number of bayous, or backwater areas, of the lower Grand River. On all the bayous (Pottawatomie, Millhouse, Stearns, Bruce, Lloyds, and Spring Lake), anglers fish primarily for bluegill, yellow perch, and crappies. On Stearns Bayou many of them spear northern pike. The Grand River bayous have historically been excellent winter fishing locations. As recently as the late 1970's bluegill fishing was particularly outstanding (Richey, 1978), but has declined over the past few years. Some of the local anglers interviewed felt

the recent programs of poisoning the bayous for weed control had caused the poor fishing.

In the winter of this study fishing on the bayous was good for a few weeks after "first ice", but then dropped off rapidly. Anglers said that in recent years thousands of anglers would fish the bayous over the course of the ice fishing season, with hundreds of people present every weekend. Interviewers never saw more than fifty people outside of shanties on all the bayous combined on a sample day, and on many days no anglers were encountered. Although there was a season average of over 150 shanties on the bayous, most of them belonged to local residents and residents of Muskegon, and for most of the season they were seldom used.

Forty-three percent of the anglers interviewed had caught fish on the day questioned, and the aggregate catch for all species was 5.2 fish per angler day. The catch was almost equally divided between yellow perch (30%), bluegill (25%), and crappie (32%).

Table 6 lists the average daily expenditures made by ice anglers in Grand Haven for a number of categories of purchases. Statistics for ice angler expenditures made in Grand Haven are in Table 7.

The total estimated gross expenditures in Ottawa County of all Grand Haven ice anglers were:

11,256 angler days X $2.76 per day = $31,067

Table 6. Grand Haven ice anglers' average daily expenditures made at home, en route, and in Ottawa County.

Type of expenditure	Other Counties		Ottawa County
	Home	En route	
Tackle-small gear	.02	--	.67
	(.09)	--	(.36)
Groceries	--	--	.17
	--	--	(.18)
Beer	.21	.02	.13
	(.91)	(.09)	(.55)
Vehicle gas	.31	--	1.52
	(1.34)	--	(.46)
Miscellaneous	--	--	.27
All anglers' total	.54	.02	2.76
Non-residents' total	(2.34)	(.09)	(1.55)

The total estimated gross expenditures in Ottawa County of Grand Haven non-resident ice anglers were:

2641 angler days X $1.55 per day = $4,094

Eighty-three percent of all the anglers interviewed felt the local businesses provided adequate services and facilities. Eighty-seven percent of the ice anglers felt prices in general in Ottawa County were the same as elsewhere in the state (90% of nonresidents), 4% higher (10% of non-residents) and 9% felt they were lower. Fifty-six percent of all the anglers interviewed felt the government agencies involved provided adequate services and facilities.

Table 8 lists ice anglers' comments about their perceptions of the adequacy of both private and public facilities and services in Grand Haven in addition to general comments

Table 7. County expenditure statistics for Grand Haven ice angling. Sample size = 48 (non-resident = 11).

Expenditure	Mean	Std. Dev.	Std. Err.	95% C.I.	Skew.
1. Small equip.	0.67	1.02	0.15	0.37 - 0.96	1.48
	(0.36)	(0.81)	(0.24)	(-0.18 - 0.91)	(1.92)
2. Groceries	0.17	0.56	0.08	-0.21 - 0.63	3.87
	(0.18)	(0.60)	(0.18)	(-0.22 - 0.59)	(3.32)
3. Beer	0.13	0.87	0.13	-0.13 - 0.38	6.93
	(0.55)	(1.81)	(0.55)	(-0.67 - 1.76)	(3.32)
4. Vehicle gas	1.52	2.93	0.42	0.65 - 2.35	4.46
	(0.46)	(0.82)	(0.25)	(-0.10 - 1.01)	(1.51)
5. Misc.	0.27	1.11	0.16	-0.05 - 0.59	4.26
All anglers' total	2.76	3.55	0.51	1.57 - 3.63	2.76
Non-residents' total	(1.55)	(2.20)	(0.66)	(-0.12 - 2.84)	(1.35)

about their fishing experience in Grand Haven. The responses represent the percentage of all interviewed ice anglers in Grand Haven who made that comment.

Non-residents comprised 22% of all the ice anglers interviewed. Figure 3 shows anglers' origins by percentages. No out-of-state anglers were encountered. All non-residents were on a one day trip. Eighteen percent of the non-residents said that at least once a year their spouse or family accompanied them on a fishing trip to the area, and that when they come, they fish also.

When asked to apportion their purpose for fishing between fishing for the "sport" or for the "food", ice

Table 8. Grand Haven ice angler comments.

I. Responses about the local businesses.

Responses	% of interviewed anglers
1. More tackle stores need to sell bait.	6.3%
2. Tackle stores need a wider selection of gear.	4.2%
3. Bait and tackle stores need to open earlier in the morning.	4.2%
4. Tackle store prices are too high.	2.1%

II. Responses about government agencies.

Responses	% of interviewed anglers
1. Need public access to Stearn's bayou.	18.8%
2. License fees are too high.	4.2%
3. Need snow plowed at the access sites.	4.2%
4. Do not charge to launch boats in the summer.	4.2%
5. Stock walleye in the Grand River.	4.2%

III. General responses.

Responses	% of interviewed anglers
1. The Grand Haven area has good fishing.	20.8%
2. Property owners should not spray the aquatic weeds in the bayous.	8.3%
3. Ban speedboats on the bayous in the summer.	4.2%
4. The fishing is poor.	4.2%
5. Appreciates Bill's Sport Shop plowing the Lloyd's Bayou access.	2.1%

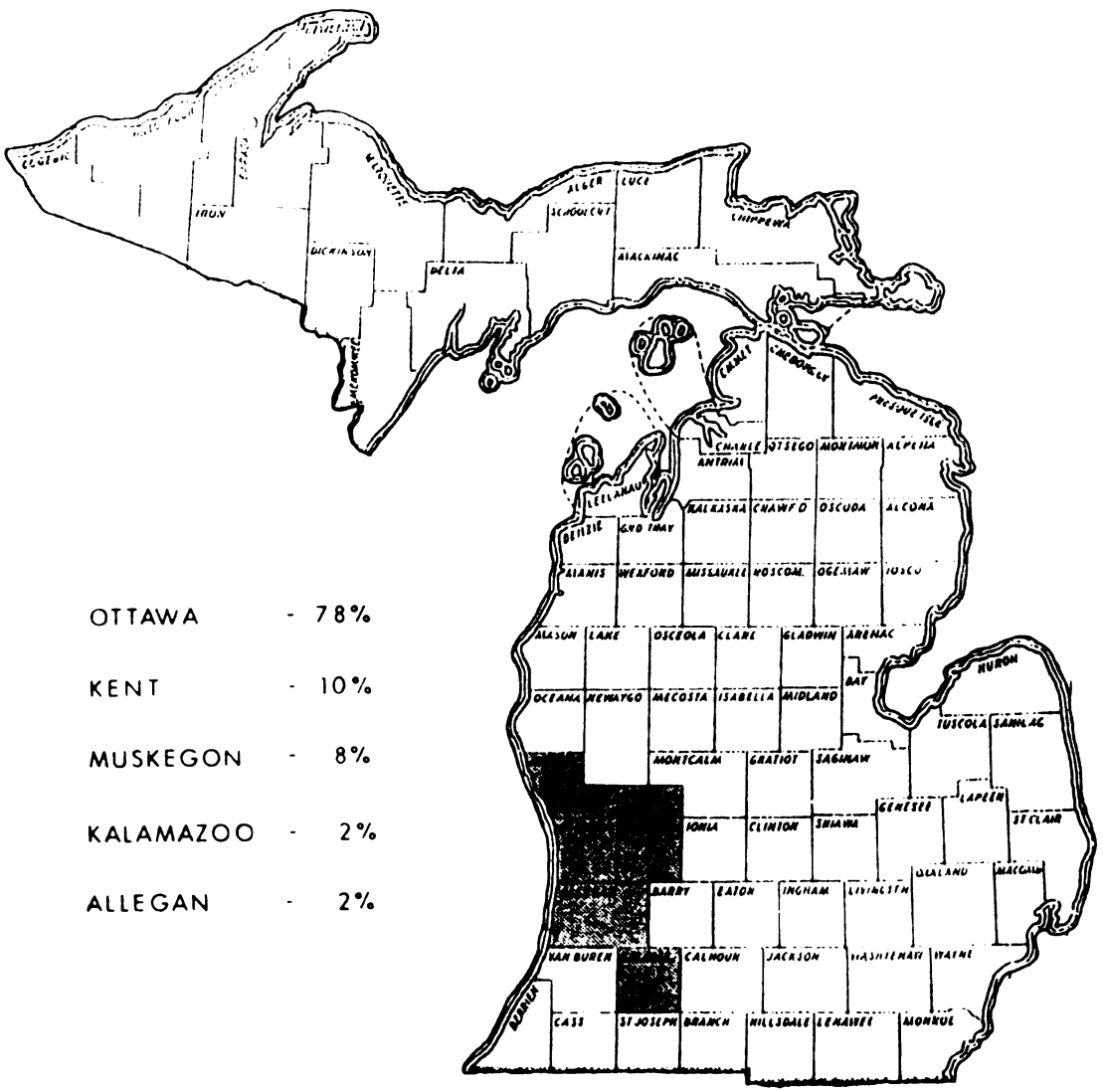

Figure 3. Grand Haven ice angler major in-state origins.

anglers' average responses were 69% for the "sport" and 31% for the "food".

Ninety-six percent of the interviewed ice anglers had fished in the Grand Haven area in the past, and 98% said they would again, with the non-resident anglers reporting 91% had fished there before and 91% would fish there again. Grand Haven ice anglers averaged 36 fishing trips (all trips - ice, shore, pier and boat) in Ottawa County per year (non-residents, 20 trips). Twenty-three percent of the ice anglers said they fish most in the winter, 4% in the spring, 19% in the summer, 5% in the fall, and 46% said they fish all year. Thirty-five percent of all the anglers interviewed were primarily interested in catching bluegills, 27% were interested in catching yellow perch, 23% interested in northern pike, with the remaining 8% fishing for anything that would bite.

Twenty-five percent of the anglers had learned about fishing in the Grand Haven area from a friend (82% of the non-residents had learned from a friend), while the rest expressed they knew about fishing there because they had lived in the area all their life.

Males comprised 91% of all the anglers interviewed, with 25% of the anglers saying their spouse accompanied them an average of 47% of the time. The average angler age was 42 years. The relative percentages for a range of ice anglers' household incomes are listed in Table 9.

Table 9. Grand Haven ice anglers' household incomes.

Income Range	% of interviewed anglers
$0 - $4,999	8%
$5,000 - $9,999	26%
$10,000 - $14,999	21%
$15,000 - $19,999	18%
$20,000 - $24,999	10%
$25,000 - $29,999	10%
$30,000 - $34,999	3%
$35,000 - $39,999	0%
$40,000 - up	5%

PIER FISHING

Both Holland and Grand Haven 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 both 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 is for anglers to begin by fishing for steelhead 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. Finally, pier anglers fish from the Grand Haven piers for lake trout, which in some years make a spawning run up the Grand River in late fall.

Pier fishing in Ottawa County can be excellent, especially on the Grand Haven pier, and over the years the Ottawa County piers have earned a reputation which attracts people from all around the Great Lakes region. However,

salmonid fishing on the Holland pier was generally poor during the year of this study, while the catches on the Grand Haven piers were generally on a par with previous years according to angler testimonies (one fish per angler day). Yellow perch fishing overall was very poor, with a catch rate of 2.9 fish per angler day in Grand Haven and 2.8 fish in Holland.

Pier angler use was estimated using the roving survey techniques described in the Methods section. In total pier anglers spent an estimated 39,718 days fishing and $373,077 in Ottawa County. Of that, non-resident pier anglers spent an estimated 20,309 days fishing and $199,258. In both Holland and Grand Haven the average expenditures of pier anglers were probably not higher because many of the non-residents traveled only short distances (many came from Muskegon and Kent Counties), and most stayed for only one day. Daily expenditures usually increase with longer visits, but since most non-residents in this case did not stay long enough, they did not spend any appreciable amounts of money.

Holland

The Holland piers are located where Lake Macatawa empties into Lake Michigan. The south pier in Holland is not accessible to the public. A few local residents with property near the south pier are the only people who fish

there. The north pier is within the boundaries of Holland State Park, and it is only for that pier that an analysis was conducted.

For all anglers interviewed on the north pier, 40% 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 2.8 fish per angler day, 99% of which were yellow perch.

Table 10 lists the average daily expenditures made by pier anglers in Holland 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.

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

17,574 angler days X $6.74 per angler day = $121,964

The total estimated gross expenditures in Ottawa County of Holland non-resident pier anglers were:

9,015 angler days X $8.51 per angler day = $76,718

Statistics for pier angler expenditures made in Holland are in Table 11. Statistics for all anglers are listed first, followed by non-resident angler statistics in parentheses.

Ninety-seven percent of the Holland pier anglers interviewed felt that local businesses provided adequate services and facilities. Seventy-two percent of the pier anglers felt prices in general in Ottawa County were the

Table 10. Holland pier anglers' average daily expenditures made at home, en route, and in Ottawa County.

Type of expenditure	Other Counties		Ottawa County
	Home	En route	
Tackle-small gear	.09	.04	2.94
	(.17)	(.08)	(3.91)
Licenses	--	--	.62
	--	--	(.48)
Launch fees	--	--	.05
Boat gas and oil	--	.03	--
	--	(.05)	--
Camping	--	.07	.47
	--	(.14)	(.52)
Lodging	--	--	.18
	--	--	(.31)
Restaurants	--	.15	.23
	--	(.30)	(.29)
Groceries	.05	.35	1.00
	(.10)	(.69)	(1.31)
Beer	.01	--	.08
	(.03)	--	(.04)
Vehicle gas	.65	2.67	1.81
	(1.26)	(5.20)	(2.57)
Miscellaneous	--	--	.16
Family spending	--	--	.05
	--	--	(.10)
All anglers' total	.80	3.31	6.74
Non-residents' total	(1.80)	(6.46)	(8.51)

Table 11. County expenditure statistics for Holland pier angling. Sample size = 193 (non-resident = 99).

