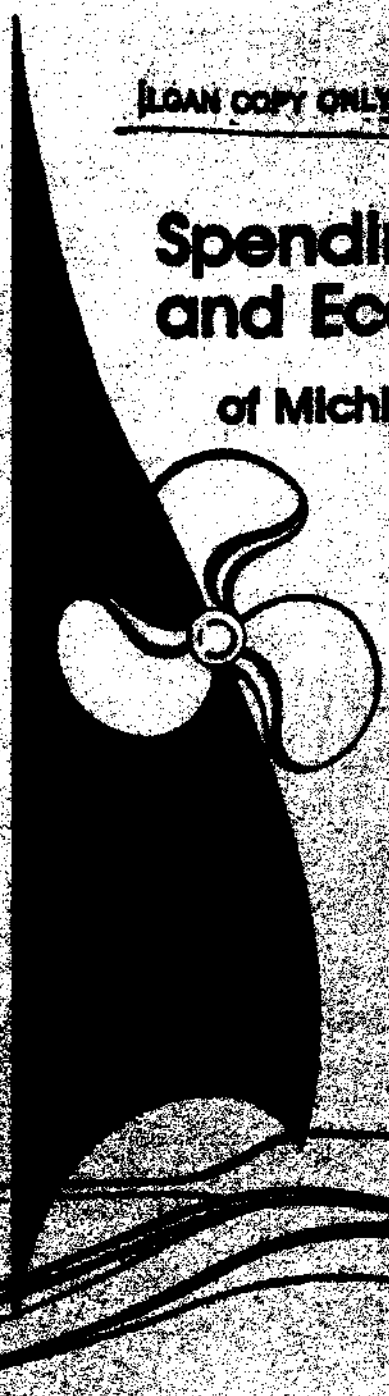
RECREATIONAL BOATING

Spending Patterns and Economic Impacts of Michigan Registered Boat Owners



Daniel J. Stynes, Gene L. Brothers,
Donald F. Holecek, and Dave Verbyla

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Daniel J. Stynes
Gene L. Brothers
Donald F. Holecek
Dave Verbyla

Department of Park and Recreation Resources
Michigan State University

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ABSTRACT

Michigan registered boat owners spent over one billion dollars on boating in 1981. This spending was divided between new and used boat purchases (10%), craft-related expenses (24%) and trip-related expenses (66%). Craft spending primarily accrues to boating industries, while trip spending benefits a wide range of retail sectors of the economy. The average boat owner spends $469 a year on craft-related items and about $39 per day on 33 days of boating each year. This amounts to an average of $1,787 per boat per year.

There is considerable variation in spending across different types of boats. While only 6% of the registered fleet is stored at a marina or yacht club, these boat owners account for about 20% of all boater spending in the state. Boaters using the Great Lakes account for almost half of all boater spending. The average annual spending of owners of different type of craft varies from about $1000 for small power and sail boats to over $8000 for power boats over 25 feet in length stored at a marina.

These estimates are based upon a survey of expenditures of over 1,000 registered boat owners in 1981. The report details survey methods and reports spending patterns of different boater segments within 10 spending categories. Food (28%), equipment (21%), boat fuel (18%), and auto fuel (16%) make up the largest proportions of the boating budget.

While most boating occurs close to home, there are significant regional transfers of dollars resulting from boating. Out-of-state registered boat owners spent $41.5 million in Michigan in 1981. There were also significant regional transfers of income from southeastern Michigan and the Thumb area to the northern lower peninsula. Imports represent 40 percent of all boater spending in the northern lower peninsula, contributing $62 million dollars in direct spending to this area.

An electronic spreadsheet program to estimate the spending impacts of alternative boating marketing and development actions is presented and then applied to two simple examples. It is estimated that a 100 boat Great Lakes marina generates $582,229 in spending by boat owners storing their craft at the facility. By attracting 100 additional boaters to local access sites and launch facilities, as much as $179,000 in spending can be generated. By testing these and other possibilities on the spreadsheet program, spending impacts of alternative development and marketing programs can be estimated. Guidelines for interpreting and applying the program are presented.

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Many students and staff helped with the tedious tasks of conducting a mailed survey. In particular, Dave Safronoff provided programming support for the sampling procedures, data cleaning, and further analysis of the 1980 survey.

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INTRODUCTION

In 1978 the Michigan Sea Grant Program initiated a program of recreation and tourism research, focusing upon Michigan's coastal zone. An initial objective of this program was to conduct a comprehensive state-wide study of Great Lakes recreational boating in Michigan. Boating is an easily identifiable and important recreational activity on the Great Lakes. As such, it afforded a good vehicle for testing improvements in recreation planning and research methods. Both the results and methods from our boating research will be applied to a broader array of coastal recreation and tourism activities in future research projects.

This is the fourth and final major technical report resulting from a three year study of boating in Michigan. Previous reports are:

1. Michigan Great Lakes Recreational Boating: A Synthesis of Current Information. MICHU-SG-82-203.
2. 1980 Michigan Recreational Boating Survey. MICHU-SG-82-202.
3. Michigan Boater Market Segments. MICHU-SG-82-502.

The first report summarizes boating information collected prior to 1980, including demand, supply, economic impact, and fuel utilization. In addition to reviewing previous boating studies, this report guided the design of two major boater surveys conducted in 1980 and 1981. The 1980 survey methods and results are documented in the second report. Based upon a survey of almost 4,000 boat owners, statistics are presented on boating trends, activity, and origin-destination patterns.

Characteristics of registered boat owners are described and boating activity estimates are generated by region and county for both Great Lakes and inland boating.

The third report examines the problem of disaggregating the boater population into subgroups that are meaningful for research, planning, and management. Four different boater market segmentations are developed and compared. Guidelines are presented for selecting a target market segment and designing products and services to better serve a given segment.

In this final report, we summarize the methods and results of an expenditure survey of Michigan boaters conducted in 1981. Methods for estimating the spending effects of Michigan boaters bring together boating activity and use patterns from the 1980 survey, boater segmentations and regionalizations developed from that survey data, and spending estimates made from the 1981 survey. Simple methods are developed for estimatng the spending impacts of recreational boating at the local level. These methods integrate primary and secondary data into a simple system for evaluating the economic impacts of boating developments. The methods are designed to require a minimum of data collection at the local level, and to be able to easily take advantage of future research on boating activity and spending patterns.

Previous Studies of Economic Impact of Boaters in Michigan

There have been several reports generated concerning expenditures of boaters using the Great Lakes in Michigan, (Warner 1974; Schott 1975; and Stynes and Holecek 1981). These reports all stem from ex-

penditure data collected in 1973 by Warner. A questionnaire was mailed to a sample of boaters renting dockage from commercial marinas located in southwestern Michigan servicing Lake Michigan. Warner's primary objective was to generate boater spending patterns in this region for use in directing marina investment decisions.

Schott (1975), using Warner's data, along with Great Lakes boating use estimates (Han 1975), derived an estimate of the total economic impact of Great Lakes recreational boating in Michigan. Schott calculated Great Lakes boaters spent $125 million during 1972. Total economic impact in Michigan through stimulation of additional spending was estimated at between $209 and $230 million. Flow of these dollars through the economy were estimated to have resulted in 8,932 jobs.

Stynes and Holecek (1981) used Schott's methodology in addition to various price indices, to adjust Warner's 1972 estimates to 1980 levels. In addition, they estimated 1980 Great Lakes craft purchases in Michigan through the use of 1980 sales tax data. Total Great Lakes boater expenditures in Michigan for 1980 were figured at $176 million. To reflect these direct expenditures plus the impact of subsequent spending, a multiplier of 1.78 was applied. Application of this multiplier resulted in a total economic impact of Great Lakes boating in Michigan for 1980 to be about $313 million. This spending resulted in approximately 9,000 full time jobs. Given the long list of approximations employed in this derivation, Stynes and Holecek pointed out these estimates should be considered crude at best.

A limitation of these previous estimates of economic impacts is that they rely on data collected for 1972 which are now out-of-date. An attempt to adjust Warner's estimates to reflect price increases is

useful; however, as pointed out by Stynes and Holecek (1981), this cannot account for shifts in the quantity or quality of items purchased. For example, although boater spending on fuel can be adjusted to reflect 1981 prices, another survey is needed to measure possible changes in the quanitity of fuel purchased by boaters.

Another potential problem with these studies involves recall difficulties respondents may have had with Warner's questionnaire. Boaters were asked to report expenditures for the previous year's boating season for such items as fuel, groceries, slip rental, insurance, etc. Some of these items would be consistent from year to year or records would be available and therefore easily reported; however, few individuals keep accurate records of expenditures such as fuel and groceries. Thus, responses to some expenditure items were likely only rough estimates.

The final difficulty is that these estimates of total economic impact of Great Lakes boating in Michigan are based on Warner's subpopulation sample. His sample was drawn from Great Lakes boaters renting slippage in southwestern Michigan. These data do not account for regional variations in the Great Lakes boater population, nor do they include the significant portion of the Great Lakes boater population who trailer their boats. This subpopulation also excluded those boaters who are from out-of-state, not renting slippage in Michigan, but yet spend money in Michigan during their boating trip.

Previous studies of economic impacts of boating have provided information for policy and investment decisions, but also have pointed out deficiencies in the data which limit the usefulness of their results. The primary purpose of this study is to overcome deficien-

cies of these previous works and thus improve on estimates of economic impacts of recreational boating in Michigan for 1981. In addition to providing updated estimates of boater spending, we hope to reduce and simplify future studies by integrating economic impact analyses with marketing and demand surveys, and developing methods for estimating economic impacts that are easily updated or modified to be applied at the local level. Updating of spending estimates by means of price indices is included as Appendix C. This appendix discusses a comparison of the estimates of boater spending for 1980 derived by Stynes and Holecek (1982) and spending estimates from the 1981 boating expenditure survey.

Objectives

1. Provide up-to-date information on recreational boating expenditures in Michigan.
2. Examine trip and craft related expenditures by various boat types.
3. Determine the overall impact of inland and Great Lakes recreational boating for 1981 at the regional and statewide levels.
4. Develop simple planning models for estimating economic impacts at the local level utilizing boating activity levels and segmentation of boaters.

These objectives focus on direct spending of boat owners in Michigan. No attempt will be made to estimate indirect effects of boater spending. The statewide scope of our study precludes a detailed analysis of local economic structures necessary to the development of input-

output tables and multipliers. Estimating direct spending is a necessary first step toward obtaining a clearer picture of boating's impact on state and local economies.

This report draws upon the 1980 Recreational Boating Survey, integrating these data with expenditure estimates of various boat owner segments. Previous studies have documented the diversity of the boating population, and the need to disaggregate the boater population in order to identify the contributions and impacts of various subgroups. A segmentation approach will help direct offerings, planning, and policies to serve or attract particular subgroups of boaters. This will help communities and individual firms in identifying those segments that can be most profitably served, and in estimating the local impacts of attracting a particular segment or segments.