Expenditure	Mean	Std. Dev.	Std. Err.	95% C.I.	Skew.
1. Small equip.	2.94	12.09	0.87	1.22 - 4.65	11.73
	(3.91)	(16.52)	(1.66)	(0.61 - 7.20)	(8.89)
2. Licenses	0.62	2.39	0.17	0.28 - 0.96	4.08
	(0.48)	(2.11)	(0.21)	(0.05 - 0.90)	(5.16)
3. Launch fees	0.05	0.72	0.05	-0.05 - 0.15	13.89
4. Camping	0.47	2.03	0.15	0.18 - 0.75	7.38
	(0.52)	(1.94)	(0.20)	(0.13 - 0.91)	(5.90)
5. Lodging	0.18	2.18	0.16	-0.13 - 0.49	13.56
	(0.31)	(3.02)	(0.30)	(-0.30 - 0.91)	(9.95)
6. Restaurants	0.23	1.18	0.09	0.06 - 0.39	6.19
	(0.29)	(1.21)	(0.12)	(0.04 - 0.53)	(5.06)
7. Groceries	1.00	3.91	0.28	0.44 - 1.55	6.42
	(1.31)	(4.83)	(0.49)	(0.34 - 2.27)	(5.77)
8. Beer	0.08	0.61	0.04	-0.01 - 0.16	8.39
	(0.04)	(0.34)	(0.03)	(-0.03 - 0.11)	(9.44)
9. Vehicle gas	1.81	6.50	0.47	0.89 - 2.74	8.49
	(2.57)	(8.79)	(0.88)	(0.82 - 4.32)	(6.51)
10. Misc.	0.16	1.52	0.11	-0.06 - 0.37	9.75
11. Family	0.05	0.72	0.05	-0.05 - 0.16	13.88
	(0.10)	(1.01)	(0.10)	(-0.10 - 0.30)	(9.95)
All anglers' total	6.74	15.81	1.14	4.49 - 8.98	6.54
Non-residents' total	(8.51)	(20.64)	(2.07)	(4.39 - 12.62)	(5.43)

same as elsewhere in the state (74% of non-residents), 14% felt they were higher (8% of non-residents) and 14% felt they were lower than average (18% of non-residents).

Table 12 lists pier anglers' comments about their perceptions of the adequacy of both private and public facilities and services in Holland in addition to general comments about their fishing experience in the county. The responses represent the percentage of all interviewed pier anglers who made that comment. Fifty-six percent of the Holland pier anglers interviewed felt the government agencies involved provided adequate services and facilities.

Non-residents comprised 52% of all the Holland pier anglers interviewed. Table 13 lists non-resident origins by percentages and Figure 4 shows the major in-state origins. Nine percent of the non-residents stayed overnight in the area on their trip. Their accommodations are listed in Table 14. Eighteen percent of the non-residents said that at least once a year their spouse or family accompanied them on a fishing trip to the area. The range of activities the family members engage in are listed in Table 15.

When asked to apportion their purpose for fishing between fishing for the "sport" or for the "food", Holland pier anglers' average responses were 73% for the "sport" and 27% for the "food".

Eighty-two percent of the interviewed pier anglers had fished in the Holland area in the past, and 90% said they would again, with the non-resident anglers reporting 68% had

Table 12. Holland pier angler comments.

I. Responses about the local businesses.

Responses	% of interviewed anglers
1. Bait store prices are too high.	1.0%
2. Bait stores need to open earlier.	0.5%
3. Bait stores need to open on Sunday.	0.5%
4. A cocktail bar would be nice near the north pier.	0.5%

II. Responses about government agencies.

Responses	% of interviewed anglers
1. State Park admission fees are too high.	7.8%
2. Put a sidewalk out to the pier.	6.7%
3. Need bathrooms on or near the pier.	5.2%
4. Enforce NO SWIMMING off the pier.	3.6%
5. Open the restrooms earlier in the State Park.	2.6%
6. Something must be done to increase the yellow perch stocks.	2.1%
7. Need more parking at the State Park	2.1%
8. The Indian gillnetting must be stopped.	2.1%

III. General responses.

Responses	% of interviewed anglers
1. Need cushions on the pier.	0.5%
2. This is a nice area.	0.5%
3. The Anchorage Marina is nice.	0.5%
4. Likes the bike path into town.	0.5%
5. Thinks American Tackle Outfitters is a good tackle store.	0.5%

Table 13. Holland non-resident pier angler origins.

Origin	% of anglers	Origin	% of anglers
1. Kent	28%	8. Calhoun	0.5%
2. Allegan	6%	9. Eaton	0.5%
3. Muskegon	4%	10. Jackson	0.5%
4. Indiana	4%	11. Mecosta	0.5%
5. Illinois	3%	12. Newaygo	0.5%
6. Ohio	2%	13. Washtenaw	0.5%
7. Wayne	2%		

Table 14. Holland non-resident pier angler accommodations.

Accommodation	% of non-resident anglers
1. State park	6%
2. Relatives	2%
3. Friends	1%

Table 15. Holland non-resident pier angler family activities.

Activity	% of non-resident anglers accompanied by spouse and/or family
1. Fishing	61%
2. Shopping	22%
3. Camping	7%
4. Picnicing	6%

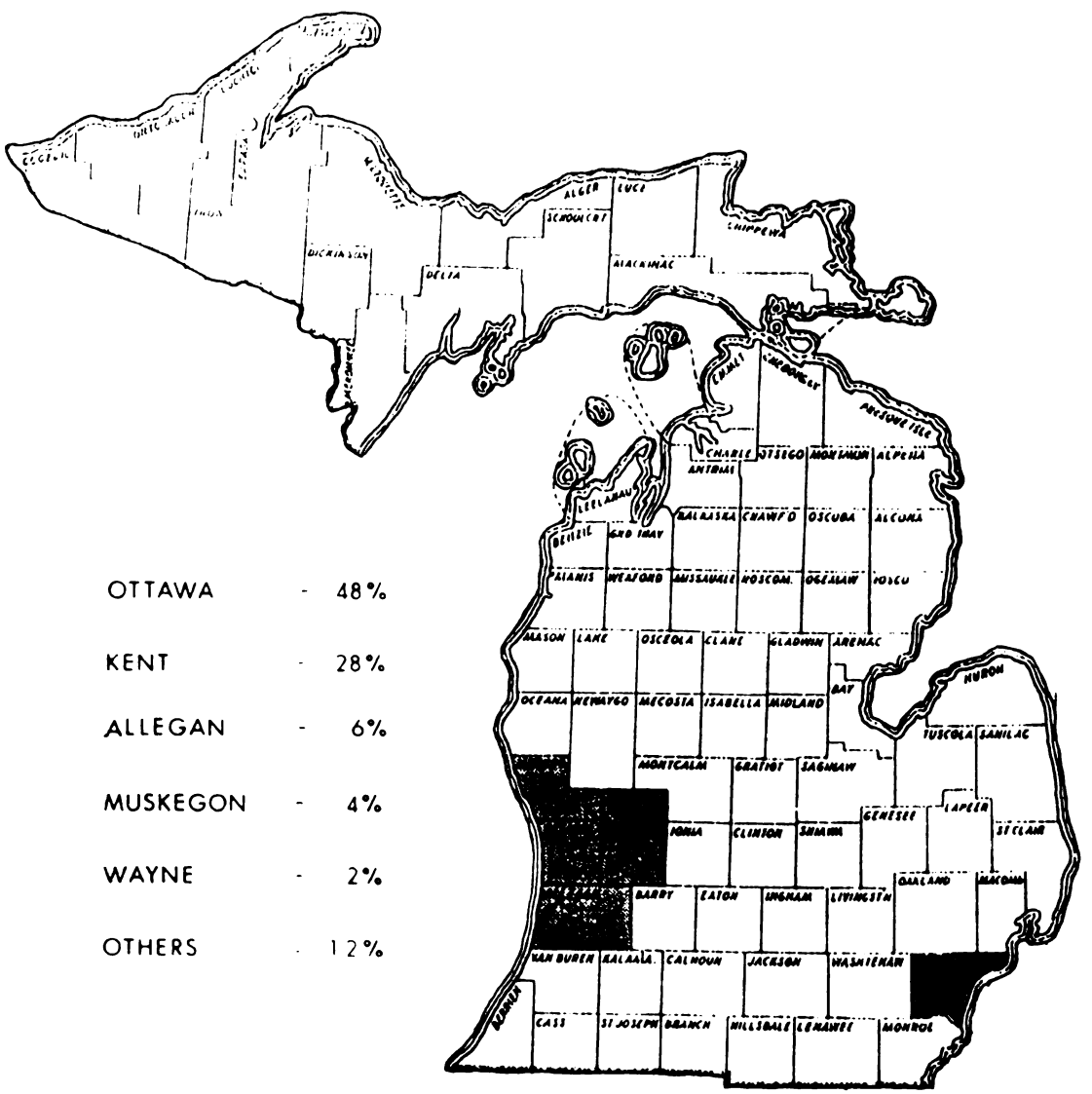

Figure 4. Holland pier angler major in-state origins.

fished there before and 84% would fish there again. Holland pier anglers averaged 20 fishing trips (all trips - ice, pier, shore and boat) to Ottawa County per year (non-residents, 17 trips). Non-resident Holland pier anglers spent an average of 1.7 days on pier fishing trips to Ottawa County.

Eighty percent of the Holland pier anglers said they fish most in the summer, 3% in the spring, 2% in the fall and 15% said they fish all year. Table 16 lists the means by which Holland pier anglers learned about the fishing opportunities in Ottawa County. Ninety-six percent of all the anglers interviewed were primarily interested in catching yellow perch, 2% were interested in catching salmon, and 2% in catching anything that would bite.

Table 16. Means by which Holland pier anglers learned about fishing in the Holland area.

Source	% of all anglers	% of non-residents
1. Relative	10%	17%
2. Friend	7%	22%
3. Traveling through	5%	17%
4. Media	2%	5%

Males comprised 86% of all the pier anglers interviewed, with 33% of the anglers saying their spouse accompanied them an average of 47% of the time. Holland pier anglers' average age was 38 years. The relative percentages for a range of Holland pier anglers' household incomes are listed in Table 17.

Table 17. Holland pier anglers' household incomes.

Income Range	% of interviewed anglers
$0 - $4,999	2%
$5,000 - $9,999	17%
$10,000 - $14,999	18%
$15,000 - $19,999	27%
$20,000 - $24,999	12%
$25,000 - $29,999	15%
$30,000 - $34,999	3%
$35,000 - $39,999	3%
$40,000 - up	3%

Grand Haven

The Grand Haven piers are located where the Grand River flows into Lake Michigan. The southern pier is accessible from a state park and the north pier has access from a city park. The piers receive heavy use because of the reputation they have of providing good fishing.

For all anglers interviewed on the Grand Haven piers, 49% had caught fish on the day questioned. That percentage is an average for all species from the spring through the fall seasons. The aggregate catch for all species was 1.9 fish per day. The average salmonid catch was 1.0 fish per angler day for those anglers specifically fishing for salmonids, and the average yellow perch catch was 2.9 fish per angler day.

Table 18 lists the average daily expenditures made by pier anglers in Grand Haven 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. Statistics for pier angler expenditures made in the Grand Haven are in Table 19. Statistics for all anglers are listed first, followed by non-resident angler statistics in parentheses.

The total estimated gross expenditures in Ottawa County of all Grand Haven pier anglers were:

22,144 angler days X $11.34 per day = $251,113

The total estimated gross expenditures in Ottawa County of Grand Haven non-resident pier anglers were:

11,294 angler days X $10.85 per day = $122,540

Eighty percent of the Grand Haven pier anglers interviewed felt the local businesses provided adequate services and facilities. Forty-nine percent of the pier anglers felt prices in general in Ottawa County were the same as elsewhere in the state (57% of non-residents), 8% felt they were higher (24% of non-residents) and 43% felt they were lower than average (36% of non-residents). Sixty-five percent of all the anglers interviewed felt the government agencies involved provided adequate services and facilities.

Table 20 lists pier anglers' comments about their perceptions of the adequacy of both private and public facili-

Table 18. Grand Haven pier anglers' average daily expenditures made at home, en route, and in Ottawa County.

Type of expenditure	Other Counties		Ottawa
	Home	En route	County
Major fishing equip.	.24	.18	1.58
	(.41)	(.34)	(.96)
Tackle-small gear	.29	.62	3.35
	(.56)	(1.20)	(2.79)
Licenses	.03	.02	.24
	(.05)	(.02)	(.12)
Boat gas and oil	.01	--	.01
	(.01)	--	(.01)
Camping	--	.29	.32
	--	--	(.56)
Lodging	--	.06	.19
	--	(.12)	(.37)
Restaurants	.01	.13	1.04
	--	(.21)	(1.56)
Groceries	1.27	.06	1.03
	(2.49)	(.12)	(1.08)
Beer	.02	.03	.47
	(.03)	(.06)	(.30)
Vehicle gas	.78	.41	2.46
	(1.51)	(.81)	(2.54)
Miscellaneous	.18	.10	.24
	(.35)	(.20)	(.12)
Family spending	--	.10	.41
	--	(.19)	(.44)
All anglers' total	2.83	2.01	11.34
Non-residents' total	(5.41)	(3.27)	(10.85)

Table 19. County expenditure statistics for Grand Haven pier angling. Sample size = 681, (non-resident = 347).

Expenditure	Mean	Std. Dev.	Std. Err.	95% C.I.	Skew.
1. Major equip.	1.58	7.63	0.29	1.01 - 2.16	5.43
	(0.96)	(6.23)	(0.34)	(0.30 - 1.62)	(7.87)
2. Small equip.	3.35	5.96	0.23	2.90 - 3.80	4.31
	(2.79)	(5.91)	(0.32)	(2.17 - 3.42)	(6.02)
3. Licenses	0.24	1.88	0.07	0.10 - 0.38	8.40
	(0.12)	(1.49)	(0.08)	(-0.04 - 0.28)	(13.55)
4. Boat gas	0.01	0.17	0.01	-0.01 - 0.02	26.10
	(0.01)	(0.20)	(0.01)	(-0.01 - 0.03)	(18.63)
5. Camping	0.32	2.32	0.09	0.15 - 0.50	12.69
	(0.56)	(3.14)	(0.17)	(0.22 - 0.89)	(9.69)
6. Lodging	0.19	3.88	0.15	-0.11 - 0.48	25.13
	(0.37)	(5.44)	(0.29)	(-0.21 - 0.94)	(17.94)
7. Restaurants	1.04	3.55	0.14	0.78 - 1.31	5.25
	(1.56)	(4.36)	(0.23)	(1.10 - 2.02)	(4.23)
8. Groceries	1.03	2.81	0.11	0.82 - 1.24	10.28
	(1.08)	(3.62)	(0.19)	(0.70 - 1.46)	(9.23)
9. Beer	0.47	1.75	0.07	0.34 - 0.60	4.67
	(0.30)	(1.43)	(0.08)	(0.15 - 0.45)	(6.46)
10. Vehicle gas	2.46	8.53	0.33	1.82 - 3.10	18.70
	(2.54)	(4.86)	(0.26)	(2.03 - 3.06)	(3.69)
11. Misc.	0.24	0.84	0.03	0.18 - 0.30	6.70
	(0.12)	(0.41)	(0.02)	(0.08 - 0.17)	(3.52)
12. Family	0.41	2.59	0.10	0.21 - 0.60	8.03
	(0.44)	(2.63)	(0.14)	(0.16 - 0.72)	(7.25)
All anglers' total	11.34	17.56	0.67	10.02 - 12.66	4.57
Non-residents' total	(10.85)	(16.88)	(0.91)	(9.06 - 12.64)	(4.30)

Table 20. Grand Haven pier angler comments.

I. Responses about the local businesses.

Responses	% of interviewed anglers
1. Need more tackle stores in general.	6.3%
2. Need a tackle store closer to the North pier.	3.2%
3. Tackle stores are hard to find.	2.8%
4. Tackle stores need to open earlier.	2.5%
5. More tackle stores need to sell live bait.	2.2%
6. Need better bait shops.	1.9%
7. Tackle stores have a limited selection of merchandise.	1.3%
8. Tackle store prices are too high.	1.3%
9. Need a tackle store closer to the South pier.	0.7%

II. Responses about government agencies.

Responses	% of interviewed anglers
1. Stop the Indian gillnetting.	18.8%
2. Plant more steelhead and brown trout.	2.1%
3. Clean and fix N. pier restrooms.	1.8%
4. Need more parking at N. pier lot.	1.6%
5. Need more public access in area.	1.6%
6. Do not charge to park at S. pier lot.	1.3%
7. Plant walleye in the Grand River.	1.3%
8. Need more public boat launches in area.	1.2%
9. Grand Haven needs an artificial reef.	1.2%
10. Something should be done to improve the perch fishing.	1.2%
11. Need fish cleaning stations on the piers.	0.7%

Table 20. (cont'd.)

III. General responses.

Responses	% of interviewed anglers
1. Grand Haven is a good place to fish.	5.7%
2. The fishing is poor.	2.6%
3. North pier lot and walkway is nice.	2.2%
4. Grand Haven is a great place.	2.2%
5. The piers are nice.	1.2%

ties and services in Grand Haven in addition to general comments about their fishing experience in the county. The responses represent the percentage of all interviewed pier anglers who made that comment.

Non-residents comprised 52% of the Grand Haven pier anglers interviewed. Table 21 lists non-resident origins by percentages and Figure 5 shows the major in-state origins. Seven percent of the non-residents stayed overnight in the area on their trip. Their accommodations are listed in Table 22. Forty-seven percent of the non-residents said that least once a year their spouse or family accompanied them on a fishing trip to the area. The range of activities the family members engaged in are listed in Table 23.

When asked to apportion their purpose for fishing between fishing for the "sport" or for the "food", Grand Haven pier anglers' average responses were 58% for the "sport" and 42% for the "food".

Table 21. Grand Haven non-resident pier angler origins.

Origin	% of anglers	Origin	% of anglers
1. Kent	24%	16. Kalkaska	0.2%
2. Muskegon	21%	17. Montcalm	0.2%
3. Oakland	0.9%	18. Osceola	0.2%
4. Ingham	0.6%	19. St. Clair	0.2%
5. Wayne	0.6%	20. Shiawassee	0.2%
6. Genessee	0.4%	21. Indiana	0.2%
7. Lenawee	0.4%	22. Illinois	0.2%
8. Calhoun	0.3%	23. Ohio	0.2%
9. Clinton	0.3%	24. Minnesota	0.2%
10. Ionia	0.3%	25. New York	0.2%
11. Jackson	0.3%	26. Maryland	0.2%
12. Newaygo	0.3%	27. Massachusetts	0.2%
13. Saginaw	0.3%	28. Missouri	0.2%
14. Eaton	0.2%	29. Arkansas	0.2%
15. Kalamazoo	0.2%		

Table 22. Grand Haven non-resident pier angler accommodations.

Accommodation	% of non-resident anglers
1. State park	4%
2. Relatives	2%
3. Friends	1%
4. Motel	0.3%

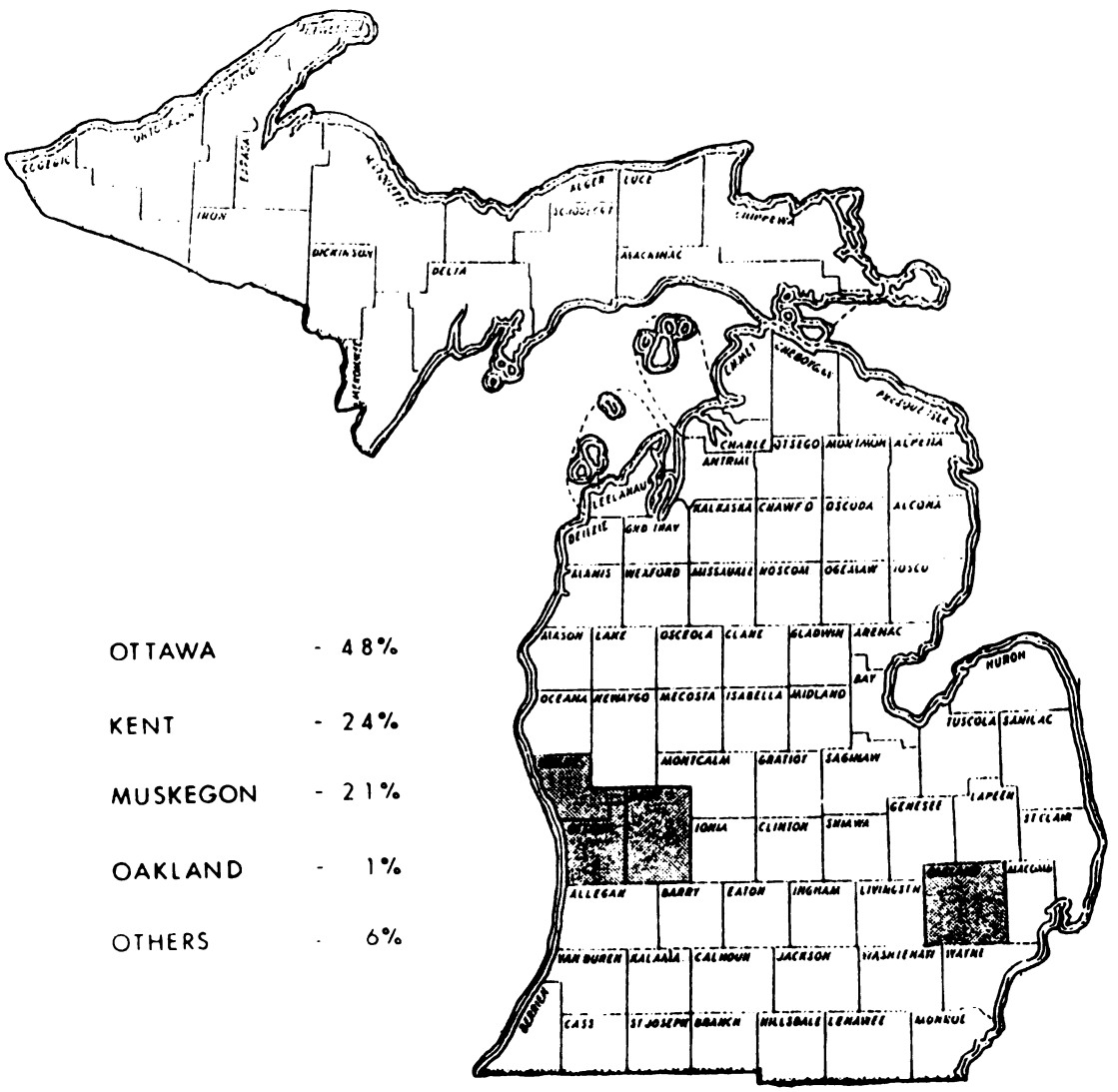

Figure 5. Grand Haven pier angler major in-state origins.

Table 23. Grand Haven non-resident pier angler family activities.

Activity	% of non-resident anglers accompanied by spouse and/or family
1. Fishing	33%
2. Shopping	7%
3. Sunbathing	5%
4. Swimming	4%
5. Visiting relatives	2%
6. Movies	2%
7. Reading	2%

Ninety-eight percent of the interviewed pier anglers had fished in the Grand Haven area in the past, and 99% said they would again, with the non-resident anglers reporting 96% had fished there before and 98% would fish there again. Grand Haven pier anglers averaged 63 fishing trips (all trips - ice, pier, shore and boat) to Ottawa County per year (non-residents, 54 trips). Non-resident Grand Haven pier anglers spent an average of 1.3 days on pier fishing trips to Ottawa County.

Nineteen percent of the Grand Haven pier anglers said they fish most in the summer, 9% in the spring, 8% in the fall and 66% said they fish all year. Table 24 lists the means by which non-resident Grand Haven pier anglers learned about the fishing opportunities in Ottawa County. Table 25 lists by percentage the species of fish anglers were primarily fishing for.

Table 24. Means by which Grand Haven pier anglers learned about fishing in the Grand Haven area.

Source	% of all anglers	% of non-residents
1. Relative	7%	12%
2. Friend	8%	13%
3. Traveling through	2%	3%
4. Media	5%	5%
5. Used to live here	--	7%

Table 25. Species Grand Haven pier anglers primarily fished for.

Species	% of interviewed anglers
1. Yellow perch	39%
2. Lake trout	21%
3. Chinook salmon	21%
4. Brown trout	7%
5. Steelhead	5%
6. Menominee	3%
7. Catfish	1%
8. Bluegill	1%
9. Anything	2%

Males comprised 90% of the Grand Haven pier anglers interviewed, with 40% of the pier anglers saying their spouse accompanied them an average of 39% of the time. Grand Haven pier anglers' average age was 43 years. The relative percentages for a range of Grand Haven pier anglers' household incomes are listed in Table 26.

Table 26. Grand Haven pier anglers' household incomes.

Income Range	% of interviewed anglers
$0 - $4,999	12%
$5,000 - $9,999	22%
$10,000 - $14,999	18%
$15,000 - $19,999	16%
$20,000 - $24,999	10%
$25,000 - $29,999	12%
$30,000 - $34,999	3%
$35,000 - $39,999	2%
$40,000 - up	6%

BOAT FISHING

In both Holland and Grand Haven boat fishing accounted for the largest proportion of angler use and economic impact. In Holland, boat angler use was 72% of the total and in Grand Haven it was 85% of the total. In total boat anglers spent an estimated 131,355 days fishing in Ottawa County. Out of that, non-resident boat anglers spent an estimated 50,703 days fishing in Ottawa County. Seventy-two percent of the non-resident boat angler use in Ottawa County was out of Grand Haven.

Boat anglers also had the highest average daily expenditures, the average for Holland and Grand Haven; over $22 per day. This far exceeded the $10 per day for pier and shore fishing and the $3 per day for ice fishing. In Holland, boat angler expenditures were 69% of the total and in Grand Haven they were 59% of the total. In total, boat anglers spent an estimated $2,786,863 in Ottawa County. Of that, non-resident boat anglers spent an estimated $1,222,968. Eighty-eight percent of the non-resident boat angler expenditures in Ottawa County were made by anglers fishing out of Grand Haven.

Holland

Boat angling use in the Holland area was estimated from three subsets of anglers: those that launched their boats on Lake Macatawa and either 1) fished on Lake Michigan at some time during that day; or 2) fished only on Lake Macatawa; or 3) those that launched their boats at Port Sheldon and fished on Lake Michigan. All three subsets of anglers were analyzed as one group for the expenditure estimates.

We estimated that 2.1% of all fishing boat trips were strictly for fishing on Lake Macatawa. Therefore, out of the total 64,660 boat angler days estimated for the Holland area, 1,320 were attributable solely to fishing on Lake Macatawa.

Of all anglers interviewed, 48% had caught fish on the day questioned, and the aggregate catch for all species on days anglers were interviewed was 1.83 fish per day. Chinook salmon and lake trout comprised 62% of the catch.

Table 27 lists the average daily expenditures made by boat anglers in Holland 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. Statistics for boat angler expenditures made in Holland are in Table 28. Statistics for all anglers are listed first, followed by non-resident angler statistics in parentheses.

Table 27. Holland boat anglers' average daily expenditures made at home, en route, and in Ottawa County.

Type of expenditure	Other Counties		Ottawa County
	Home	En route	
Major fishing equip.	--	--	.05
Tackle-small gear	--	--	1.58
	--	--	(1.10)
Licenses	--	--	.31
	--	--	(.92)
Boat rentals	--	--	.32
	--	--	(1.46)
Launch fees	--	--	.16
	--	--	(.06)
Boat gas and oil	.29	.20	4.73
	(1.31)	(.42)	(2.44)
Camping	--	--	--
	--	--	(.02)
Lodging	--	--	.06
	--	--	(.26)
Restaurants	--	--	.57
	--	--	(.32)
Groceries	.09	.24	.95
	(.29)	(1.06)	(.54)
Beer	.03	--	.63
	(.13)	--	(.22)
Vehicle gas	1.95	.18	1.40
	(2.54)	(.83)	(3.43)
Miscellaneous	--	--	.04
	--	--	(.04)
Family spending	--	--	.94
	--	--	(4.25)
All anglers' total	1.81	.62	10.69
Non-residents' total	(4.28)	(2.31)	(10.27)

Table 28. County expenditure statistics for Holland boat angling. Sample size = 217 (non-resident = 48).