Outline of Report

Chapter II outlines our procedures for estimating the spending impacts of Michigan registered boat owners. This involves tying registration statistics and boating activity estimates from the 1980 survey to the results of the 1981 boater spending survey. Survey methods for the 1981 spending study are detailed in Chapter II. At the end of Chapter II we present two boater segmentations that are used throughout the report. Basic spending patterns of boaters estimated in the 1981 survey are summarized in Chapter III. After summarizing statewide spending of Michigan boaters, spending patterns of different boater segments are examined. Chapter III concludes with an analysis of regional flows of spending resulting from boating activity. This includes an estimate of the impact of out-of-state boaters on Michigan.

In Chapter IV methods are developed to bring statewide and regional boater spending analyses down to the local level. An electronic spreadsheet program for estimating the spending impacts of Michigan boat owners is described and two examples are presented to illustrate its application. The program is applied to the problem of estimating the impacts of attracting 100 boaters to an area, and also to the problem of estimating the spending impacts of a 100 boat marina. Other applications are suggested. Chapter V presents a summary of our results and some suggestions for further research.

CHAPTER II

METHODS

As stated in the objectives, our study is concerned with dollars spent on boating in Michigan. Included in this is development of methods for estimating economic impacts of boaters that are tied closely to existing data bases and on-going data collection procedures. Specifically these data bases would include boat registration statistics and boater surveys. (For a summary of these data see Appendix A of Stynes and Holecek, 1982). Registration statistics provide periodic estimates of numbers of craft in the state by county and craft type. Boater surveys have provided statistics on statewide boating activity (boat days) by region and type of craft. A method was desired which would generate boater spending estimates from these recurring data sources.

The basic approach that was developed divides boater spending into two major categories (1) craft-related spending and (2) trip-related spending. Craft-related spending would include major expenditures for new equipment, insurance, repair, and storage of the boat. These could be estimated by applying average spending estimates per boat to the numbers of craft. The latter is easily obtained from registration statistics. Since there is considerable variation in craft spending across different types of craft, annual craft-related spending estimates were desired for different categories of craft.

Trip-related spending includes all spending in conjunction with boating trips, i.e., the variable costs of operating a boat. This would include food, auto and boat fuel, lodging, boating and other

recreational gear purchased on trips, and other expenses incurred on boat outings. We anticipated that the variety of boating trips and expenditures would make this category more difficult to estimate than the craft-related items. Since estimates were available for boat days from the 1980 and previous boater surveys, a procedure was desired to utilize this existing information. The approach selected was to estimate average trip spending by boaters per boat day. Given accurate estimates of this statistic, total trip spending could be readily calculated by multiplying per day trip spending times the number of boat days. Anticipating wide variations in trip spending across different types of boats, we also desired trip spending estimates within designated craft types.

This approach dictated the data requirements for our expenditure study and guided the design of the 1981 survey. Review of Warner's (1973) boater expenditure study and our experience in trying to update his estimates to 1980 (Stynes and Holecek, 1982 Chapter 3) suggested many aspects of the research design. There were four key data needs:

(1) Boat characteristics were required to develop spending estimates within craft type categories. Craft type, propulsion, and length were the key variables. These were measured in the same manner as in the 1980 survey to assure comparability of results and consistency with registration data.

(2) Estimates of annual craft-related spending were needed for a representative sample of boats. These could then be expanded to county, regional, or statewide totals by applying the estimates to numbers of craft from registration files.

(3) Estimates of per day trip-related spending were needed from a representative sample of boats and types of boat trips. A year-end survey was rejected because of our concern with recall problems. On-site surveys are equally problematic in that it is difficult to obtain representative samples in this way, a statewide on-site study would be overly expensive, and boaters interviewed on-site have not yet completed their trip and incurred all of their trip expenses. We selected a mailed survey to be sent out in waves over the boating season. Subjects would report trip-related spending only for their most recent trip. This would minimize recall errors, yield estimates for a variety of different types of trips, and be relatively inexpensive to administer. Trip spending was estimated in 8 different categories and separated into spending at the origin, en route, and at the destination. The former would help in identifying which sectors benefit from boater spending and the latter is essential to allocate spending to local areas.

(4) Regionalization of spending required information concerning origin and destination of the boating trip, as well as location of boat owner residence. These data allowed analysis of variations among regions by allocation of spending to local areas.

The wave approach to obtaining representative samples of boating trips required that trip and craft spending be estimated for different

years. Annual estimates of craft-related spending would be difficult to estimate in the middle of a boating season. Boat owners were therefore asked to report annual craft-related spending for the previous year, 1980. Trip expenses were reported for the 1981 boating season. Estimates of boat days from Stynes and Safronoff (1982) were for the 1980 boating season. Our methods therefore apply to a two year period, 1980 and 1981. However, we will estimate spending for a single year - 1981. This requires that we assume craft-related spending and boat days estimated for 1980 can be applied for 1981.

An important component of the approach was the estimation of spending within boater market segments. A segmentation based upon craft type was deemed the most useful approach for economic impact assessment. Since craft type segments are easily identified and understood, market shares for different types of craft can be estimated easily from secondary data, and we hypothesized length and type of craft would be two of the strongest predictors of boater spending. Variables were included in the 1981 survey to permit some experimentation with different segmentations. Our working assumption was that a segmentation by craft type developed from the 1980 survey (Stynes and Safronoff 1982, Stynes et. al. 1982), or a minor variation thereof, would be adequate, (See Table 2.2). Spending patterns measured in the 1981 survey would be compared for different types of craft type segments in order to arrive at a useful and simple segmentation that helped explain differences in spending across different types of craft.

Sampling Procedures

A listing of boats registered in Michigan as of April 1, 1981, obtained from the Michigan Secretary of State's Office, was used as the sampling frame. This listing contained the registration number, county of registration, and boat length for all registered craft. The population was stratified by three boat length classes and in-state/out-of-state residency. Boat length classes were: 1) less than 16 feet; 2) 16 to 20 feet; and 3) greater than 20 feet. The 1980 Michigan Recreational Boating Survey statistics of populations within each of these strata were used to develop a disproportionate sampling scheme to insure adequate sample size from each group.

Boat owners were selected using a systematic sampling procedure with random start for each of the six strata. Sampling intervals for each stratum were calculated to yield an adequate sample size and then applied to the listing to select registration numbers of boats. The three in-state boat length classes were sampled to provide 600 registered boat owners per class. Out-of-state boat owners were sampled to provide a sample of 240 per class. Names and addresses corresponding to these registration numbers were then provided by the Secretary of State's Office.

Survey Administration

Surveys were sent out in six waves approximately every ten days to account for variability during the boating season. Initial mailings to 420 registered boat owners were sent on July 21, July 29,

August 10, August 24, September 2, and September 10, 1981. These mailings resulted in a total of 2,520 questionnaires being sent. Initial mailings were stopped after September 10 because recreational boating activity in Michigan declines significantly with the approach of cool weather. Each initial mailing of 420 questionnaires included 100 registered boat owners in each in-state boat length class and 40 boat owners in each out-of-state boat length class. Questionnaires were mailed first class with a cover letter, and return envelope with postage. Questionnaires were numbered to keep track of who had not responded and the three sets of mailing labels were printed to handle bookkeeping of returns. Returns were dated as they were received and coding proceeded concurrently with the processing of returned questionnaires.

Follow-up mailings (a cover letter, return envelope with postage, and questionnaire) were sent to persons not responding within 10 days after the initial mailing. An additional follow-up mailing was sent if no response was received within 14 days after the first follow-up mailing. Multiple mailings provided a return rate of nearly 67%, with close to 54% of the mailings being returned as useable responses. Survey response rate, by sampling strata, is presented in Table 2.1. There was slight variability in response rates within boat length classes but not within residency classes (Table 2.2). The less than 16 feet boat size class seems to be under represented from these returns and the 16 to 20 feet boat size class slightly over represented. This disproportionate response was also noted in the returns from the 1980 Recreational Boating Survey.[1]

[1] It was speculated by Stynes and Safronoff (1982) that these response rates could be due to registration fee increases for boats greater than 16 feet.

Table 2.1. 1981 Michigan Recreational Boating Expenditure Survey Response Rate

	Sample Breakdown	Percent of Initial Sample (N = 2,520)	Percent of Deliverable Sample (N = 2,308)
Sample Drawn	2,520	100.0	
Deletions			
Commercial	31	1.2	
Incomplete address	41	1.6	
Total	72	2.8	
Initial Mailing	2,448	97.1	
Returned as Non-deliverable	157	6.2	
Un-useable	17	.1	.1
Didn't boat	53	2.1	2.3
Didn't wish to participate	81	3.2	3.5
Had not boated in 1981	165	6.6	7.2
Useable responses	1,232	48.9	53.8
Total Returns	1,548	60.7	66.9
Non-responses	760	30.1	33.1
Total Deliverable Surveys	2,308	90.9	100.0

Table 2.2 Active Boaters Response Rate by Sampling Strata

Strata		Deliverable Surveys	Useable Responses[a]	Response Rate (%)
Instate				
Less than 16 Ft.		547	160	29.25
16 to 20 Ft.		546	318	58.24
Greater than 20 Ft.		544	281	51.65
	Total	1,637	870	53.15
Out-of-State				
Less than 16 Ft.		219	75	34.25
16 to 20 Ft.		216	147	68.06
Greater than 20 Ft.		219	93	42.47
	Total	654	357	54.59
TOTAL		2,291	1,232	53.78

[a]Totals include responses missing either size class or residence; therefore, column does not sum to totals.

Other than this inconsistency the sample appears to be representative of the boating fleet with respect to the various strata.

The variability in response rates among boat length classes and disproportionate sampling, required to insure adequate samples of each stratum, mandated the development of weights to balance the sample by boat length class and residency class (Table 2.3). These were developed by comparing actual returns to the population of registered craft reported by the Secretary of State's Office on December 31, 1980.

Questionnaire Design

The survey instrument is included as Appendix A. The primary elements of the questionnaire were specifically designed to provide information concerning the four data requirements discussed in the previous section: 1) boat characteristics, 2) annual craft-related spending, 3) per day trip-related spending, and 4) regionalization of spending categories.

These four groups of questions are presented in outline form followed by their question number.

1) Boat characteristics

   A) Boat type, propulsion, boat length, and horsepower (Q12)[2]

[2]Identical questions appeared in the 1980 Michigan Recreational Boating Survey.

Table 2.3 Expansion Weights by Sampling Strata

Strata	Population Size[a]	Useable Responses	Weight Factor
Instate			
Less than 16 Ft.	279,537	160	3.688
16 to 20 Ft.	167,044	318	1.100
Greater than 20 Ft.	46,914	281	.352
Missing size class	- - - -	111	1.369
Out-of-State			
Less than 16 Ft.	8,228	75	.234
16 to 20 Ft.	5,683	147	.082
Greater than 20 Ft.	1,611	93	.037
Missing size class	- - - -	42	.105
Missing Residence			
16 to 20 Ft.	- - - -	4	.778
Missing size class	- - - -	1	1.000

[a]From Stynes and Safronoff, 1982. 1980 Recreational Boating Survey.

2) Annual craft related expenditures[3]

A) Boat Equipment Expenses: fishing, non-fishing sports, safety, trailer, electronic, galley, deck, charting, anchor, lines, paddles, motors, slip, and other equipment (QII-1)

B) Boat Maintenance and Repair Expenses: hull repair and painting, trailer, motor, electrical, shaft and prop, mast and sail, galley and deck, and other maintenance and repair expenses (QII-2)

C) Boat and Motor Insurance (QII-3)

D) Slip Related Expenditures: slip rental fee, craft haul out, boat storage, effluent pump-out, and other slip related expenses (QIII-1 to QIII-5)

3) Per day trip related expenditures

A) Boat fuel and oil, equipment rental, sporting goods, lodging, grocery, beverage, restaurant, and other expenses (Q13)[4]

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[3]Many of the annual craft related expenditure categories were the same as in Warner's 1973 boating expenditure survey

[4]Trip related expenditure categories follow those used by Warner (1974) however, he asked boaters to estimate expenditures by category for the entire 1972 boating season. In the 1981 survey, respondents were asked to provide expenditures only for their most recent trip. This approach was adopted over Warner's because it should reduce recall problems for the respondents, and recall bias in the resulting expenditure estimates.

B) Vehicle fuel consumption one way (Q9)[5]

C) Length of stay (Q4)

4) Origin/Destination

A) county of trip origin (Q3)

B) county of trip destination (Q6)

C) boat owner residence (Q1)

Limitations of the Survey

Several factors affecting results of the survey should be considered in their evaluation. These factors related to the boater population itself, the survey instrument, and data processing and analysis. Several procedures were implemented to minimize effects of biases and errors in these data.

Some biases were inherent in the sampling population of boat owner registration list. This list limits the sample to only boat owners required to register their boats in Michigan. Boats requiring a registration number are all motorized craft and non-motorized craft greater than 12 feet. Therefore, all small non-motorized craft owners were excluded from the boater population. Since the unit of analysis is the boat owner, those who own more than one registered boat are over-represented in the population.

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[5]Twice the automobile fuel reported was multiplied by $1.46, the average price per gallon reported by American Auto Association for the time frame of our study.

Biases in these data also arise from recording procedures and accuracy in responses. Technical errors were held to a minimum through repeated editing and revision of the survey instrument, verifying all keypunching, and extensive data cleaning procedures to check for out-of-range and illogical response values.

Missing values related to expenditures categories caused a special problem in our coding and analysis of data. It was impossible to determine from the way questions could be answered, if blanks on the questionnaire were zero expenditures or the respondent failed to answer. Therefore, it was felt blanks or missing values should be considered true zero values. This assumption has led to a conservative estimate of total boating expenditures.

The data analysis was limited to spending by boat owners. Expenditures by others in the boating party were not reported and therefore could not be considered in the analyses. This also has led to the estimate of total spending to be conservative.

A final problem which developed in analyses of these data was application of boat days from the 1980 boating study to spending per day from the 1981 survey. A boat day for the 1980 survey is defined as any day or portion of a day spent actually in the water under power or sail while the stay length used to determine spending per day may have included days not spent "in the water under power or sail." The conflict here is that the stay length may be longer than the number of days boated. The fact that the total number of boat days generated does not include all possible days spent on activities related to boating leads to an underestimate of the total spending associated with boating.

Segmenting Boat Owners by Type of Craft

Analysis of boating activity and spending patterns from the 1980 and 1981 surveys indicated that the greatest variation among boaters occured across different types of craft. In particular, boating activity and spending increased with the size of the craft. Differences in spending patterns were also expected between power and sail boat owners. Our segmentations are therefore based upon the type and size of craft. These segmentations are recommended for several reasons:

1. They are easily understood
2. Boat types are easily identified
3. Market shares can be easily estimated from registration statistics or observation
4. Boat type and size are strongly related to spending patterns

One segmentation was developed for the entire registered boating fleet and another was developed for application to marinas. Michigan's boating fleet is dominated by smaller craft, while marinas cater to a small segment of the fleet consisting predominatly of larger power and sail boats. The same segmentation could not be applied to both groups. Segments had to be defined so that sufficient numbers of sampled boats were included in each segment to accurately estimate spending statistics. While the sampling plan for both the 1980 and 1981 surveys oversampled larger boats, sample sizes are still fairly small for marina applications. Only 6% of the fleet are stored at a marina, although this segment spends as much as five times as much

as the average boat. The high spending of these large craft will tend to inflate averages for the fleet as a whole. Also, including smaller craft spending in marina applications would yield very conservative estimates.

Fleet Segmentation

For applications to the registered fleet, craft were segmented into five categories:

1. Small Open craft less than 16 ft. in length (SM OPEN)
2. Larger Open craft 16 ft. or greater in length (LG OPEN)
3. Cabin cruisers (of any length) (CABIN)
4. Sail boats (of any length) (SAIL)
5. Pontoon boats (PONTOON)

Table 2.4 Segmentation of Michigan Registered Boating Fleet by Craft Type

SEGMENT	MARKET SHARE	AGE	INCOME	YEARS OF EDUCATION	HOUSEHOLD SIZE	CHILDREN UNDER 12
		--------average for the market segment----------				
Small Open	52%	50	18,000	13	3.0	.46
Large Open	27%	47	23,000	13	3.2	.50
Cabin	6%	48	27,000	14	3.1	.44
Sail	7%	42	30,000	16	3.1	.62
Pontoon	8%	54	18,000	13	2.7	.25

Note. From Stynes and Safronoff, 1982.

Marina Segmentation

The 1980 survey found that marina users were primarily larger open craft (28%), cabin cruisers (37%), and large sail boats (25%). While craft storage was not included as a variable in the 1981 expenditure survey, spending on craft storage was included. Through examination of spending in the craft storage category by type and length of craft, three marina segments were defined, as follows:

1. Power boats 20-25 feet in length
2. Power boats over 25 feet in length
3. Sail boats over 20 feet in length

These categories were also suggested in discussions with marina managers. Power boats include both open craft and cabin cruisers. A craft storage fee of $250 was used to operationally separate boat owners using a marina from those who do not. The length divisions employed in the marina segmentation effectively isolated boat owners spending more than $250 a year on storage from those spending less. Average annual storage fees for craft reporting $250 or more are close to slip rental rates at public and commercial marinas in Michigan.

Survey Error

In addition to non-sampling errors discussed above, results of the 1981 survey are subject to sampling errors. Sampling errors depend upon the size of the sample and the degree of variation in the population. One reason for stratification of the sample and segmentation of the boat owner population was to reduce this variation.

Sampling errors for estimates of craft- and trip-related expenditures are reported in Appendix B by craft type. For the fleet as a whole, sampling errors are 17% for craft spending and 19% for trip spending. Estimates for particular segments are subject to larger errors due to the smaller sample sizes. Craft spending estimates for sail boats have the largest errors (45%) while craft spending of larger open craft have the smallest errors (14%). Trip spending errors within particular segments are all around 30 percent.

The error structure changes somewhat for subgroupings of craft. These are based upon smaller numbers of craft, but tend to reduce variations in spending, in some cases yielding smaller errors. In general, errors for Great Lakes boaters and inland lake boaters are about 2 to 3 percent larger than the fleet estimates. Exceptions include errors greater than 50% for sail boats on inland lakes and small open craft on the Great Lakes. Although the Great Lakes spending estimates are based upon smaller numbers of craft, errors tend to be somewhat smaller than inland lakes boaters due to lower variances. Great Lakes craft spending estimates are subject to errors of 21% and trip spending estimates are subject to 22% errors. For inland lake boaters craft spending is slightly more accurate (19% error), while trip spending estimates are less accurate (30% error).

Estimates for marina boaters are based upon 233 craft reporting slip expenses of greater than $250 in 1980. Lower variances in spending by marina boaters yield fairly accurate spending estimates. Craft spending estimates are subject to sampling errors of 13% and trip expenses per day contain sampling errors of 27%.

All of these errors are reported for 95% confidence intervals. This means that the true figure will lie within plus or minus this tolerance of the reported mean with a 95% confidence level. That is, based upon sampling error alone, there is a 5 percent chance the true spending figure will lie outside of this confidence interval.

Most errors are below 30 percent, even within particular boat owner segments. For most applications of these results, these levels of accuracy appear to be adequate, particularly when non-sampling errors are likely to be as large, if not larger. Efforts to reduce recall error and related problems would appear to be more useful than increasing sample sizes. Regression models predicting craft and trip spending based upon type of craft and type of trip would be useful in attempting to further explain variations in spending. Trip spending errors tend to be larger than craft spending due to the absence of variables defining the type of trip. Also, trip spending is estimated on a per day rather than an annual basis.

CHAPTER III

SPENDING PATTERNS OF MICHIGAN BOAT OWNERS

In this chapter we report estimates of spending by Michigan registered boat owners. After summarizing total spending within broad categories for the registered fleet as a whole, boater spending is broken down in detail for different types of craft, including boats using the Great Lakes, boats using inland lakes, and boats stored at a marina or yacht club. Finally, regional import-export patterns of boater spending are examined, including the contribution of out-of-state registered boaters to regional economies.

These spending estimates only include spending by boat owners with craft registered in Michigan. Spending by guests on boating trips, spending associated with unregistered craft, and spending on trips where charter or rental craft are used are not included in these estimates. The spending figures reported here represent only the direct spending of boat owners. Indirect effects through the respending of these dollars in a local community will not be addressed here.

Statewide Spending of Registered Boat Owners

Michigan's registered boat owners spent over one billion dollars on boating in 1981. This spending is reported within four categories:

(1) Boat registration fees

(2) New and used boat purchases

(3) Craft-related spending (equipment, repair, insurance, storage)

(4) Trip-related spending (food, lodging, boat & auto fuel, equipment, and other spending on boating trips)

The first two categories are readily estimated from secondary data. A 4% sales tax is collected on new boat purchases and a 4% use tax is collected on used boat purchases. Based upon figures provided by Michigan's Secretary of State, new boat purchases in Michigan amounted to 41.184 million dollars in 1981. Used boat purchases were $63.639 million. Boat registration fees collected in 1981 amounted to 2.826 million dollars. Estimation of craft- and trip-related spending require more elaborate procedures. Data from the 1980 and 1981 Michigan boater surveys were used to estimate this spending.