Expenditure	Mean	Std. Dev.	Std. Err.	95% C.I.	Skew.
1. Major equip.	0.05	0.68	0.05	-0.05 - 0.14	14.73
2. Small equip.	1.58	4.76	0.32	0.94 - 2.22	4.36
	(1.10)	(5.27)	(0.76)	(-0.43 - 2.64)	(6.02)
3. Licenses	0.31	2.95	0.20	-0.09 - 0.70	12.01
	(0.92)	(5.79)	(0.84)	(-0.77 - 2.60)	(6.83)
4. Boat rental	0.32	3.35	0.23	-0.13 - 0.77	10.34
	(1.46)	(7.06)	(1.02)	(-0.59 - 3.51)	(4.74)
5. Launch fees	0.16	1.73	0.12	-0.08 - 0.39	13.89
	(0.06)	(0.43)	(0.06)	(-0.06 - 0.19)	(6.93)
6. Boat gas	4.73	14.80	1.01	2.69 - 6.65	10.92
	(2.44)	(4.89)	(0.71)	(1.02 - 3.85)	(2.49)
7. Camping	(0.02)	(0.27)	(0.02)	(-0.02 - 0.06)	(14.73)
8. Lodging	0.06	0.85	0.06	-0.06 - 0.17	14.73
	(0.26)	(1.80)	(0.26)	(-0.26 - 0.78)	(6.93)
9. Restaurants	0.57	5.06	0.34	-0.11 - 1.24	12.45
	(0.32)	(2.17)	(0.31)	(-0.31 - 0.95)	(6.92)
10. Groceries	0.95	2.12	0.14	0.67 - 1.24	2.90
	(0.54)	(1.70)	(0.25)	(0.05 - 1.04)	(4.31)
11. Beer	0.63	1.92	0.13	0.35 - 0.86	3.80
	(0.22)	(1.44)	(0.21)	(-0.20 - 0.64)	(6.89)
12. Vehicle gas	1.40	3.66	0.25	0.91 - 1.89	4.99
	(3.43)	(6.38)	(0.92)	(1.57 - 5.28)	(1.58)
13. Misc.	0.04	0.29	0.02	0.00 - 0.08	7.87
	(0.04)	(0.29)	(0.04)	(-0.04 - 0.12)	(6.93)
14. Fam. spend.	0.94	13.58	0.92	-0.88 - 2.75	14.73
All anglers' total	10.69	24.71	1.68	7.40 - 14.01	6.14
Non-residents' total	(10.27)	(17.14)	(2.47)	(5.27 - 15.22)	(2.30)

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

64,660 angler days X $10.69 per angler day = $691,215

The total estimated gross expenditures in Ottawa County of Holland non-resident boat anglers were:

14,303 angler days X $10.27 per angler day = $146,892

Table 29 lists boat anglers' comments about their perceptions of the adequacy of both private and public facilities and services in Holland in addition to general comments about their fishing experience in the county. The responses represent the percentage of all interviewed boat anglers who made that comment.

Ninety-seven percent of all the anglers interviewed felt the local businesses provided adequate services and facilities. Eighty-one percent of Holland boat anglers felt prices in the area were the same as elsewhere in the state (non-residents - 77%), 10% felt prices were higher than average (non-residents - 15%), and 9% felt they were lower than average (non-residents - 8%). Fifty-five percent of all the anglers interviewed felt the government agencies involved provided adequate services and facilities.

Non-residents comprised 22% of all the boat anglers interviewed. Table 30 lists non-resident origins by percentages and Figure 6 shows the major in-state origins. Only two percent of the non-residents stayed overnight in the area on their trip, and they stayed at the state park. Twenty-three percent of the non-residents said that at least

Table 29. Holland boat angler comments.

I. Responses about the local businesses.

Responses	% of interviewed anglers
1. Need another marina on Lake Macatawa.	1.4%
2. Need boat rentals.	1.0%

II. Responses about government agencies.

Responses	% of interviewed anglers
1. Stop the Indian gillnetting.	9.6%
2. Need more ramps at the DNR launch.	9.2%
3. Do not charge to launch boats.	8.8%
4. Plant more salmon.	6.9%
5. Need more dockage at the DNR launch.	3.2%
6. Need a municipal marina.	2.3%

III. General responses.

Responses	% of interviewed anglers
1. The fishing is poor.	1.5%
2. The fishing is good.	1.0%

Table 30. Holland non-resident boat angler origins.

Origin	% of anglers	Origin	% of anglers
1. Kent	12%	6. Pennsylvania	0.5%
2. Allegan	4%	7. Baraga	0.5%
3. Eaton	2%	8. Benzie	0.5%
4. Illinois	1%	9. Ingham	0.5%
5. Muskegon	1%	10. Van Buren	0.5%

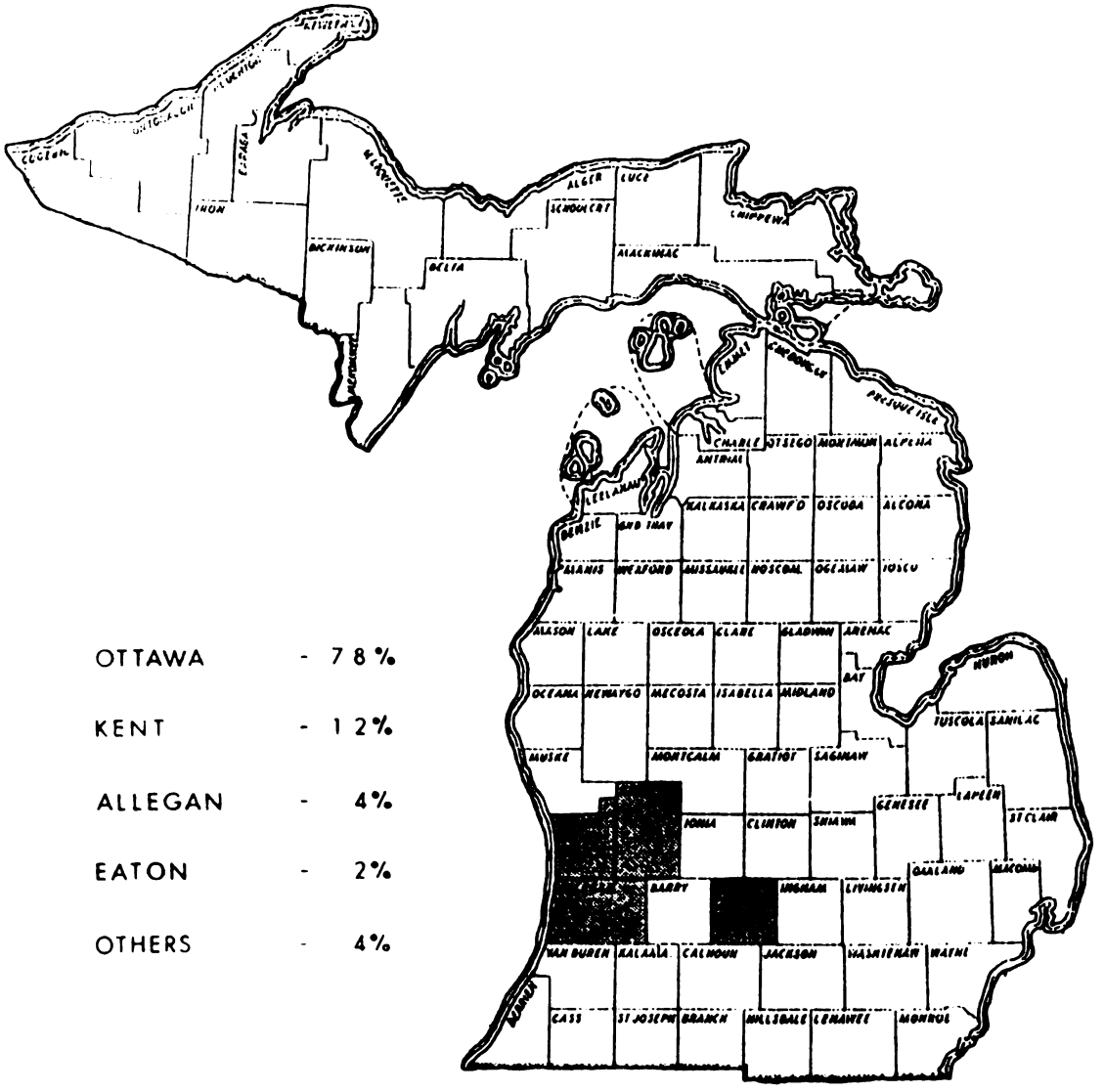

Figure 6. Holland boat angler major in-state origins.

once a year their spouse or family accompanied them on a fishing trip to the area, and the only activity family members engaged in was fishing.

When asked to apportion their purpose for fishing between fishing for the "sport" or for the "food", Holland boat anglers' average responses were 77% for the "sport" and 23% for the "food".

All of the interviewed boat anglers had fished in the Holland area in the past, and 97% said they would again, with the non-resident anglers reporting 96% would fish there again. Boat anglers averaged 37 fishing trips (all trips - ice, pier and boat) to Holland per year (non-residents, 20 trips). Non-resident boat anglers spent an average of 1.4 days fishing in Ottawa County.

Seventy-eight percent of the boat anglers said they do most of their fishing in the summer, 2% in the spring, 5% in the fall, and 15% said they fish all year. Sixty-six percent of the boat anglers interviewed were fishing primarily for trout or salmon, 15% for yellow perch, and 14% for anything that would bite. Twenty percent of the non-resident anglers reported they had learned about the fishing in the Holland area from a relative and another 20% said they had learned from friends.

Males comprised 93% of all the anglers interviewed, with 24% of the anglers saying their spouse accompanied them an average of 46% of the time. Holland boat anglers' average age was 46 years. The relative percentages for a

range of boat anglers' household incomes are listed in Table 31.

Table 31. Holland boat anglers' household incomes.

Income Range	% of interviewed anglers
$0 - $4,999	0%
$5,000 - $9,999	5%
$10,000 - $14,999	10%
$15,000 - $19,999	22%
$20,000 - $24,999	15%
$25,000 - $29,999	28%
$30,000 - $34,999	15%
$35,000 - $39,999	0%
$40,000 - up	5%

Grand Haven

Grand Haven is Ottawa County's real drawing card for Great Lakes offshore fishing. The Grand River receives one of the largest runs of anadromous salmonids in Michigan, and the concentrations of fish off the mouth of the river provides some of the state's best fishing. Grand Haven has a reputation of success throughout the Great Lakes region, and with the recent completion of the fish ladders along the Grand River and the increased plants of salmon and trout to assure enough fish get upstream to Lansing, Grand Haven's reputation as a fish-producing area has a secure future. As proof, eighty-one percent of all the boat anglers

interviewed had caught fish on the day questioned, with an average of 1.8 salmonids per day in addition to 0.4 perch and panfish per day.

Table 32 lists the average daily expenditures made by boat anglers in Grand Haven 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. Statistics for boat angler expenditures made in Grand Haven are in Table 33. Statistics for all anglers are listed first, followed by non-resident angler statistics in parentheses.

The total estimated gross expenditures in Ottawa County of all Grand Haven boat anglers were:

66,975 angler days X $31.29 per day = $2,095,648

The total estimated gross expenditures in Ottawa County of Grand Haven non-resident boat anglers were:

36,400 angler days X $29.59 per day = $1,077,076

Table 34 lists boat anglers' comments about their perceptions of the adequacy of both private and public facilities and services in Grand Haven in addition to general comments about their fishing experience in the county. The responses represent the percentage of all interviewed boat anglers who made that comment.

Ninety percent of all the anglers interviewed felt the local businesses provided adequate services and facilities. Forty-five percent of Grand Haven boat anglers felt prices

Table 32. Grand Haven boat anglers' average daily expenditures made at home, en route, and in Ottawa County.

Type of expenditure	Other Counties		Ottawa County
	Home	En route	
Major fishing equip.	--	--	5.28
	--	--	(5.14)
Tackle-small gear	--	--	8.86
	--	--	(6.23)
License	--	--	.09
Boat rental	--	--	.03
Slip fees - transient	--	--	.66
	--	--	(1.06)
Launch fees	--	--	.15
	--	--	(.12)
Boat gas and oil	.08	--	5.12
	(.14)	--	(5.23)
Camping	--	--	.25
	--	--	(.37)
Lodging	--	--	.50
	--	--	(.81)
Restaurants	--	--	2.81
	--	--	(3.19)
Groceries	.14	--	2.26
	(.25)	--	(2.46)
Beer	.08	--	2.53
	(.14)	--	(2.05)
Vehicle gas	1.04	.33	1.11
	(1.91)	(.61)	(1.06)
Miscellaneous	.01	--	1.28
	(.02)	--	(1.60)
Family spending	--	--	.36
	--	--	(.27)
All anglers' total	1.35	.33	31.29
Non-residents' total	(2.46)	(.61)	(29.59)

Table 33. County expenditure statistics for Grand Haven boat angling. Sample size = 184, (non-resident = 100).