Table 3.1 summarizes statewide boater spending in 1981 within these four major categories. Registrations accounted for less than one percent of the total. New and used boat purchases amounted to over 100 million dollars in 1981 and ten percent of the measured spending. Trip and craft-related spending make up the remaining 90% of registered boat owner's spending. Particularly significant is the fact that trip-related spending makes up 66% of the total. Trip spending accrues to a variety of different retail sectors including boating industries as well as food & beverage, lodging, sporting goods, gasoline service and many other types of establishments. Thus, boating has far-reaching impacts on coastal communities, reaching many sectors of the local economy through both direct and indirect effects of boater spending.

Table 3.1. Spending by Michigan Registered Boat Owners-1981

Category	Amount (000's)	Percent
Boat registration fees	$ 2,856	<1
New and used boat purchases	$104,823	10
Craft-related spending	$238,842	24
Trip-related spending	$670,764	66
Total Spending	$1,017,285	100

The remainder of this report deals only with craft- and trip-related spending. This is the spending estimated in the 1981 boater spending survey. Craft- and trip-related spending amounted to $910 million dollars in 1981. The majority of this spending fell into trip-related categories (74%). Figure 3.1 depicts the distribution of boat owner spending by craft- and trip-related categories. Fuel, divided about equally between auto and boat fuel, accounts for 34 percent of the total, followed by food which takes up 28% of the boater budget. Equipment purchases contribute 21 percent to boater spending, about one third of which is bought on boating trips.

The average registered boat owner spends $469 on craft-related items and $1313 on trip-related items. Boaters averaged 33 days on the water in 1980, spending $39 per day on boating trips. Since there is considerable variation in the spending patterns of owners of different

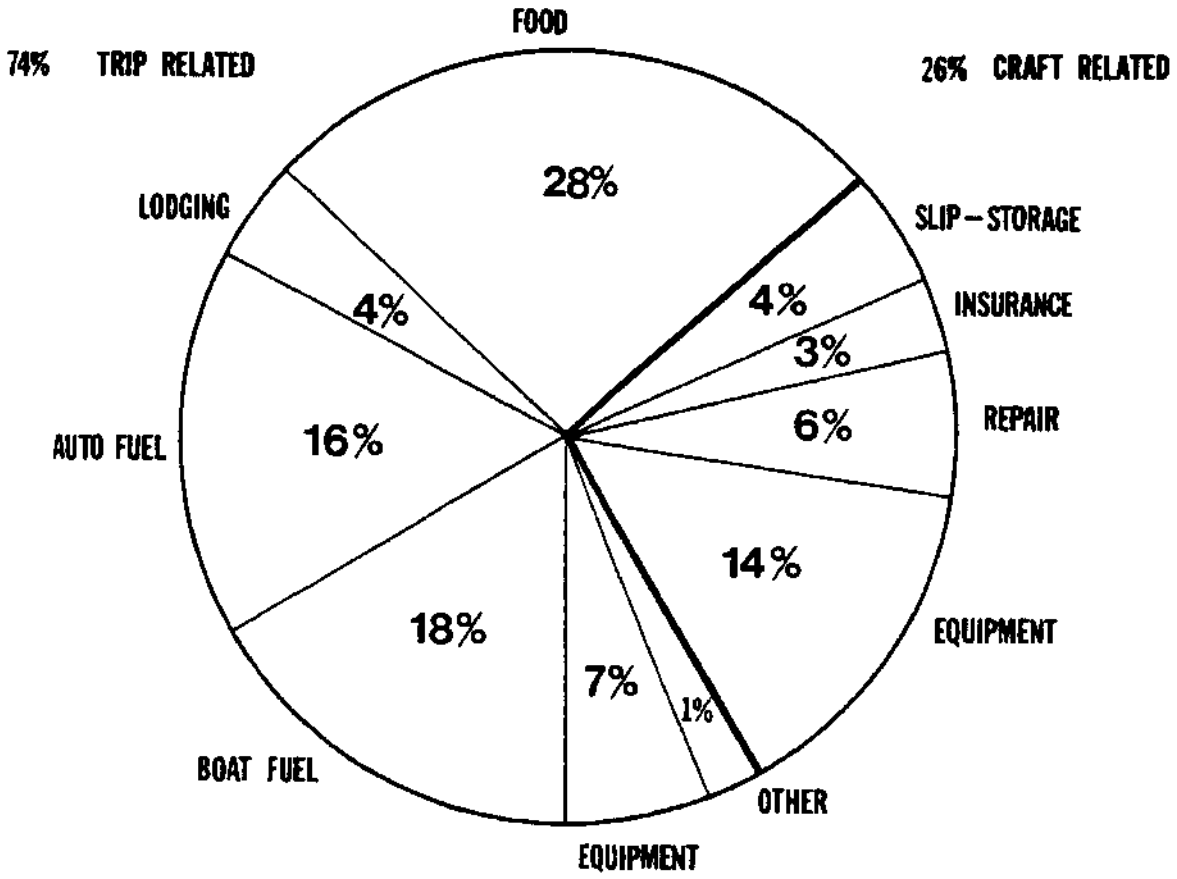

FIGURE 3.1. Boating Trip and Craft Spending by Spending Category

types of boats, these average spending figures can be misleading. For example, owners of large cabin cruisers spend upwards of $8,000 per year, while owners of small sail and power boats spend about $1,000 per year on boating. Thus, an accurate picture of the spending patterns of Michigan's registered boat owners requires some disaggregation or segmentation of the boating fleet.

Spending by Craft Type

By disaggregating the boating fleet into distinct types of craft, the spending estimates become more meaningful and more applicable to situations involving different numbers and types of boats. The statewide distribution of registered craft by boat type, and differences in activity between types are summarized in Table 3.2. Figure 3.2 depicts differences in the contribution of each boat class to the numbers of craft, boat days, and spending. Small open boats make up 53 percent of the fleet, but account for smaller percentages of boating activity and spending. Larger open craft are the biggest contributors to statewide boat owner spending. They account for 27% of the fleet and 44% of all spending. Cabin cruisers make up about six percent of the fleet and 13% of boater spending. In general, larger craft are more active and spend more money on boating, although in terms of sheer numbers, smaller craft dominate the fleet.

Table 3.3 summarizes the spending of each craft type in both trip- and craft-related categories. It also illustrates how the total spending figures were calculated from 1980 and 1981 survey statistics. Average annual spending by boat owners varies from just over $1,000 for

Table 3.2. Michigan Boating Activity by Craft Type - 1980

Activity	TYPE OF CRAFT					
	Open < 16 ft.	Open ≥ 16 ft.	Cabin	Sail	Pontoon	All Craft
Active Boats in Fleet [a]	267,451	136,837	28,182	36,523	40,024	509,017
Average Days Boated	29	38	43	36	39	33
Total Boat Days (1,000's)	7,651	5,228	1,196	1,292	1,558	16,925

Note. These data from Stynes, Daniel J. and David Safronoff, 1982. 1980 Michigan Recreational Boating Survey. Michigan Sea Grant Technical Report MICHU-SG-82-202.

a. Registered boats in each category were reduced by 14.5% to reflect craft that were inactive in 1980.

Table 3.3 Summary of Boating Activity and Spending by Craft Type

	TYPE OF CRAFT					
	SM OPEN	LG OPEN	CABIN	SAIL	PONTOON	ALL CRAFT
1. Active registered boats (1980)	267,451	136,837	28,182	36,523	40,024	509,017
2. percent	53	27	6	7	8	100
3. Avg Number of days boated (1980)	29	38	43	36	39	33
4. Total boat days (000's)	7,651	5,228	1,196	1,292	1,558	16,925
5. percent	45	31	7	8	9	100
6. Avg craft-related spending(per boat)	$232	$735	$1,515	$670	$231	$469
7. Avg trip-related spending (per boat day)	$27	$58	$63	$23	$39	$39
8. Total craft-related spending (000's)	$62,076	$100,596	$42,421	$24,570	$9,178	$238,842
9. Total trip-related spending (000's)	$205,838	$299,182	$75,805	$29,937	$60,002	$670,764
10. Total spending (000's)	$267,914	$399,779	$118,226	$54,506	$69,179	$909,605
11. percent	29	44	13	6	8	100
12. Avg Total spending per boat per year	$1,002	$2,921	$4,195	$1,492	$1,728	$1,787

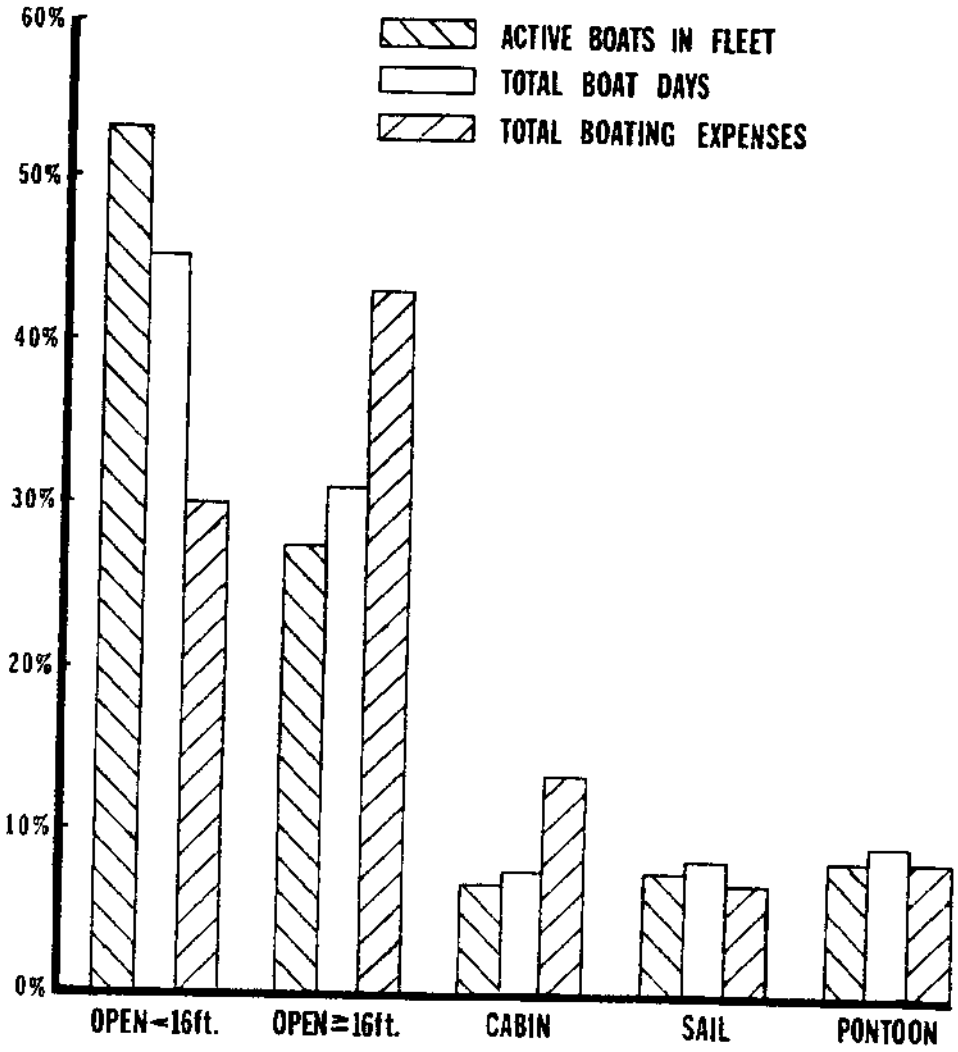

FIGURE 3.2. Boating Activity and Spending by Craft Type

small open boat owners to $4,195 for owners of cabin cruisers. Keep in mind that these averages include boats of all lengths. Spending of larger power and sail boats are well above these averages. This will be illustrated later in this chapter where spending of marina boaters is estimated.

Table 3.4 breaks craft and trip spending down into more specific spending categories. Craft-related spending is reported on an annual basis, while trip spending is reported per boat day. Differences in spending patterns of owners of different types of craft can be seen by calculating the percentage of the boating budget allocated to each category. These are reported in Table 3.5. These percentages coincide with those in Figure 3.1.

Comparing spending patterns of different craft, we see that cabin cruisers and sail boats require the largest percentages of craft-related spending. Owners of pontoon and open craft allocate more of their boating budget to trip-related items. As one would expect, boat fuel is a big item for larger powered craft and relatively insignificant for sailing craft. Sail and cabin cruisers incur significant storage costs. Owners of pontoon boats spend the highest percentage of their boating budget on food and beverages and owners of larger open craft are the most likely to incur lodging expenses on overnight trips.

A complete breakdown of boat owner spending by craft type and spending category is given in Table 3.6. This and several subsequent tables were generated by a SuperCalc program, which is described more fully in the next chapter.

Table 3.4. Average Boating Expenditures by Craft Type and Spending Category

	TYPE OF CRAFT					
	SM OPEN	LG OPEN	CABIN	SAIL	PONTOON	ALL CRAFT
	AVERAGE CRAFT-RELATED SPENDING PER BOAT					
SPENDING						
Craft Expenses ($/boat/year)						
Equipment	142.09	415.31	572.83	269.53	101.17	245.26
Repair	52.42	151.56	336.64	120.12	53.67	99.69
Insurance	21.78	87.04	164.19	64.93	34.23	51.25
Storage	15.56	80.77	441.61	215.82	42.09	73.02
TOTAL CRAFT-RELATED	231.85	734.68	1515.27	670.40	231.16	469.22
	AVERAGE TRIP SPENDING PER BOAT DAY					
Trip Expenses ($/boat day)						
Food	9.68	21.39	18.82	13.04	17.05	14.88
Lodging	.65	4.97	.92	1.35	.26	2.02
Auto fuel	7.89	8.81	16.66	5.98	8.42	8.70
Boat fuel	5.41	15.24	21.57	1.46	9.08	9.62
Equipment	2.46	6.26	2.68	.23	3.37	3.56
Other	.42	.83	2.32	.63	.57	.71
TOTAL TRIP-RELATED	26.51	57.50	62.97	22.69	38.75	39.49

Note. Sampling errors for these statistics are reported in Appendix B, Table B.1.

Table 3.5. Percent Distribution of State Boating by Spending Category for Each Craft Type

	TYPE OF CRAFT					
	SM OPEN	LG OPEN	CABIN	SAIL	PONTOON	AVERAGE
SPENDING						
Annual Craft Expenses						
Equipment	14	14	14	18	6	14
Repair	5	5	8	8	3	6
Insurance	2	3	4	4	2	3
Storage	2	3	10	15	2	4
TOTAL CRAFT-RELATED	23	25	36	45	13	26
Trip Expenses						
Food	28	28	19	32	38	28
Lodging	2	6	1	3	1	4
Auto fuel	23	11	17	14	19	16
Boat fuel	16	20	22	4	20	18
Equipment	7	8	3	1	8	7
Other	1	1	2	2	1	1
TOTAL TRIP-RELATED	77	75	64	55	87	74
TRIP + CRAFT SPENDING	100	100	100	100	100	100

Table 3.6. Boating Activity and Spending Summary: The 1981 Active Registered Fleet

	TYPE OF CRAFT					
	SM OPEN	LG OPEN	CABIN	SAIL	PONTOON	ALL CRAFT
BOATING ACTIVITY						
Pct Boats by Type	53	27	6	7	8	100
Number of Boats (000's)	268	137	28	37	40	509
Avg Boat days	29	38	43	36	39	33
Total Boat days (000's)	7765	5203	1204	1319	1548	17039
SPENDING (Thousands of Dollars)						
Annual Craft Expenses						
Equipment	38044	56867	16037	9878	4017	124842
Repair	14035	20752	9425	4402	2131	50745
Insurance	5831	11918	4597	2380	1359	26085
Storage	4166	11059	12363	7910	1671	37170
TOTAL CRAFT-RELATED	62076	100596	42421	24570	9178	238842
Trip Expenses						
Food	75161	111296	22656	17205	26401	252718
Lodging	5047	25860	1108	1781	403	34198
Auto fuel	61262	45840	20056	7890	13038	148086
Boat fuel	42006	79296	25967	1926	14060	163255
Equipment	19101	32572	3226	303	5218	60421
Other	3261	4319	2793	831	883	12086
TOTAL TRIP-RELATED	205838	299182	75805	29937	60002	670764
TRIP + CRAFT SPENDING	267914	399779	118226	54506	69179	909605
	AVERAGE CRAFT-RELATED SPENDING PER BOAT					
SPENDING						
Craft Expenses ($/boat/year)						
Equipment	142	415	573	270	101	245
Repair	52	152	337	120	54	100
Insurance	22	87	164	65	34	51
Storage	16	81	442	216	42	73
TOTAL CRAFT-RELATED	232	735	1515	670	231	469
	AVERAGE TRIP SPENDING PER BOAT DAY					
Trip Expenses ($/boat day)						
Food	10	21	19	13	17	15
Lodging	1	5	1	1	0	2
Auto fuel	8	9	17	6	8	9
Boat fuel	5	15	22	1	9	10
Equipment	2	6	3	0	3	4
Other	0	1	2	1	1	1
TOTAL TRIP-RELATED	27	58	63	23	39	39

Boater Spending on Great Lakes and Inland Lakes

The 1980 survey measured important differences in patterns and types of boating activity between Great Lakes and inland locations. The Great Lakes and connecting waters received 32% of the boating activity reported in 1980. Great Lakes craft tend to be larger than craft used on inland lakes, suggesting some likely differences in spending patterns.

Although only 32% of the boat days occured on the Great Lakes, about half of the spending of Michigan's registered boat owners can be attributed to Great Lakes boating. Great Lakes boaters reported craft spending averaging $849 per boat per year, as compared with $260 for inland boaters. Spending on Great Lakes trips was $47 per day as compared with $32 per day for inland trips.

Table 3.7 summarizes the total contribution of Great Lakes (GL) and inland lakes (IL) boating to statewide activity and spending. The Great Lakes and Inland Lakes columns do not add up to the totals due to some double counting and roundoff errors. About 18% of the boating fleet use both GL and IL waters. While we were able to separate GL from IL trips for these craft, there is no simple way of allocating craft-related spending of these boat owners to GL and IL categories. They are therefore included in both columns, but not double counted in the row totals. About 90,000 craft use both GL and IL waters. Applying an average annual craft-related spending of $469 yields about $42 million in craft spending that is double counted in the craft and total spending rows of the table.

Table 3.7. Summary of Boating Activity and Spending: Great Lakes & Inland Lakes Users.

	Great Lakes		Inland Lakes		Total
	Number	Pct	Number	Pct	
Boats (000's) [a]	206	40	392	77	509
Boat Days (000's)	5443	32	11631	68	17039
Expenditures (Millions of Dollars) [b]					
Craft	179	64	121	43	239
Trip	279	42	394	59	671
Total [c]	457	48	515	54	910

a. Row does not add to total since 17% of fleet use both GL and IL waters.
b. Boats using both GL and IL are counted in both columns. Row therefore will not add to total.
c. Some craft expenses are double counted. See note b.

Compared to inland lakes boaters, Great Lakes boaters spend much higher percentages of their boating budget on craft-related items. Great Lakes boating accounts for over 60% of the total spending in the craft categories and only 42% of the trip spending. These patterns are reversed for inland boaters.

These spending differences between GL and IL boaters also appear in comparisons of spending by craft type. Summary tables similar to Table 3.6 (for the fleet as a whole) are presented for Great Lakes and inland lakes boaters in Tables 3.8 and 3.9, respectively. The bottom half of these tables report average spending per boat and per boat day for GL and IL boaters. Pontoon boats are omitted from the GL table since

Table 3.8. Boating Activity and Spending Summary : 1981 Great Lakes Boating

	TYPE OF CRAFT				
	SMALL OPEN	LARGE OPEN	CABIN	SAIL	ALL CRAFT
BOATING ACTIVITY					
Pct Boats by Type	32.20	45.10	13.70	9.00	100.00
Number of Boats (000's)	66.33	92.91	28.22	18.54	206.00
Avg Boat days	17.00	27.00	43.00	32.00	26.42
Total Boat days (000's)	1127.64	2508.46	1213.55	593.28	5442.93
SPENDING (Thousands of Dollars)					
Annual Craft Expenses					
Equipment	13326.10	49083.17	19285.50	9373.82	91068.60
Repair	5770.88	16309.65	11333.67	3262.67	36676.87
Insurance	2164.41	8421.00	5527.84	1789.11	17902.37
Storage	2779.31	8356.89	14867.63	7093.40	33097.24
TOTAL CRAFT-RELATED	24040.71	82170.71	51014.65	21519.01	178745.08
Trip Expenses					
Food	7713.08	48087.22	22838.94	9889.98	88529.21
Lodging	146.59	17659.57	1116.46	1477.27	20399.90
Auto fuel	12043.24	24056.15	20217.68	3162.18	59479.25
Boat fuel	9167.75	43321.14	26176.19	1109.43	79774.51
Equipment	1229.13	19340.24	3252.30	183.92	24005.59
Other	755.52	2357.95	2815.43	421.23	6350.13
TOTAL TRIP-RELATED	31055.32	154822.27	76416.99	16244.01	278538.59
TRIP + CRAFT SPENDING	55096.02	236992.99	127431.64	37763.01	457283.67
SPENDING	AVERAGE CRAFT-RELATED SPENDING PER BOAT				
Craft Expenses ($/boat/year)					
Equipment	200.90	528.31	683.35	505.60	419.93
Repair	87.00	175.55	401.59	175.98	174.64
Insurance	32.63	90.64	195.87	96.50	84.64
Storage	41.90	89.95	526.81	382.60	170.00
TOTAL CRAFT-RELATED	362.43	884.45	1807.62	1160.68	849.21
	AVERAGE TRIP SPENDING PER BOAT DAY				
Trip Expenses ($/boat day)					
Food	6.84	19.17	18.82	16.67	14.69
Lodging	.13	7.04	.92	2.49	3.02
Auto fuel	10.68	9.59	16.66	5.33	11.21
Boat fuel	8.13	17.27	21.57	1.87	13.12
Equipment	1.09	7.71	2.68	.31	3.71
Other	.67	.94	2.32	.71	1.09
TOTAL TRIP-RELATED	27.54	61.72	62.97	27.38	46.84

Note. Sampling errors for these statistics are reported in Appendix B, Table B.3.