Expenditure	Mean	Std. Dev.	Std. Err.	95% C.I.	Skew.
1. Major equip.	5.28	19.96	1.47	2.38 - 8.19	5.84
	(5.14)	(18.73)	(1.87)	(1.42 - 8.86)	(4.10)
2. Small equip.	8.86	17.28	1.27	6.34 - 11.37	5.77
	(6.23)	(8.68)	(0.87)	(4.51 - 7.96)	(1.49)
3. Licenses	0.09	0.83	0.06	-0.03 - 0.21	9.51
4. Boat rental	0.03	0.37	0.03	-0.03 - 0.08	13.57
5. Slip fees	0.66	5.53	0.41	-0.15 - 1.47	13.49
	(1.06)	(7.50)	(0.75)	(-0.43 - 2.55)	(9.95)
6. Launch fees	0.15	1.11	0.08	-0.01 - 0.31	9.55
	(0.12)	(0.72)	(0.07)	(-0.03 - 0.26)	(6.58)
7. Boat gas	5.12	6.62	0.49	4.15 - 6.08	1.41
	(5.23)	(6.71)	(0.67)	(3.89 - 6.56)	(1.19)
8. Camping	0.25	1.44	0.11	0.04 - 0.45	6.31
	(0.37)	(1.86)	(0.19)	(0.00 - 0.74)	(5.05)
9. Lodging	0.50	4.19	0.31	-0.11 - 1.10	9.30
	(0.81)	(5.63)	(0.56)	(-0.31 - 1.93)	(6.96)
10. Restaurants	2.81	4.64	0.34	2.14 - 3.49	2.02
	(3.19)	(5.01)	(0.50)	(2.20 - 4.19)	(1.53)
11. Groceries	2.26	3.05	0.23	1.81 - 2.70	1.99
	(2.46)	(3.43)	(0.34)	(1.78 - 3.14)	(1.83)
12. Beer	2.53	5.26	0.39	1.77 - 3.30	2.80
	(2.05)	(4.79)	(0.48)	(1.10 - 3.00)	(3.45)
13. Vehicle gas	1.11	2.28	0.17	0.78 - 1.44	4.57
	(1.06)	(2.75)	(0.28)	(0.52 - 1.61)	(4.47)
14. Misc.	1.28	4.37	0.32	0.64 - 1.91	6.60
	(1.60)	(5.77)	(0.58)	(0.46 - 2.75)	(5.15)
15. Family	0.36	2.29	0.17	0.02 - 0.69	7.27
	(0.27)	(1.56)	(0.16)	(-0.04 - 0.58)	(6.39)
All anglers' total	31.29	38.08	2.81	25.75 - 36.83	2.87
Non-residents' total	(29.59)	(34.41)	(3.44)	(22.76 - 36.42)	(2.17)

Table 34. Grand Haven boat angler comments.

I. Responses about the local businesses.

Responses	% of interviewed anglers
1. Tackle shops are hard to find.	7%
2. Need better tackle shops.	2%
3. Need more tackle shops.	2%

II. Responses about government agencies.

Responses	% of interviewed anglers
1. Stop the Indian gillnetting.	53%
2. Clean the restrooms at the municipal launch.	12%
3. Need more public launches in the area.	7%
4. Need more municipal parks along the Grand River.	6%
5. Plant more salmon.	4%
6. State should not charge to launch boats.	3%
7. Grand Haven needs an artificial reef.	2%

III. General responses.

Responses	% of interviewed anglers
1. Likes the Grand Haven area.	22.3%
2. Grand Haven area has good fishing.	15.6%
3. The fishing is poor.	11.7%
4. Enjoyed the musical fountain.	4.0%

area were the same as elsewhere in the state (non-residents - 57%), 10% felt prices were higher than average (non-residents - 10%), and 45% felt they were lower than average (non-residents - 33%). Thirty-five percent of all the anglers interviewed felt the government agencies involved provided adequate services and facilities.

Fifty-five percent of the anglers were non-residents of Ottawa County. Table 35 lists non-resident origins by percentages and Figure 7 shows the major in-state origins. Twenty-one percent of the non-residents stayed overnight in the area on their trip. Their accommodations are listed in Table 36. Sixty-two percent of the non-residents said that at least once a year their spouse or family accompanied them on a fishing trip to the area, and the only activity family members engaged in was fishing.

Table 35. Grand Haven non-resident boat angler origins.

Origin	% of anglers	Origin	% of anglers
1. Kent	26%	5. Wayne	4%
2. Muskegon	11%	6. Barry	3%
3. Kalamazoo	4%	7. Indiana	1%
4. Genesee	4%	8. Massachusetts	1%

When asked to apportion their purpose for fishing between fishing for the "sport" or for the "food", Grand Haven boat anglers' average responses were 70% for the "sport" and 30% for the "food".

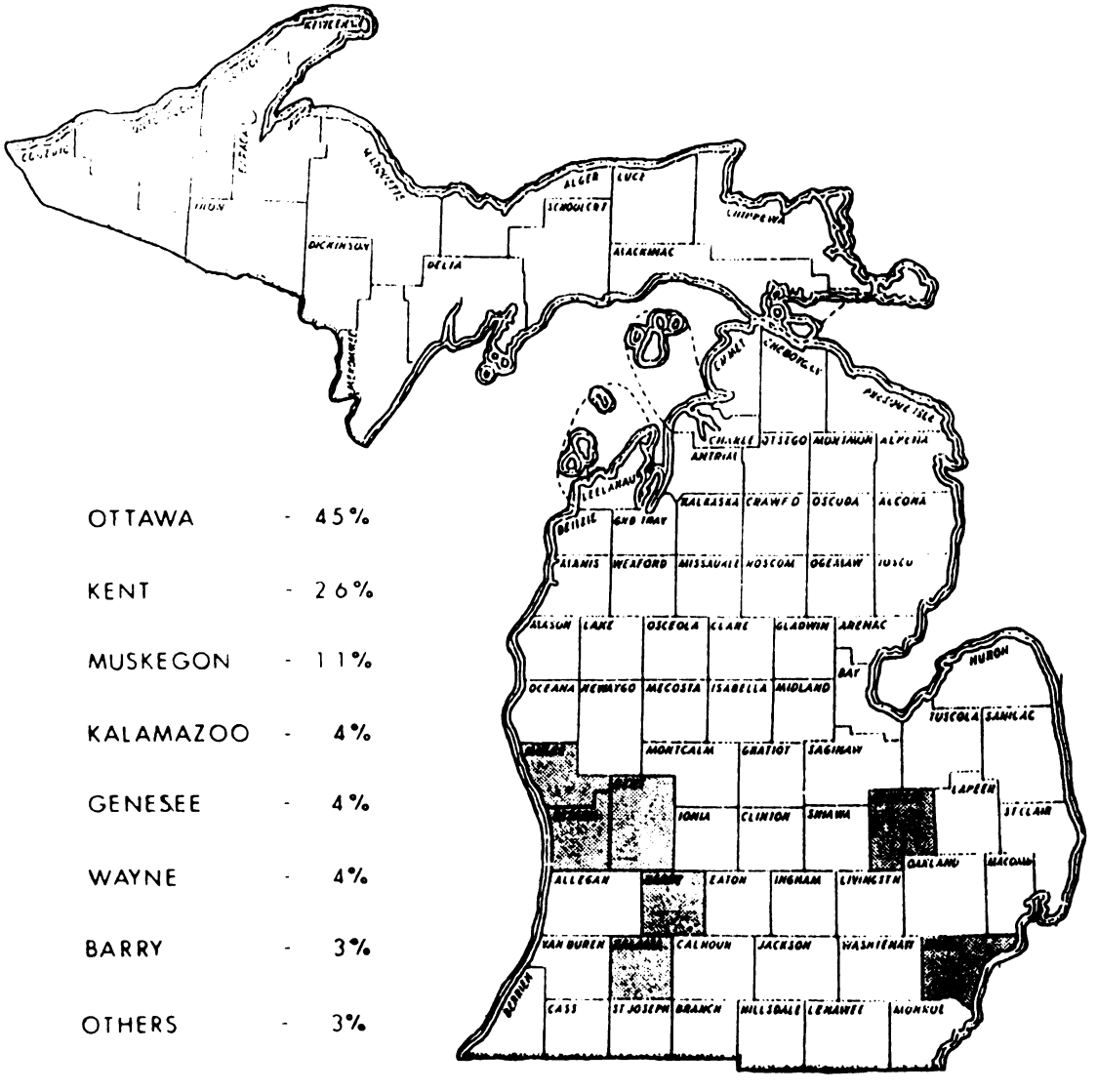

Figure 7. Grand Haven boat angler major in-state origins.

Table 36. Grand Haven non-resident boat angler accommodations.

Accommodation	% of non-resident anglers
1. State park	65%
2. Relatives	27%
3. Motel	8%

Ninety-eight percent of the interviewed boat anglers had fished in the Grand Haven area in the past, and 100% said they would again, with the non-resident anglers reporting similarly. Boat anglers averaged 65 fishing trips (all trips - ice, pier, shore and boat) to Grand Haven in a year (non-residents made 58 trips). Non-resident boat anglers spent an average of 1.4 days fishing in Ottawa County.

Twenty-four percent of the boat anglers said they do most of their fishing in the summer (non-residents - 35%), 2% in the spring , 1% in the fall , and 73% saying they fish all year (non-residents - 65%). Seventy-three percent of all the anglers interviewed were fishing primarily for trout or salmon, 10% for bass, 2% for yellow perch, and 13% for anything that would bite. Table 37 lists the means by which Grand Haven boat anglers learned about the fishing opportunities in Grand Haven.

Males comprised 84% of all the anglers interviewed, with 68% of the anglers saying their spouse accompanied them an average of 48% of the time. Grand Haven boat anglers' average age was 42 years. The relative percentages for a

range of boat anglers' household incomes are listed in Table 38.

Table 37. Means by which Grand Haven boat anglers learned about fishing in the Grand Haven area.

Source	% of all anglers	% of non-residents
1. Sportsmens club	23%	41%
2. Friend	8%	25%
3. Relative	5%	18%
4. Used to live here		5%

Table 38. Grand Haven boat anglers' household incomes.

Income Range	% of interviewed anglers
$0 - $4,999	6%
$5,000 - $9,999	9%
$10,000 - $14,999	16%
$15,000 - $19,999	18%
$20,000 - $24,999	21%
$25,000 - $29,999	15%
$30,000 - $34,999	10%
$35,000 - $39,999	4%
$40,000 - up	2%

GRAND HAVEN SHORE FISHING

The Grand Haven shore fishery is predominantly found along the Grand River and its connecting bayous. Shore anglers were interviewed on the following bayous: Stearn's, Millhouse, Pottawatamie, Bruce's, Lloyd's, Smith's, and Petty's. Anglers were also interviewed at Grand Valley Marina on the Grand River, and at Fruitport and Johnson's Marina on Spring Lake.

Anglers fish the shores of the lower Grand River and bayous primarily for panfish, bass, and pike. The average aggregate catch rate of the anglers interviewed for all species was 6.8 fish per angler day, with perch and panfish comprising 90% of the catch.

Table 39 lists the average daily expenditures made by Grand Haven shore anglers 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. Statistics for shore angler expenditures made in the county are in Table 40. Statistics for all anglers are listed first, followed by non-resident angler statistics in parentheses.

Table 39. Grand Haven shore anglers' average daily expenditures at home, en route, and in Ottawa County.

Type of expenditure	Other Counties Home	Other Counties En route	Ottawa County
Major fishing equip.	-- --	-- --	1.42 (1.46)
Tackle-small gear	.02 (.07)	1.57 (.43)	3.18 (3.29)
Restaurants	-- --	.05 --	.27 (0.09)
Groceries	.02 (.06)	.05 (.16)	1.07 (1.36)
Beer	-- --	.06 (.17)	.28 (.17)
Vehicle gas	.34 (1.04)	.08 (.25)	1.87 (2.80)
Miscellaneous	.03 (.10)	.02 (.07)	.43 (.28)
Family spending	--	--	.09
All anglers' total	.41	1.83	8.61
Non-residents' total	(1.27)	(1.23)	(9.45)

The total estimated gross expenditures in Ottawa County of all Grand Haven shore anglers were:

14,577 angler days X $8.61 per day = $125,508

The total estimated gross expenditures in Ottawa County of Grand Haven non-resident shore anglers were:

4,789 angler days X $9.45 per day = $45,256

Table 41 lists shore anglers' comments about their perceptions of the adequacy of both private and public facilities and services in the Grand Haven area. Eighty-seven percent of all the anglers interviewed felt the local businesses provided adequate services and facilities.

Table 40. County expenditure statistics for Grand Haven shore angling. Sample size = 210, (non-resident = 69).

Expenditure	Mean	Std. Dev.	Std. Err.	95% C.I.	Skew.
1. Major equip.	1.42	6.21	0.43	0.58 - 2.27	4.91
	(1.46)	(6.34)	(0.76)	(-0.06 - 2.99)	(4.41)
2. Small equip.	3.18	3.05	0.21	2.76 - 3.59	3.21
	(3.29)	(3.38)	(0.41)	(2.48 - 4.10)	(2.11)
3. Restaurants	0.27	1.11	0.08	0.12 - 0.42	4.85
	(0.09)	(0.51)	(0.06)	(-0.04 - 0.21)	(5.74)
4. Groceries	1.07	1.36	0.09	0.89 - 1.26	2.20
	(1.36)	(1.77)	(0.21)	(0.94 - 1.79)	(2.46)
5. Beer	0.28	1.10	0.08	0.13 - 0.43	4.18
	(0.17)	(0.82)	(0.10)	(-0.02 - 0.37)	(5.89)
6. Vehicle gas	1.87	2.24	0.16	1.56 - 2.17	2.80
	(2.80)	(2.54)	(0.31)	(2.19 - 3.41)	(0.56)
7. Misc.	0.43	1.13	0.08	0.28 - 0.58	4.50
	(0.28)	(0.68)	(0.08)	(0.11 - 0.44)	(3.00)
8. Family	0.09	0.64	0.04	0.00 - 0.18	8.26
All anglsers' total	8.61	9.55	0.66	7.31 - 9.91	4.48
Non-residents' total	(9.45)	(9.14)	(1.10)	(7.26 - 11.64)	(3.04)

Twenty-five percent of the shore anglers felt prices in the Grand Haven area were the same as elsewhere in the state (29% of non-residents), 5% felt they were higher than average (6% of non-residents) and 70% felt they were lower (65% of non-residents). Ninety-four percent of all the anglers interviewed felt the government agencies involved provided adequate services and facilities.

Non-residents comprised 33% of all the shore anglers interviewed. Figure 8 shows that all the non-residents came

Table 41. Grand Haven shore angler comments.

I. Responses about the local businesses.	
Responses	% of interviewed anglers
1. Need more sport shops in area.	9.0%
2. Tackle shops are hard to find.	1.9%
3. Tackle store prices are too high.	1.0%
4. Need better bait stores.	0.5%
5. Bait costs too much here.	0.5%

II. Responses about government agencies.	
Responses	% of interviewed anglers
1. Stop the Indian gillnetting.	4.3%
2. Too much money is being spent on the "big" lake fisheries.	1.4%
3. Plant more fish in inland lakes.	0.5%

from the two adjacent counties of Muskegon and Kent. Not surprisingly, all of the non-residents were on one-day trips. Thirty-eight percent of the non-residents said their spouse or family accompanied them an average of 35% of the time on fishing trips to Ottawa County, and that when they come they also fish.