Table 3.9. Boating Activity and Spending Summary : 1981 Inland Lakes Boating

	TYPE OF CRAFT				
	SMALL OPEN	LARGE OPEN	SAIL	PONTOON	ALL CRAFT
BOATING ACTIVITY					
Pct Boats by Type	57.90	25.00	7.00	10.10	100.00
Number of Boats (000's)	226.97	98.00	27.44	39.59	392.00
Avg Boat days	27.00	32.00	30.00	39.00	29.67
Total Boat days (000's)	6128.14	3136.00	823.20	1544.09	11631.42
SPENDING (Thousands of Dollars)					
Annual Craft Expenses					
Equipment	28784.08	28481.74	2291.51	5296.62	64853.95
Repair	9859.49	12259.80	2087.91	2809.84	27017.04
Insurance	4303.31	8140.86	1098.97	1792.33	15335.48
Storage	1979.16	6922.72	2315.94	2203.69	13421.51
TOTAL CRAFT-RELATED	44926.05	55805.12	7794.33	12102.48	120627.98
Trip Expenses					
Food	63855.18	67079.04	8371.94	26326.70	165632.86
Lodging	4779.95	8435.84	378.67	401.46	13995.92
Auto fuel	43877.45	24931.20	5342.57	13001.22	87152.44
Boat fuel	28740.96	40768.00	938.45	14020.32	84467.72
Equipment	17281.34	14582.40	139.94	5203.58	37207.26
Other	2144.85	2226.56	469.22	880.13	5720.76
TOTAL TRIP-RELATED	160679.73	158023.04	15640.80	59833.41	394176.98
TRIP + CRAFT SPENDING	205605.77	213828.16	23435.13	71935.89	514804.96
AVERAGE CRAFT-RELATED SPENDING PER BOAT					
SPENDING					
Craft Expenses ($/boat/year)					
Equipment	126.82	290.63	83.51	133.78	141.41
Repair	43.44	125.10	76.09	70.97	58.37
Insurance	18.96	83.07	40.05	45.27	33.23
Storage	8.72	70.64	84.40	55.66	26.95
TOTAL CRAFT-RELATED	197.94	569.44	284.05	305.68	259.96
AVERAGE TRIP SPENDING PER BOAT DAY					
Trip Expenses ($/boat day)					
Food	10.42	21.39	10.17	17.05	13.50
Lodging	.78	2.69	.46	.26	1.25
Auto fuel	7.16	7.95	6.49	8.42	7.29
Boat fuel	4.69	13.00	1.14	9.08	6.37
Equipment	2.82	4.65	.17	3.37	3.29
Other	.35	.71	.57	.57	.67
TOTAL TRIP-RELATED	26.22	50.39	19.00	38.75	32.37

Note. Sampling errors for these statistics are reported in Appendix B, Table B.2.

there were not enough pontoon boat owners in the GL sample to accurately estimate spending. Similarly, cabin cruisers are omitted from the IL table.

Boaters using the GL consistently report higher spending than the fleet averages, while inland boaters are consistently lower than the fleet averages. Spending patterns of sailors are particularly different due to the larger types of sailing craft using the GL. Great Lakes sailors report craft spending of $1160 annually , much higher than the inland lake figure of $284 per year.

Breaking down the boating budgets of GL and IL boaters by spending category yields additional differences (Table 3.10). Great Lakes boaters spent 39% of their budget on craft-related items, as compared with 23% for IL boaters. Great Lakes boat owners allocate higher percentages of their boating budgets to all craft-related categories, particularly equipment and storage. Conversely, inland boaters spend 32 percent of their boating budget on food, as contrasted with only 19% for Great Lakes boaters. Inland boaters spend proportionately more money on trip-related items with the exception of lodging. Great Lakes boaters exhibit a greater tendency to go on overnight trips and incur lodging expenses.

Spending Patterns of the Marina Boater

We have seen that Michigan boater spending patterns vary by type of craft and use on the Great Lakes vs inland lakes. Craft stored at a marina or boat club account for about 6% of the registered fleet. Although this is a small segment of the boating market, it is an important one since marinas provide storage for larger craft and tend to concentrate their impacts within coastal communities.

Table 3.10 . Percentage Distribution of Boating Budgets by Craft Type : Great Lakes and Inland Boaters

INLAND BOATERS

SPENDING	TYPE OF CRAFT: SM OPEN	LG OPEN	SAIL	PONTOON	ALL CRAFT[a]
	percent				
Annual Craft Expenses					
Equipment	14	13	10	7	13
Repair	5	6	9	4	5
Insurance	2	4	5	2	3
Storage	1	3	10	3	3
TOTAL CRAFT-RELATED	22	26	33	17	23
Trip Expenses					
Food	31	31	36	37	32
Lodging	2	4	2	1	3
Auto fuel	21	12	23	18	17
Boat fuel	14	19	4	19	16
Equipment	8	7	1	7	7
Other	1	1	2	1	1
TOTAL TRIP-RELATED	78	74	67	83	77
TRIP + CRAFT SPENDING	100	100	100	100	100

GREAT LAKES BOATERS

SPENDING	TYPE OF CRAFT: SM OPEN	LG OPEN	CABIN	SAIL	ALL CRAFT[a]
	percent				
Annual Craft Expenses					
Equipment	24	21	15	25	20
Repair	10	7	9	9	8
Insurance	4	4	4	5	4
Storage	5	4	12	19	7
TOTAL CRAFT-RELATED	44	35	40	57	39
Trip Expenses					
Food	14	20	18	26	19
Lodging	0	7	1	4	4
Auto fuel	22	10	16	8	13
Boat fuel	17	18	21	3	17
Equipment	2	8	3	0	5
Other	1	1	2	1	1
TOTAL TRIP-RELATED	56	65	60	43	61
TRIP + CRAFT SPENDING	100	100	100	100	100

[a] Statistics in this column correspond to the distribution of craft reported in Tables 3.8 and 3.9.

The marina boater spends significantly more than the average registered boat owner, and more than the typical Great Lakes boater. In order to more clearly identify the marina boater, a different boater segmentation was developed to focus more specifically on larger craft that are often stored at a marina. The marina segmentation divides craft into three types : (1) power boats 20-25 feet in length, (2) power boats over 25 feet in length, and (3) sail boats over 20 feet in length. Using these categories, boats using a marina were identified as those reporting slip-related spending of at least $250. Spending patterns of these boat owners were significantly larger than averages reported so far in this report.

Power boats over 25 feet in length report annual craft expenses of $3199 and per day trip expenses of over $100. Larger sail boats kept at a marina spend almost $2500 a year on their craft and about $43 a day on boating trips. Power boats from 20 to 25 feet in length report annual craft expenses of about half that of the larger powered craft, and trip spending of $75 a day (Table 3.11).

Compared with an average registered boat owner, the marina boater spends about four times as much on craft-related items and about twice as much on trip spending. Table 3.12 illustrates the breakdown of a marina boater's budget. Large power boats spend an average of $8264 annually, with 39% of the spending going to craft-related expenses. Marina sail boaters average $4489 annually with 55% going to craft spending. Sail boaters spend proportionately more for equipment and storage than the other two marina boater categories. Power boats allocate from 19-24 percent of their boating budgets to cover fuel.

Table 3.11. Spending Patterns of Marina Boaters

	TYPE OF CRAFT			
	POWER 20-25FT	POWER GT 25 FT	SAIL GT 20 FT	AVERAGE
SPENDING				
Annual Craft Expenses ($/boat/year)				
Equipment	560	1024	1033	798
Repair	310	630	345	416
Insurance	171	356	191	232
Storage	535	1189	921	815
TOTAL CRAFT-RELATED	1576	3199	2490	2262
Trip Expenses ($/boat day)				
Food	33	33	31	33
Lodging	5	0	2	3
Auto fuel	10	23	3	13
Boat fuel	22	41	3	24
Equipment	3	5	1	3
Other	2	4	3	3
TOTAL TRIP-RELATED	75	106	43	79

Note. Sampling errors for these statistics are reported in Appendix B, Table B.4.

Table 3.12. Distribution of Annual Boating Budget: Marina Boaters

	TYPE OF CRAFT			
	POWER 20-25FT	POWER 25 FT	SAIL 20 FT	AVERAGE
SPENDING				
Annual Craft Expenses				
Equipment	560	1024	1033	872
Repair	310	630	345	428
Insurance	171	356	191	239
Storage	535	1189	921	882
TOTAL CRAFT-RELATED	1576	3199	2490	2421
Trip Expenses				
Food	1427	1592	1439	1486
Lodging	236	12	97	115
Auto fuel	428	1101	158	562
Boat fuel	932	1951	146	1010
Equipment	120	227	34	127
Other	101	181	126	136
TOTAL TRIP-RELATED	3245	5065	1999	3436
TRIP + CRAFT SPENDING	4821	8264	4489	5858
SPENDING	---------- percent ----------			
Annual Craft Expenses				
Equipment	12	12	23	15
Repair	6	8	8	7
Insurance	4	4	4	4
Storage	11	14	21	15
TOTAL CRAFT-RELATED	33	39	55	41
Trip Expenses				
Food	30	19	32	25
Lodging	5	0	2	2
Auto fuel	9	13	4	10
Boat fuel	19	24	3	17
Equipment	2	3	1	2
Other	2	2	3	2
TOTAL TRIP-RELATED	67	61	45	59
TRIP + CRAFT SPENDING	100	100	100	100

Regional Distribution of Boater Spending

Assessments of the economic effects of boater spending upon the state, regions of the state, or local communities requires the separation of local spending by resident boat owners from the spending of non-local residents who are attracted to the area. In this section we examine regional flows of boater spending, using Great Lakes boating regions defined in Stynes and Safronoff (1982). Figure 3.3 depicts the ten regions to be used in this analysis. Region 10 includes out-of-state origins.