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

All of the interviewed shore anglers had fished in the Grand Haven area in the past, and all said they would again.

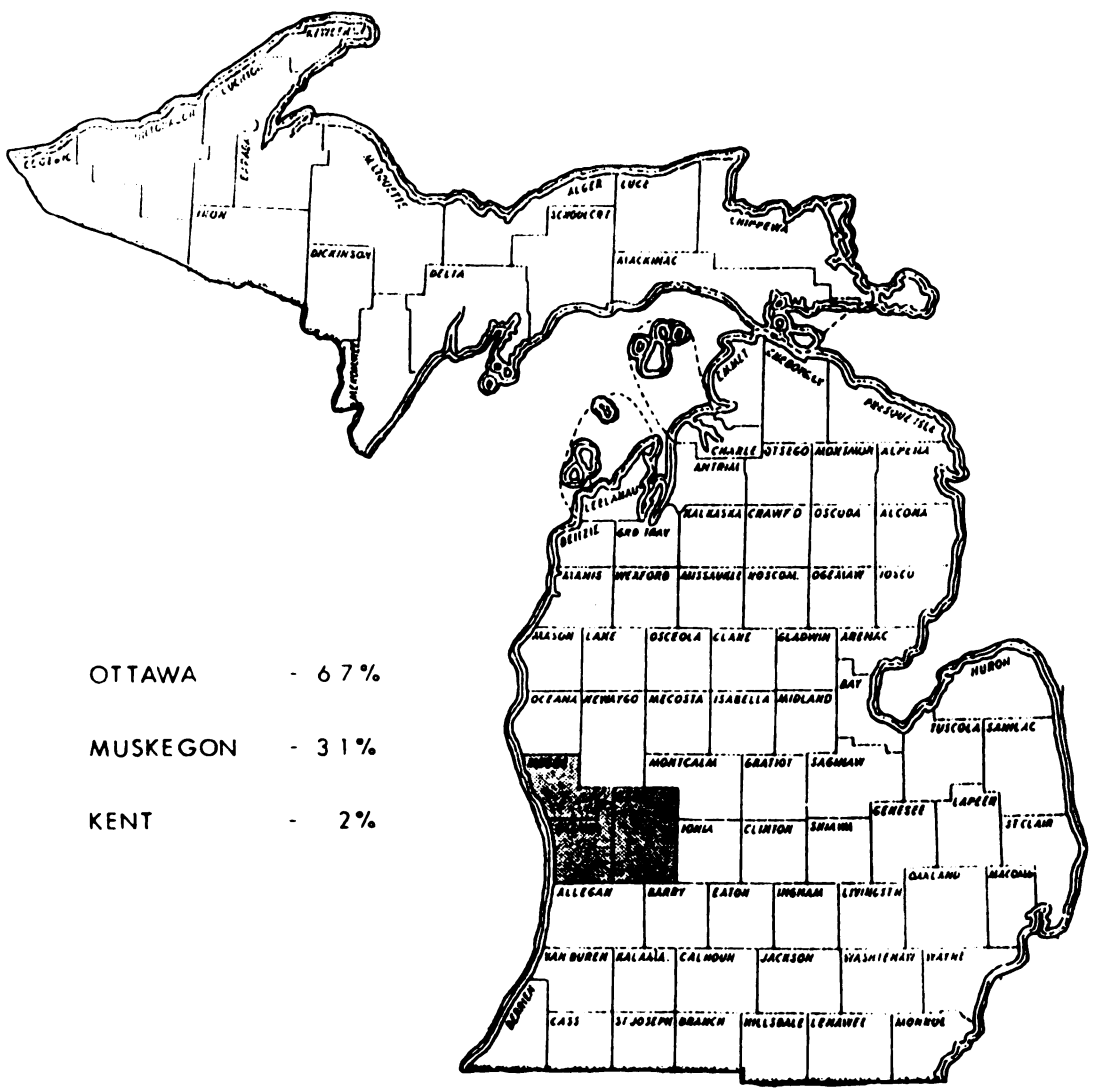

Figure 8. Grand Haven shore angler major in-state origins.

Shore anglers averaged 84 fishing trips (all trips - ice, pier, boat and shore) to Grand Haven per year (non-residents, 80 trips). Thirty percent of the shore anglers said they do most of their fishing in the summer, 1% in the spring and 69% said they fish all year. Table 42 lists by percentage the species shore anglers were primarily interested in catching. Table 43 lists the means by which non-resident shore anglers learned about the fishing opportunities in Grand Haven.

Males comprised 74% of all the anglers interviewed, with 33% of the anglers saying their spouse or family accompanied them an average of 31% of the time. Grand Haven shore anglers' average age was 37 years. Too few shore anglers responded to the question about household income to tabulate any meaningful results.

Table 42. Species shore anglers primarily fished for.

Species	% of anglers
1. Bluegill	36%
2. Yellow perch	30%
3. Crappie	12%
4. Largemouth bass	4%
5. Catfish	1%
6. Salmon	1%
7. Anything	16%

Table 43. Means by which non-resident shore anglers learned about fishing in the Grand Haven area.

Source	% of non-residents
1. Friend	57%
2. Relative	28%
3. Used to live in area.	14%

GRAND HAVEN BAYOU BOAT FISHING

The Grand River and its bayous in the Grand Haven area offer boat anglers a very productive warm-water fishery from the spring through the fall. Anglers make excellent catches of bluegills, crappie, catfish, largemouth bass, and northern pike. There are a number of public and private access sites on the river and the bayous, and two of the private launching sites sponsor bass tournaments through the summer (Felix's and Grand Valley). The bayous are well known for their good fishing, and draw a large number of non-resident anglers. The surveys showed more than 63% of bayou boat use was by non-residents.

The majority of the fishing effort on the bayous is directed at largemouth bass. Many bass clubs come to the area to participate in the tournaments, and although their use and expenditures were not separated from the total, interviewers encountered them frequently enough to suggest that the clubs provide a large portion of the economic impact of the bayou fishery. Eighty-four percent of the interviewed bayou boat anglers caught fish on the day questioned. The aggregate catch rate for all the bayou boat anglers was 2.8 fish per day, with largemouth bass comprising 71% of the catch.

Table 44 lists the average daily expenditures made by bayou boat anglers 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. Statistics for bayou boat angler expenditures made in the county are in Table 45. Statistics for all anglers are listed first, followed by non-resident angler statistics in parentheses.

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

27,889 angler days X $22.46 per day = $626,387

The total estimated gross expenditures of non-resident bayou boat anglers in Ottawa County were:

17,711 angler days X $26.20 per day = $464,028

Table 46 lists bayou boat anglers' comments about their perceptions of the adequacy of both private and public facilities and services in the Grand Haven area in addition to general comments about their fishing experience in the county.

Eighty-nine percent of all the anglers interviewed felt the local businesses provided adequate services and facilities. Forty-five percent of interviewed bayou boat anglers felt prices in general in Ottawa County were the same as elsewhere in the state (47% for non-residents), 7% felt prices in the area were higher than average (11% for non-residents) and 47% felt prices were lower than average

Table 44. Grand Haven bayou boat anglers' average daily expenditures made at home, en route, and in Ottawa County.

Type of expenditure	Other Counties		Ottawa County
	Home	En route	
Major fishing equip.	.73	--	2.45
	(1.15)	--	(2.17)
Tackle-small gear	--	.04	5.90
	--	(.06)	(5.39)
Slip fees	--	--	.18
	--	--	(.29)
Launch fees	--	--	.96
	--	--	(1.29)
Boat gas and oil	.17	--	3.57
	(.26)	--	(5.23)
Camping	--	--	.27
	--	--	(.42)
Lodging	--	--	.96
	--	--	(1.51)
Restaurants	--	--	2.85
	--	--	(3.60)
Groceries	--	--	1.48
	--	--	(1.68)
Beer	--	--	1.25
	--	--	(1.54)
Vehicle gas	.85	.07	1.70
	(1.33)	(.12)	(2.10)
Miscellaneous	--	--	.63
	--	--	(.58)
Family spending	--	--	.26
	--	--	(.40)
All anglers' total	1.75	.11	22.46
Non-residents' total	(2.74)	(.18)	(26.20)

Table 45. County expenditure statistics for Grand Haven bayou boat angling. Sample size = 137, (non-resident = 87).

Expenditure	Mean	Std. Dev.	Std. Err.	95% C.I.	Skew.
1. Major equip.	2.45	9.72	0.83	0.81 - 4.09	4.29
	(2.17)	(8.37)	(0.90)	(0.39 - 3.95)	(4.60)
2. Small equip.	5.90	8.54	0.56	4.80 - 7.00	1.29
	(5.39)	(5.96)	(0.64)	(4.12 - 6.66)	(0.99)
3. Slip fees	0.18	2.14	0.18	-0.18 - 0.54	11.71
	(0.29)	(2.68)	(0.29)	(-0.28 - 0.86)	(9.33)
4. Launch fees	0.96	7.97	0.68	-0.38 - 2.31	10.53
	(1.29)	(9.78)	(1.05)	(-0.80 - 3.37)	(8.91)
5. Boat gas	3.57	5.79	0.62	2.33 - 4.80	1.61
	(5.23)	(6.71)	(0.67)	(3.89 - 6.56)	(1.19)
6. Camping	0.27	1.39	0.12	0.03 - 0.50	5.07
	(0.42)	(1.72)	(0.19)	(0.05 - 0.79)	(3.93)
7. Lodging	0.96	4.44	0.38	0.21 - 1.71	4.61
	(1.51)	(5.50)	(0.59)	(0.34 - 2.68)	(3.55)
8. Restaurants	2.85	6.20	0.53	1.80 - 3.90	4.44
	(3.60)	(7.24)	(0.78)	(2.06 - 5.15)	(4.04)
9. Groceries	1.48	2.48	0.21	1.06 - 1.90	2.84
	(1.68)	(2.87)	(0.31)	(1.07 - 2.29)	(2.65)
10. Beer	1.25	2.87	0.25	0.77 - 1.74	2.85
	(1.54)	(3.10)	(0.33)	(0.88 - 2.20)	(2.56)
11. Vehicle gas	1.70	3.34	0.29	1.14 - 2.27	2.42
	(2.10)	(3.94)	(0.42)	(1.27 - 2.94)	(1.99)
12. Misc.	0.63	1.79	0.15	0.32 - 0.93	4.59
	(0.58)	(1.56)	(0.17)	(0.25 - 0.92)	(3.42)
13. Family	0.26	1.37	0.12	0.03 - 0.49	6.16
	(0.40)	(1.70)	(0.18)	(0.04 - 0.77)	(4.83)
All anglers' total	22.46	22.66	1.94	18.63 - 26.29	1.70
Non-residents' total	(26.20)	(24.50)	(2.63)	(20.98 - 31.42)	(1.57)

Table 46. Grand Haven bayou boat angler comments.

I. Responses about the local businesses.	
Responses	% of interviewed anglers
1. Need better bathrooms at Stearn's bayou.	4.8%
2. Need more good restaurants along the Grand River.	3.2%
3. Businesses should be more hospitable to bass fishermen.	3.2%

II. Responses about government agencies.	
Responses	% of interviewed anglers
1. Stop the landfill at Riverside Park.	21.0%
2. Plant more largemouth bass.	21.0%
3. Enforce the NO WAKE law.	8.1%
4. Get rid of the shad.	8.1%
5. Stop the Indian gillnetting.	6.5%

III. General responses.	
Responses	% of interviewed anglers
1. People do not understand bass clubs.	3.2%

(42% for non-residents). Fifty-three percent of all the anglers interviewed felt the government agencies involved provided adequate services and facilities.

Table 47 lists non-resident origins by percentages and Figure 9 shows the major in-state origins. Fourteen percent of the non-residents stayed overnight in the area on their trip. Their accommodations are listed in Table 48. Thirty-nine percent of the non-residents said their spouse

Table 47. Grand Haven non-resident bayou boat angler origins.

Origin	% of anglers	Origin	% of anglers
1. Kent	33.0%	8. Bay	0.7%
2. Muskegon	19.0%	9. Genesee	0.7%
3. Allegan	3.0%	10. Gladwin	0.7%
4. Indiana	1.4%	11. Ionia	0.7%
5. Barry	1.4%	12. Midland	0.7%
6. Kalamazoo	1.4%	13. Otsego	0.7%
7. Alpena	0.7%		

Table 48. Grand Haven non-resident bayou boat angler accommodations.

Accommodation	% of non-resident anglers
1. State park	8%
2. Relatives	8%
3. Motel	33%
4. Private campground	33%
5. Rented cabin.	17%

or family accompanied them an average of 20% of the time on fishing trips to the area, and that when they come they fish also.

When asked to apportion their purpose for fishing between fishing for the "sport" or for the "food", Grand Haven bayou boat anglers' average responses were 95% for the "sport" and 5% for the "food".

Ninety-nine percent of the interviewed bayou boat anglers had fished in the Grand Haven area in the past, and all said they would again, with the non-resident anglers

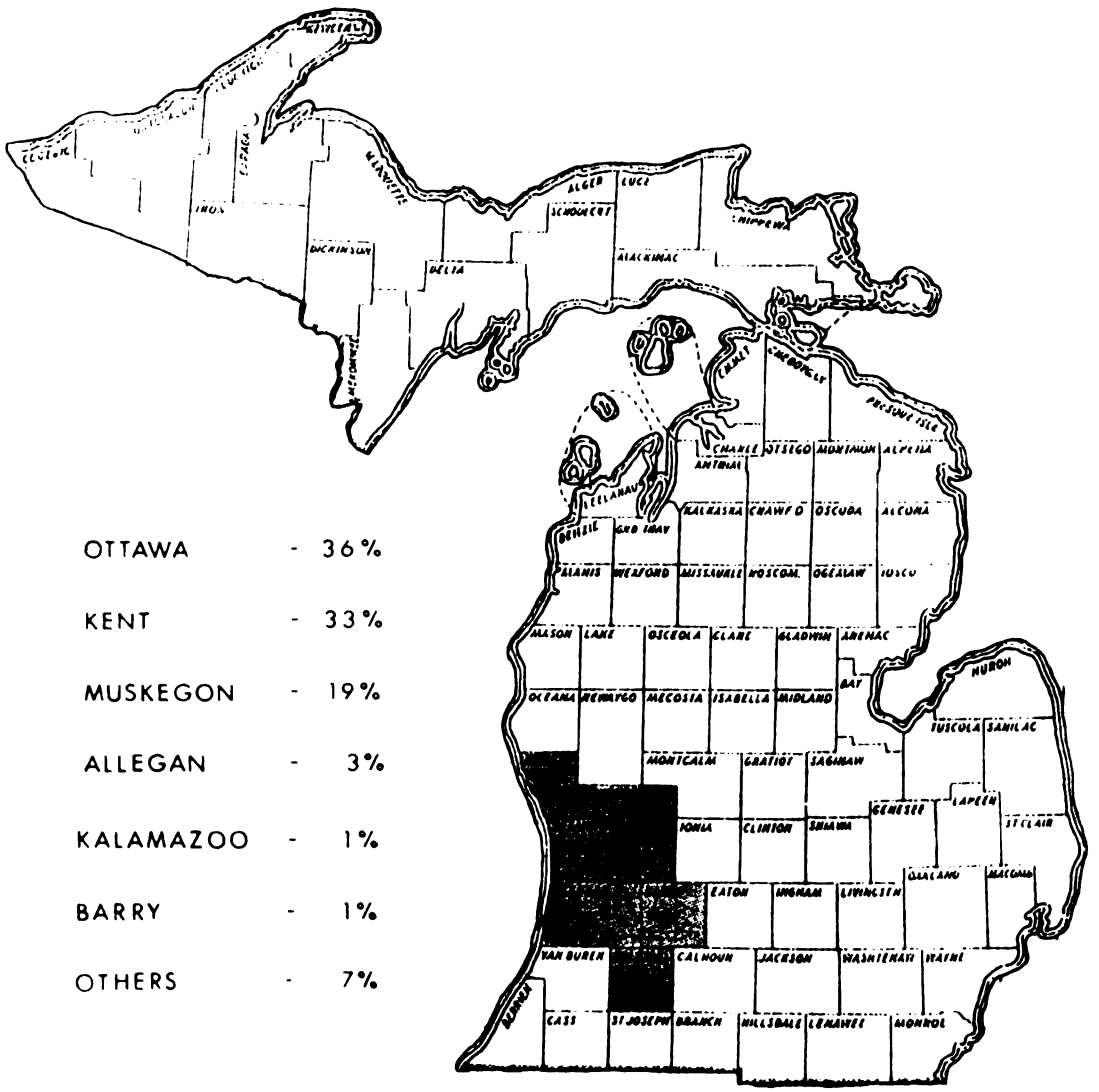

Figure 9. Grand Haven bayou boat angler major in-state origins.

reporting similarly. Bayou boat anglers averaged 72 fishing trips (all trips - boat, ice, pier and shore) to Grand Haven in a year (non-residents, 74 trips). Eighteen percent of the bayou boat anglers said they do most of their fishing in the summer (non-residents - 16%), 1% in the spring (non-residents - 2%), 6% in the fall (non-residents - 9%), and 75% said they fish all year (non-residents - 72%). Table 49 lists by percentage the species bayou boat anglers were primarily interested in catching. Table 50 lists the means by which non-resident bayou boat anglers learned about the fishing opportunities in the Grand Haven area.

Males comprised 95% of all the anglers interviewed, with 41% of the anglers saying their spouse accompanied them an average of 27% of the time. Bayou boat anglers' average age was 38 years. Too few of the bayou boat anglers interviewed cooperated in supplying information about their household incomes to do any resonable tabulation.

Table 49. Species bayou boat anglers primarily fished for.

Species	% of anglers
1. Largemouth bass	91%
2. Crappie	3%
3. Salmon	3%
4. Bluegill	1%
5. Anything	2%

Table 50. Means by which non-resident bayou boat anglers learned about fishing in the Grand Haven area.

Source	% of non-residents
1. Sportsmens club	64%
2. Fishing Hotline	11%
3. Relative	14%
4. Friend	9%
5. Used to live here	2%

CHARTER FISHING

Charter captains were asked to help gather information for this study. Although charter captains from both Holland and Grand Haven agreed to cooperate, only the captains in Grand Haven (and even then, not all of them) interviewed enough anglers for a suitable analysis. However, the captains in Holland did provide estimates of the total number of clients they booked that season, which were then expanded by the Grand Haven expenditure data to estimate total Holland charter client expenditures.

Besides the season in which this study took place (1982), some of Grand Haven's charter captains conducted surveys during the prior season (1981). Charter captains asked 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.

In addition to interviewing their clients, charter captains estimated the total number of clients they booked for each of the past two seasons. Grand Haven's total for the 1981 season was 3,813 clients based on 12 boats' responses, and for the 1982 season the total was 4,095 clients (94% of which were non-residents) based on 15 boats'

responses. Grand Haven charter captains interviewed 72 clients or parties during the 1981 season and 58 during the 1982 season. Seven Holland charter captains reported they booked a total of 1,422 clients in 1982, 93% of which were non-residents. Figure 10 shows the major in-state origins of Grand Haven charter clients.

Charter captains were asked to interview each client in a party during the 1981 season. However, the captains were reluctant to interview each client, and in most cases the captains either interviewed the party as a whole, or only interviewed the person who had spent the most money. Although it was hoped the captains would not do one interview for a whole party because it would reduce the effective sample size, it was decided to allow them to continue that practice in order to maintain what cooperation they were giving. Therefore, party interviews were agreed to for the 1982 season, with the average of party expenditures assigned to each angler in the party in both the 1981 and 1982 samples. The 1981 sample included 180 anglers and 1982 included 319 anglers. The 1982 sample was larger because some large corporate parties were interviewed.

Table 51 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 plus-minus 95% statistical confidence interval. Because only two of the clients which Grand Haven charter captains interviewed were residents of

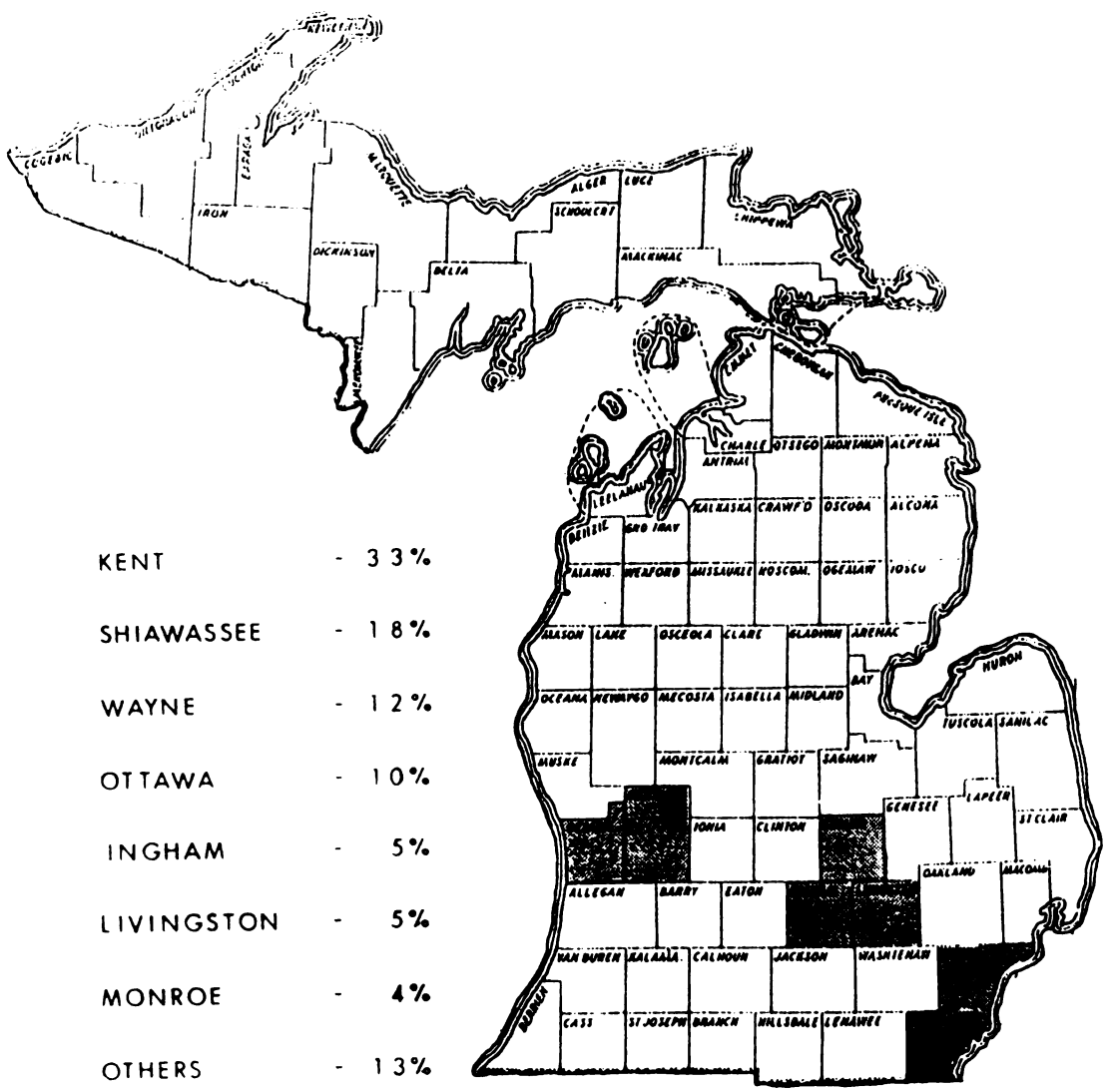

Figure 10. Grand Haven charter angler major in-state origins.

Ottawa County, resident expenditures were not separately analyzed. However, since the expenditures of those two resident clients were included in the calculations, it is possible the values in Table 51 underestimate actual non-resident expenditures.

Table 51. 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	

Total expenditures calculations

Grand Haven

1981 - all clients:

$$\frac{\$52.13}{\text{day}} \times \frac{2.167 \text{ days}}{\text{client}} \times 3{,}813 \text{ clients} = \$430{,}738$$

1982 - all clients:

$$\frac{\$51.59}{\text{day}} \times \frac{1.953 \text{ days}}{\text{client}} \times 4{,}095 \text{ clients} = \$412{,}593$$

1982 - non-resident:

$$\frac{\$51.59}{\text{day}} \times \frac{1.953 \text{ days}}{\text{client}} \times 3{,}821 \text{ clients} = \$384{,}949$$

Holland

1982 - all clients:

$$\frac{\$51.59}{\text{day}} \times \frac{1.953 \text{ days}}{\text{client}} \times 1{,}422 \text{ clients} = \$142{,}441$$

1982 - non-residents:

$$\frac{\$51.59}{\text{day}} \times \frac{1.953 \text{ days}}{\text{client}} \times 1{,}327 \text{ clients} = \$132{,}897$$

It is interesting that the total average daily expenditures were practically identical for both seasons. However, the 1982 estimates are possibly a better approximation because of the larger sample size, reflected in the lower confidence intervals in the respective expenditure categories and totals in Table 51.

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 it was not possible to empirically estimate multipliers for Ottawa County because of the poor return of

questionnaires from area businesses, a multiplier was derived from the literature. Kalter and Lord (1968) estimated a multiplier of 1.5 for a rural area in Wisconsin. Because Ottawa County is not strictly rural, and because it more closely resembles in its basic industry mix the situation found in Manistee county by Diamond and Chappelle (1981), where estimated multipliers ranged from 2.0 upward, the multiplier for Ottawa County is more likely of a greater magnitude than the Kalter and Lord multiplier.

Marino and Chappelle (1978), in a study of lodging and restaurant establishments in northern Lower Michigan, estimated multipliers ranging from 2.2 to 2.6. Also, in a study by Strang (1970) of Door County, Wisconsin's recreation-related sectors of its economy, a multiplier of 2.16 was derived for recreationist expenditures. Therefore, even though it is probably still conservative because of Ottawa County's more sophisticated economy, an average multiplier of 2.5 was chosen for Ottawa County's fishing-related sectors. \In Table 52 non-resident anglers' expenditures are multiplied by 2.5 to estimate the adjusted total direct and indirect gross income in the county attributable to non-resident angling.

Personal income can be estimated from gross income. Pearse and Laub (1969) and Kalter and Lord (1968) suggested a range of 28% to 51% as the personal income component, and again for the sake of being conservative, a value of 35% was

chosen. The adjusted total direct and indirect gross income to the county from angler primary expenditures and successive rounds of respending is multiplied by the income component to estimate the dollar amount of wages and profits which accrues to Ottawa County's labor force and entrepreneurs.

Table 52. Adjusted gross expenditures and direct net income from non-resident angler expenditures in Ottawa County.

Total Expenditures		Multiplier		Gross Adjusted Income
$2,455,553	X	2.50	=	$6,138,883

Gross Adjusted Income		Income Component		Net Personal Income
$6,138,883	X	0.35	=	$2,148,609

SUMMARY, DISCUSSION AND RECOMMENDATIONS

During the one year period from October 1981 through September 1982, anglers spent almost $4.6 million in Ottawa County for angling for Great Lakes and nearby fish. Non-resident anglers spent almost $2.5 million, generating total Ottawa County sales of over $6 million. Table 53 summarizes the impacts from each fishery studied in the county.

The Lake Michigan boat fisheries (including charters) of Grand Haven and Holland were by far the most significant fisheries, contributing 71 percent of the non-resident economic impact. If the non-resident bayou boat anglers in Grand Haven are added, the impacts from non-residents in all the boat fisheries accounted for almost 90 percent of the non-resident total. It was apparent at the time of this study that local officials were very much aware of the importance of the boat angler, although they were not sure as to the magnitude.