The allocation of boater spending to different regions of the state required a number of simplifying assumptions. Craft-related spending was allocated to the region of registration of the craft. There will be some mis-assignments due to boats stored other than in the region of registration. There is some inconsistency in registration procedures, making it impossible to distinguish residence from storage location. This problem will tend to underestimate spending in coastal areas and northern regions where craft are often stored at second homes and marinas. Insight into the extent of this problem can be gained by examining second home ownership patterns of registered boaters reported in Stynes and Safronoff (1982). However, we still do not know how much of this activity is improperly assigned, because we do not know how many boaters are registering boats at a second home or marina location.

Trip-related spending is allocated to regions based upon travel patterns measured in the 1980 boater survey. The 1980 survey report includes a table presenting an origin-destination matrix of boat days

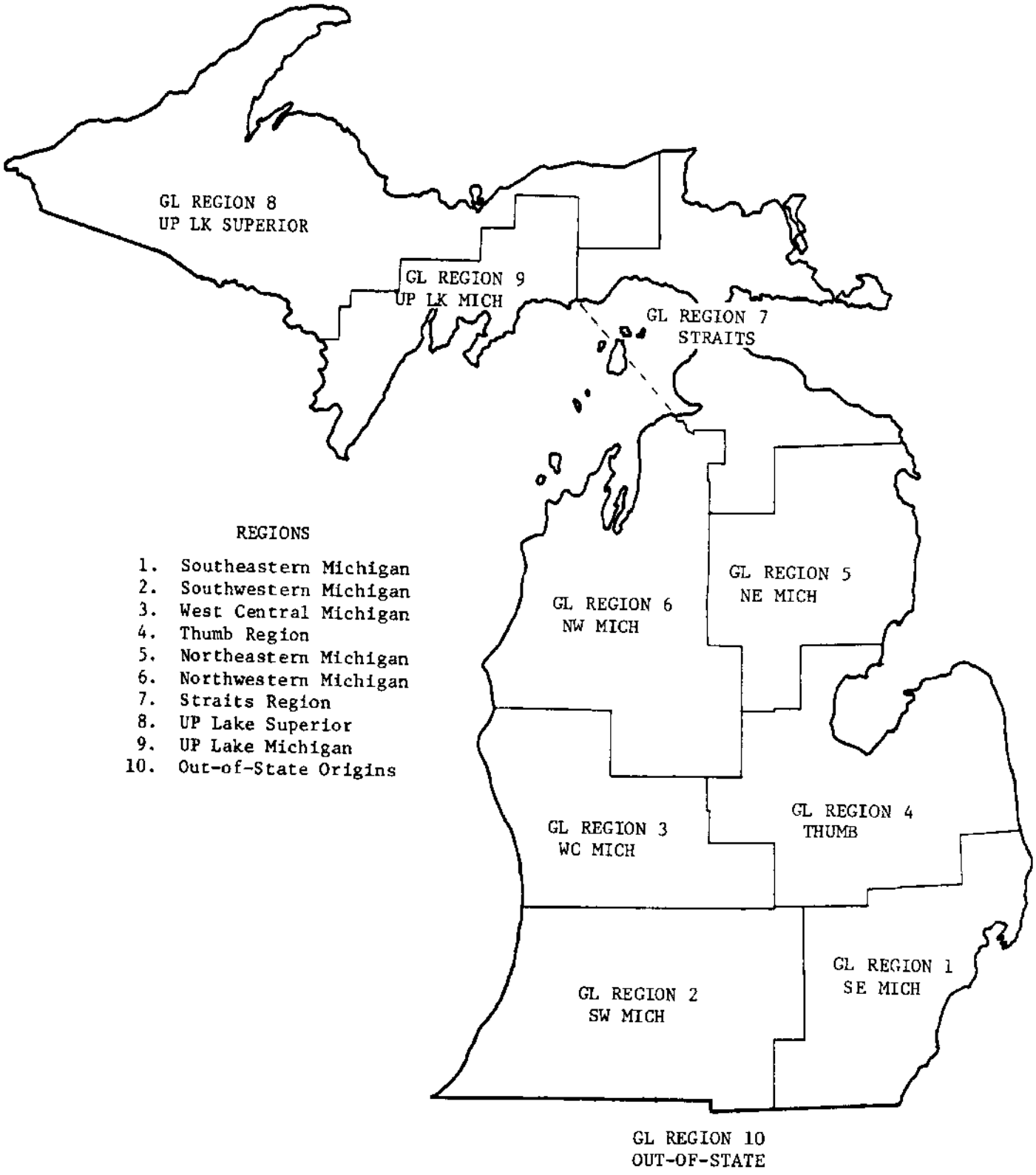

FIGURE 3.3. Michigan Great Lakes Boating Regions

generated in that year (Table 46 of Stynes and Safronoff, 1982). We assume travel patterns did not change significantly between 1980 and 1981. The larger sample size in 1980 yields a more accurate estimate of origin-destination patterns than could be developed from the 1981 survey.

Analyses of boater spending patterns by origin and destination region yielded only one significant regional difference in spending. Out-of-state boaters outspent boaters from Michigan origins and spent more of this money at the destination. Boat owners reported trip spending at the origin, en route, and at the destination. Since few trips cross more than one regional boundary, en route spending was split equally between the origin and destination region. Boaters from Michigan origins averaged $19.22 in spending at the origin and $20.04 at the destination. Boaters with out-of-state registrations spent $18.71 at home and $44.71 at the destination on a per boat day basis. These average spending figures per boat day were multiplied by boat days from Table 46 of Stynes and Safronoff to yield a statewide spending origin-destination matrix for boat trip spending (Table 3.13). The majority of boating outings occur in the region of origin. Spending on these trips are reported along the diagonal of Table 3.13.

Out-of-state boat owners also reported slightly higher craft-related spending. Out-of-state boat owners spent an average of $487 annually on craft-related items, as contrasted with $442 for in-state boat owners. Our regional analysis does not take into account regional differences in the makeup of the boating fleet. Regional differences in the proportion of different types of craft and tendencies of some types of craft to

travel longer distances for boating were not significant enough to justify more complex and costly estimation procedures that would account for these variations. Sample sizes among some craft types would make origin-destination matrices by craft type inaccurate. The regional analyses therefore employ averages for the boating fleet as a whole, only distinguishing in-state and out-of-state boat owners.

Out-of-State Boat Owner's Spending

Beginning with the entire state of Michigan as our region, we will look at the spending impacts of out-of-state boaters. Boat owners coming from out-of-state represent an infusion of new dollars to the state, creating spending and employment within Michigan. Although out-of-state registrations are only 3% of Michigan's registered fleet, they are an important part because these boaters represent new dollars to the state. Our figures only include spending by owners of out-of-state boats registered in Michigan. Spending by out-of-staters who boat in Michigan on craft registered in other states, unregistered boats, or boats owned by someone else is not included.

Out-of-state registered boat owners spent $41.4 million dollars in Michigan in 1981. About 80% of this spending was on trip-related items. Southwest Michigan benefitted the most from out-of-state boaters, receiving 36% of the $41 million dollars. Northwest Michigan received 18% and the western upper peninsula received 12%. (Table 3.14). Southwest Michigan, southeast Michigan, and the western upper peninsula each receive half of their imported boater spending from out-of-state.

Table 3.13. Regional Flows of Michigan Boater Trip Spending - 1981 (Millions of dollars)

ORIGIN	REGION OF DESTINATION									
	1	2	3	4	5	6	7	8	9	Total
1	215.10	8.36	.90	5.25	5.61	9.40	6.39	.86	1.34	253.21
2	.70	107.77	2.81	.38	1.00	4.05	1.12	.32	.68	118.83
3	.06	1.58	65.42	1.44	.66	4.63	1.04	.20	.30	75.34
4	1.22	1.08	1.48	54.16	6.85	3.09	1.16	.18	.14	69.37
5	.14	.26	.02	.36	20.97	.16	.44	.18	.00	22.53
6	.12	.24	.44	.12	.16	43.94	1.18	.22	.02	46.44
7	.02	.14	.00	.00	.32	.04	20.66	.08	.06	21.32
8	.20	.00	.02	.06	.02	.14	.06	20.41	.52	21.43
9	.00	.00	.00	.00	.00	.04	.10	.42	7.25	7.81
10	2.46	11.45	2.86	.40	1.74	5.95	3.80	3.04	.45	32.15
Total	220.02	130.88	73.95	62.18	37.34	71.42	35.96	25.92	10.76	668.43

Table 3.14. Out-of-State Boater Spending in Michigan

REGION	1	2	3	4	5	6	7	8	9	TOTAL
	----------spending in millions of dollars----------									
Craft Spending	.71	3.29	.82	.12	.5	1.71	1.09	.88	.13	9.25
Trip Spending	2.46	11.45	2.86	.4	1.74	5.95	3.8	3.04	.45	32.15
Total Spending	3.17	14.74	3.68	.52	2.24	7.66	4.89	3.92	.58	41.4
Percent	8	36	9	1	5	19	12	9	1	100

Regional Impacts of Boater Spending

Narrowing our focus to substate regions, we can measure the spending impacts within the state resulting from interregional flows of boaters. Table 3.15 summarizes the export and import of boating dollars by region. Southeast Michigan, west central Michigan, and the Thumb region are net exporters of boat days. All other regions are net importers. Northeast Michigan, northwest Michigan, and the Straits area have the largest net gains from boaters. Northwest Michigan receives $25 million dollars by providing boating opportunities to residents of other regions. Boating imports represent over 40 percent of the boater spending in northeast Michigan and the Straits area. In northwest Michigan imports account for 38 percent of boater spending in the region.

Table 3.15. Regional Export and Import of Boat Owner Spending

REGION	1	2	3	4	5	6	7	8	9
	----------spending in millions of dollars----------								
Trip Imports	4.92	23.11	8.53	8.02	16.37	27.49	15.3	5.5	3.51
Percent [a]	2	18	12	13	44	38	43	21	33
Trip Exports	38.11	11.06	9.92	15.21	1.56	2.5	.66	1.02	.56
Percent [b]	15	9	13	22	7	5	3	5	7
Imports-Exports	-33.19	12.05	-1.39	-7.19	14.81	24.99	14.64	4.48	2.95
Craft Import [c]	.71	3.29	.82	.12	.5	1.71	1.09	.87	.13
Import Total	5.63	26.4	9.35	8.14	16.87	29.2	16.39	6.37	3.64

a. Trip imports as a percent of total trip spending in the destination region.
b. Trip exports as a percent of total trip spending generated in the region.
c. Craft imports only includes craft spending of out-of-state boat owners registering their craft in Michigan.