In Grand Haven city officials were in the final stages of approving an extensive riverfront development which included a centralized docking facility for the area's charter boats. They were very interested in the results of this investigation, and used the charter fishing values

Table 53. Summary of angler use (angler days) and expenditures for all angling for Great Lakes fish, and related angling, in Ottawa County in 1981-82.

	ALL ANGLERS		NON-RESIDENT	
Fishery	Use	$	Use	$
Holland ice	7,243	51,280	630	1,103
Holland pier	17,574	121,964	9,015	76,718
Holland boat	64,660	691,215	14,303	146,892
Holland charter	1,422	142,441	1,327	132,897
Holland total	90,899	1,006,900	25,275	357,610
G. Haven ice	11,256	31,067	2,641	4,094
G. Haven pier	22,144	251,113	11,294	122,540
G. Haven boat	66,975	2,095,648	36,400	1,077,076
G. Haven shore	14,577	125,508	4,789	45,256
G. Haven bayou	27,889	626,387	17,711	464,028
G. Haven char.	4,095	412,593	3,821	384,949
G. Haven total	146,936	3,542,316	76,656	2,097,943
Ottawa total	237,796	4,549,216	101,931	2,455,553

during public hearings at that time to emphasize the importance charter operations could play in generating sales in the downtown area adjacent to the proposed facilities. They have subsequently completed the project, and there have been nothing but glowing reports as to the success of the venture. In fact, a prospective entrepreneur had conversations with me about the results of this study, and was excited with what he thought was the potential for investment in concessions planned as part of the riverfront development.

If anything, the estimated angler expenditures are probably less than actual expenditures. The estimates may be conservative for three reasons. First, because the questionnaire focused on current trip expenditures, there were never any "big ticket" expenditures (boats, motors, rec. vehicles, etc.) documented.

In the study in Alcona County (Jordan and Talhelm, 1982) it was found that anglers made most of their large durable equipment expenditures at home, and that their "at home" expenditures almost equaled their expenditures in Alcona County. In Ottawa County's case there are very likely some non-residents who purchase boats and equipment in the county rather than at home, because there are a number of boat dealers in Ottawa County. Also, with the recent proliferation of "dockominiums" in the county, it is also likely, at least for the larger boats being purchased, that the buyer intends to use them primarily in the Ottawa County fisheries.

Therefore, with most local big fishing boat purchases (boats which will be docked in the county), the proceeds of the sale are in most instances an impact wholely attributable to the county's fisheries. On the other hand, trailerable boats purchased in the county by non-residents, may or may not be used entirely for fishing in the county, and therefore it would be difficult to assess the proportion of the sale which could be regarded as an impact resulting from the county's fisheries.

The argument could be made that impacts of purchases should be considered reciprocal, meaning that although boats and equipment purchased in Ottawa County are not exclusively used there, certainly there are boats and equipment which were purchased elsewhere, which are used primarily in Ottawa County. So, perhaps as a starting point, the total of all local boat and equipment purchases made by non-residents could be regarded as impacts to the county. The point is, the estimates in this study have only captured trip expenditures, which may represent as little as half of actual impacts when purchases of boats and other large durable items are included.

The second reason the estimates may be low, is that for those fisheries (ice and shore in particular) where non-residents were a small component of the clientele, the probability of encountering non-residents in the sampling is smaller. In other words, for some fisheries there was at best a few non-residents in the sample, not withstanding even the effects poor weather and fishing were having on the overall sample sizes. Actually, this particular problem was likely due almost entirely to the non-typical year of the study. The result was the small non-resident sample sizes caused the non-resident estimates to have wide confidence intervals, making the estimates of non-resident expenditures relatively uncertain. Again, the estimates could simply be too low.

One additional problem was that in making checks of interviewers to see that they were administering the questionnaire properly, at times they were found considerably less than zealous in pursuing the expenditure questioning. Although there were interviewers who did their job well, and those who did not were soon corrected or replaced, there is no doubt the interviewers themselves introduced some bias into the estimates.

Despite the tendencies towards underestimating, of the eleven counties studied in Michigan, Ottawa County exhibited one of the highest levels of Great Lakes fisheries use and expenditures. It was surpassed only by Manistee County. There are many factors which contributed to the high levels of impacts found in Ottawa County.

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 in the Grand River each year to serve those urban areas. Anglers in Grand Rapids, Lansing and other areas are aware of these fish and would 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, and apparently it was a natural transition for many of them to take up salmon and trout fishing back in the late 60's when these fisheries began.

Third, a visitor almost cannot help but be exposed to Great Lakes fishing. This is especially true with the

latest riverfront developments in Grand Haven. The main street in town ends at the municipal marina, where now they have the major share of the town's charter boats docking. That has to be one of the greatest crowd-attractors going, what with those impressive fish being put on display for photographing almost every day. Then from the boat docks, it is either a short drive or a leisurely walk along the Grand River down to the beach and pier. Additionally, Grand Haven has the Musical Fountain operating nightly in season on the Grand River across from the boat docks, and every year the town holds a Coast Guard Festival, with all the main attractions taking place along the river.

All of these factors attract non-resident anglers to Ottawa County, and especially Grand Haven. There is also the good likelihood that they tend to make anglers out of visitors. It was interesting to see that estimated non-resident angler expenditures were over five times greater in Grand Haven than the estimated amounts spent in the Holland area, where the fisheries had a primarily more local clientele. The bottom line is that for a coastal community to realize the full economic potential of its Great Lakes fisheries, it must develop a significant non-resident user group, attracting anglers from farther away, encouraging them to stay longer and developing a desire in them to come more often.

All of the currently available fisheries in the county could sustain expanded angler usage. County sports clubs

and/or marinas could be instrumental in promoting both angler awareness and success, especially in the non-resident market. Many operators in the Grand Haven area (the charter captains, Grand Isle Marina and Felix's) are already very active in promoting the area's waterbased sports to non-residents. In Holland, the Anchor Marina is another recent development which is also beginning to promote the attractiveness of that area. Some additional possibilities they and others might consider would be to 1) conduct workshops or clinics giving hands-on demonstrations of fishing techniques, 2) hand out informational brochures at access sites suggesting gear and techniques for finding and catching fish either out on Lake Michigan or on the Grand River bayous and Lake Macatawa, or 3) institute a program of acting as one-time personal guides for non-resident anglers who inquire at local sporting goods stores about fishing in the county.

Given adequate fisheries and access, both of which Ottawa County has, the key stratagem for increasing economic impacts is marketing the fishery to out-of-county anglers, especially out-of-state anglers. The principle is that people who come a longer distance will more likely stay a longer time and spend more money. Part of this marketing should inform potential anglers about the relatively unique and attractive aspects of the area, so they will be attracted to that particular location. Other traditional marketing techniques may also help. From Ottawa County's

perspective any increase in non-resident angler use would be beneficial, regardless of angler origin. However, the reason for targeting out-of-state anglers is that from the perspective of Michigan as a whole, a county is not then "robbing Peter to pay Paul". If all a county does is attract anglers who would have been fishing somewhere else in Michigan, then the state really gains nothing but income redistribution. Of course there will be people from Michigan origins who had not previously fished the Great Lakes who will enter a successful and accommodating fishery in Ottawa County. Because of them, promotions within Michigan should not be neglected. The point, however, is that almost all of Michigan's Great Lakes fishing interests spend the majority of their time and resources trying to sell Michigan fishing to Michiganians, while neglecting the enormous income potential of out-of-state markets.

It will of course take extra incentives to encourage anglers from longer distances to spend their vacation time in Michigan, and particularly in Ottawa County. From conversations with anglers all over the state, it has become clear that one of the key factors contributing to the establishment of a repeat clientele (provided the probability of catching fish is reasonable and facilities are adequate) is out-of-town anglers' perception and experience of local concern for the anglers' recreational experience. When local parties, be it an angler, business or civic

group, go even a little bit out of their way to accommodate an "outsider" - with either some advice, a free or bargain-priced service, or a special event either for the angler or his/her family - it almost always leaves an impression on the recipient that there is something unique or special about fishing in that locality. Usually when an angler says "this town treats fishermen right", that person has had such treatment from a local party, and it may have been in only one or two instances. People with those impressions usually return more often, stay longer, and generate even more use and economic impacts by bringing friends and relatives.

While fishing derbies and tournaments are generally thought of as the way to draw anglers - and they can be successful in that respect - there are many activities and services that would be especially suitable in conjunction with a fishing tournament in attracting and establishing a repeat non-resident fishing clientele. One service would be to "package" the fishing experience. This is a very successful marketing method for other recreational pursuits, such as Carribean cruises and overseas travel, in which someone has taken care of all the "details." Packages could be tailored either for the charter client or the angler with his/her own boat, providing options for accommodations, meals at area restaurants, catered brown bag lunches at the launch site, food and tackle concessions at a major launch site, fishing seminars and information, guide service, and information and/or special rates to area attractions both

for the angler and his/her family. As an example of how desireable such a service might be, the following scenario is postulated.

In response to an advertisement in a Sunday newspaper supplement about the great largemouth bass fishing on the Grand River bayous in Michigan, in addition to the great salmon fishing in the same area (a reporter may have covered one of the tournaments held at Felix's marina each year and then gone out on a Lake Michigan charter the next day), a long-time bass angler in northern Alabama, who has his own boat and has never fished "up North" let alone for salmon, sends in his address requesting more information. He receives shortly in the mail a packet of brochures and a form which will help him "tailor" a largemouth bass-salmon fishing trip to Michigan specifically suited to his needs.

A general information brochure first informs him of the best times of the year to come fishing for both the bass and the salmon (in fact, salmon fishing can be at some of its very best when bass season opens in late spring) and the gear he may need if he is trailering his own boat. He will then fill in on the form the dates he plans to come and the type of accommodation he would like. He may choose one of a wide variety of motels, depending on his price range and preferences, or he may choose to camp at a private campground. Whatever his choice though, he will be confident that a place suiting his needs will be reserved for him when he arrives in Ottawa County.

On the form he specifies a room for four people for four nights in the $40-$50 price range. He also specifies that he will be trailering his own boat (this is to assure the motel selected has ample parking for a car with boat trailer). In addition, he indicates he would like the services of a local angler (perhaps someone who has been a consistent participant in Felix's tournaments and would like to share his/her expertise) to act as a guide for his first day out on the "bayous". (Such a service could either be provided free on a one-time basis, or on a fee basis.) He also asks for a charter fishing reservation for him and his family to go salmon fishing.

He would like to take his family out to a nice restaurant for dinner one night and specifies on the form one in the $20-$30 per person range. He plans to fish for bass two days while he is in Ottawa County, and his family plans to fish the one day with him out on the charter boat. Since his family members all play golf, he checks off to have tee times reserved at an area golf course for three people on the days when he will be bass fishing.

In about a week he receives another packet, which informs him that upon receipt of a deposit, his reservations for a motel, salmon fishing charter, dinner out, and tee times for three on a municipal golf course will be confirmed. Enclosed is a brochure of the motel selected, the charter boat operation, the restaurant he will be taking his family to and the golf course his family will use. Also

enclosed is a map with specific directions to the motel, Felix's, the municipal charter docks, restaurant, golf course and tackle store nearest the motel where he can purchase gear and licenses. There is also a listing and description of various local attractions and events (such as the Musical Fountain in Grand Haven and the Tulip Festval in Holland) that are available during his scheduled stay, a list of fees for launching his boat, the licenses, park entrance fees, tolls, etc. and an invitation to a northern pike and largemouth bass fishing seminar put on by Felix's one evening during his stay.

Upon submittal of his deposit and subsequent confirmations he has quaranteed for himself a well-planned and hassle-free fishing trip to Ottawa County with minimum risk of disappointment; well worth the modicum of a surcharge assessed for the trip planning service. He and his family will be able to spend the maximum amount of their vacation time doing the things they enjoy, without wasting their time and money finding their way around town looking for what they want and being disappointed if they end up settling for something less. There is also little doubt he will be impressed with the community's concern that he and his family have a good time, and that when he thinks of fishing "up North" in the future, he will think of Ottawa County.

Such a service could be provided by a local travel agency, the local tourist bureau, a civic group such as a sports club, or by an ad hoc tourist committee, such as they

have in Holland for the Tulip Festival. The point, however, is that no matter what more or less is done than what has been described, Ottawa County will have established at least for that person an attribute of caring, which will set fishing in Ottawa County apart, or make it "unique", from fishing anywhere else "up North". That is what marketing is all about. Providing Ottawa County can sustain viable fisheries and provide adequate facilities, the dividends in terms of income and jobs to Ottawa County and Michigan is well worth such an effort.

APPENDIX

APPENDIX A

SURVEY QUESTIONNAIRES

APPENDIX A

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? Number of each species: 10 11

   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? (Do not ask boat fishermen this question.) 30 31
7. Where are you from? County _____ 32 33

   State _____ 34 35
8. How many miles is it from your home to here? (Double the miles answered and enter) 36 37 38 39
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? For shanty anglers, "How many times do you plan to use the shanty? 53 54 55
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) ___ 1

25. Do you think the businesses here provide adequate services and facilities for you? (yes = 1. no = blank) ___ 2

26. If no, list your suggestions for improvement?

1 _____ ___ ___ ___ ___ 3 4 5 6

2 _____ ___ ___ ___ ___ 7 8 9 10

3 _____ ___ ___ 11 12

4 _____

5 _____

27 Do you think the government agencies here provide adequate facilities and services for you? ___ 13

28 If no, list your suggestions for improvement?

1 _____ ___ ___ ___ ___ 14 15 16 17

2 _____ ___ ___ ___ ___ 18 19 20 21

3 _____ ___ ___ 22 23

4 _____

5 _____

29 Was there any information you needed about this area, but could not find? _____ 24 25 26 ?

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

1 _____ ___ ___ ___ ___ 28 29 30 31

2 _____ ___ ___ ___ ___ 32 33 34 35

3 _____ ___ ___ 36 37

4 _____

5 _____

31 Are you married? ___ 49

32 If so, what percentage of the time does your spouse accompany you? ___ ___ ___ 38 39 40

33 When spouse or family are here with you, what are they doing while you fish? _____ 41 42 43 44

34 Age ___ ___ 45 46 35. Sex (M=1. F=2) ___ 47 36 Income $_____ 48

CHARTER ANGLER QUESTIONNAIRE

Month (1 2) Day (3 4) Year (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.

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