Summary

On a statewide basis, Michigan registered boat owners spend nearly one billion dollars annually. Considerable variation exists in the spending patterns of owners of different types of craft. Spending also varies between Great Lakes boaters, inland lakes boaters, and marina boaters. Owners of larger boats, particularly those stored at a Great Lakes marina, spend more than owners of smaller craft, especially in the craft-related spending categories.

The magnitude of boater spending indicates the importance of boating to Michigan residents and visitors. Many individuals are spending a large share of their disposable income on boating. Even owners of smaller craft

with limited incomes spend as much as $1000 a year on boating. Owners of large power boats average as much as $8,500 in boating expenses a year, not counting craft purchases.

The vast majority of this spending is spending by Michigan residents in Michigan. Only the 41.5 million dollars spent by out-of-staters represents new dollars to Michigan's economy. While this is a relatively small contribution to the state's economy, it has significant impacts on many areas of the state, particularly when combined with regional transfers of boating dollars within the state. Within three northern Michigan regions imports represent approximately 40% of all boater spending in the region, contributing as much as 29 million dollars in northwest Michigan. Boater spending benefits a number of different retail sectors, having a fairly broad impact on local economies.

In the next chapter we develop methods for applying these estimates of boater spending to the problem of estimating impacts of specific actions at the local level.

CHAPTER IV

ESTIMATING BOATER SPENDING IMPACTS ON LOCAL ECONOMIES

In the previous chapter we estimated total spending of registered boaters in Michigan, compared spending patterns of different types of craft, and estimated regional flows of boating dollars throughout the state. In particular, the spending by out-of-state boaters in Michigan was conservatively estimated to be $ 41.4 million.

The purpose of this chapter is to explain simple procedures for estimating direct spending of boaters at the local level. Applying statewide boating data to a local level involves certain assumptions. In particular, we must assume that local patterns do not deviate substantially from the general statewide patterns, except with respect to those factors directly incorporated into our procedures.

Using data from the 1980 and 1981 boater surveys, tests were made to explore regional variations in boating patterns and spending. Tests were conducted at the regional level using the 10 Great Lakes boating regions defined earlier (Figure 3.3). Within craft type segments no differences were found in spending patterns by origin or destination region, with one exception; out-of-state boaters tended to spend greater amounts on both craft and trip expenses than in-state boaters. These differences are not very large and ordinarily will not justify the more complicated procedures that would be required to independently estimate spending of in-state

and out-of-state boaters. Out-of-state boaters account for only 3% of statewide boating activity in Michigan.

We therefore concluded that statewide averages of boat owner spending could be applied at the regional level with little loss in accuracy. We should note that spending differences may exist at the county and community level. These could not, however, be tested for with the statewide sample. Given the added cost and complexity of developing local spending data, and the lack of significant spending differences at the regional level, we believe that average spending figures within craft type categories can be applied to local situations. We therefore developed methods for estimating the impacts of boater spending on local economies. The following objectives guided the development of these procedures.

Objectives in Spending Impact Estimation Procedures

1. Applicable to any local area in Michigan
2. Capable of estimating spending associated with different types of boating developments, for example:
    a. Access sites and launch facilities
    b. Marinas
3. Simple and easy to use
4. Limited local data requirements
5. Permit comparisons of effects of alternative developments
6. Easily updated or revised to incorporate new data or good local boating information
7. Able to estimate spending in different categories in order to identify which sectors of the local economy might benefit.

Summary of Procedures

Utilizing statistics on boating activity and spending generated from the 1980 and 1981 Michigan registered boater surveys, estimates of boat owner spending were developed in two major categories:

(1) Craft-related spending was estimated on an annual basis using reported estimates for 1980.

(2) Trip-related spending was estimated per day of boating using trip spending reported in 1981. By multiplying these per day averages by estimates of numbers of boat days (estimated in 1980 survey), annual trip spending estimates were generated.

In order to take into account wide variations in spending by owners of different types of boats, registered boats were first segmented into different types of craft. The craft type segmentation is crucial to the spending estimation procedures, since any differences in spending at the local level must be attributable to differences in the numbers of craft of each type. Different segmentations were required for marina applications than for applications to the general boating population. The examples which follow involve the same general method of estimating boat owner spending, but utilize distinct segmentations. Other segmentations could be used for particular applications as long as variables used in the segmentation base are included in the 1980 and 1981 surveys. If not, estimates of spending and boating activity must be available from some other source.

Craft-related spending is estimated by multiplying the number of craft of each type located in the area in question times the average annual spending of each craft type by spending category. Similarly, trip-related spending is estimated by multiplying per day spending estimates times the numbers of boat days in the area. Lacking local data on boating activity, the statewide averages of boat days by craft types can be used.

To simplify calculations and provide for easy use, all of the required calculations have been built into a computer program. The program has been developed with the SuperCalc spreadsheet package on a Zenith WH-89 microcomputer. Several tables in Chapter 3 were generated with this program.

SuperCalc Program for Estimating Boat Owner Spending

PURPOSE. The program calculates spending of boaters, based upon survey data and user inputs. Given a certain number and distribution of boats by type of craft, the program calculates spending of these boaters on craft- and trip-related items. The program can be used in estimating the economic effects of alternative boating developments. Spending is reported in several categories including spending on slip rental, fuel, and equipment as well as trip related expenses such as auto fuel, lodging, and food. The former largely accrue to boating industries while the latter benefit other retail sectors in coastal communities.

LANGUAGE/PROGRAM. The program has been written for the SuperCalc program and implemented on a Heath/Zenith WH-89 microcomputer with 64K of memory and CP/M operating system. The program is readily translated to other machines supporting SuperCalc or to comparable electronic spread sheet programs like VisiCalc.

DATA BASE . The primary data base consists of average spending of boat owners by type of craft and spending category. Two distinct tables of default values have been developed. One uses the fleet segmentation and statistics for the statewide boating fleet. The other uses the marina segmentation and spending statistics for boat owners reporting storage costs in excess of $250 in 1980. The average number of boat days and number of craft of each type are also required by the program. Default values for frequencies of boating were estimated from the 1980 boater survey. Numbers of craft will normally be input by the user for a specific application.

SPREADSHEET DESCRIPTION. Table 4.1 is an example of the output from the program. This application of the program uses the fleet segmentation, numbers of active registered craft (in thousands) in the state, average days boated per craft from the 1980 survey, and distribution by craft type from registration statistics. Spending figures used in calculating impacts are given in the bottom half of the table. Table 4.1 is the same as Table 3.6 in the previous chapter, with the addition of row and column labels.

Table 4.2 gives the formulas and data values that the SuperCalc program uses in generating Table 4.1. The spreadsheet is simply a large

Table 4.1. SuperCalc Program for Estimating Boater Spending: Values

	A	B	C	D	E	F	G
1				TYPE OF CRAFT			
2		SM OPEN	LG OPEN	CABIN	SAIL	PONTOON	TOTAL
3	BOATING ACTIVITY						
4	Pct Boats by Type	52.60	26.90	5.50	7.20	7.80	100.00
5	Number of Boats (000's)	267.74	136.93	28.00	36.65	39.70	509.02
6	Avg Boat days	29.00	38.00	43.00	36.00	39.00	3347.50
7	Total Boat days (000's)	7764.55	5203.17	1203.83	1319.37	1548.43	17039.34
8							
9	SPENDING (Thousands of Dollars)						
10	Annual Craft Expenses						
11	Equipment	38043.59	56866.56	16036.91	9878.07	4016.79	124841.92
12	Repair	14035.09	20752.44	9424.55	4402.30	2130.88	50745.26
13	Insurance	5831.44	11918.00	4596.65	2379.63	1359.04	26084.77
14	Storage	4166.08	11059.48	12363.28	7909.64	1671.11	37169.59
15	TOTAL CRAFT-RELATED	62076.20	100596.48	42421.40	24569.64	9177.82	238841.54
16							
17	Trip Expenses						
18	Food	75160.80	111295.84	22655.99	17204.61	26400.73	252717.97
19	Lodging	5046.95	25859.76	1107.52	1781.15	402.59	34197.98
20	Auto fuel	61262.26	45839.94	20055.73	7889.84	13037.78	148085.56
21	Boat fuel	42006.19	79296.34	25966.51	1926.28	14059.74	163255.06
22	Equipment	19100.78	32371.86	3226.25	303.46	5218.21	60420.55
23	Other	3261.11	4318.63	2792.87	831.20	882.60	12086.43
24	TOTAL TRIP-RELATED	205838.10	299182.38	75804.87	29936.55	60001.65	670763.55
25							
26	TRIP + CRAFT SPENDING	267914.30	399778.86	118226.27	54506.19	69179.47	909605.09
27							
28	AVERAGE CRAFT-RELATED SPENDING PER BOAT						
29	SPENDING						
30	Craft spending ($/boat/year)						
31	Equipment	142.09	415.31	572.83	269.53	101.17	245.26
32	Repair	52.42	151.56	336.64	120.12	53.67	99.69
33	Insurance	21.78	87.04	164.19	64.93	34.23	51.25
34	Storage	15.56	80.77	441.61	215.82	42.09	73.02
35	TOTAL CRAFT-RELATED	231.85	734.68	1515.27	670.40	231.16	469.22
36							
37	AVERAGE TRIP SPENDING PER BOAT DAY						
38	Trip Expenses ($/boat day)						
39	Food	9.68	21.39	18.82	13.04	17.05	14.83
40	Lodging	.65	4.97	.92	1.35	.26	2.01
41	Auto fuel	7.89	8.81	16.66	5.98	8.42	8.69
42	Boat fuel	5.41	15.24	21.57	1.46	9.08	9.58
43	Equipment	2.46	6.26	2.68	.23	3.37	3.55
44	Other	.42	.83	2.32	.63	.57	.71
45	TOTAL TRIP-RELATED	26.51	57.50	62.97	22.69	38.75	39.37

Table 4.2. SuperCalc Program for EStimating Boater Spending: Formulas

	A	B	C	D	E	F	G
1				TYPE OF CRAFT			
2		SM OPEN	LG OPEN	CABIN	SAIL	PONTOON	TOTAL
3	BOATINC ACTIVITY						
4	Pct Boats by Type	52.6	26.9	5.5	7.2	7.8	SUM(B4:F4)
5	Number of Boats (000's)	B4*G5*.01	C4*G5*.01	D4*G5*.01	E4*G5*.01	F4*G5*.01	509.017
6	Avg Boat days	29	38	43	36	39	SUM(B4*B6,C4*C6,D4*D6,E4*E6,F4*F6)
7	Total Boat days (000's)	B5*B6	C5*C6	D5*D6	E5*E6	F5*F6	SUM(B7:F7)
8							
9	SPENDING (Thousands of Dollars)						
10	Annual Craft Expenses						
11	Equipment	B5*B31	C5*C31	D5*D31	E5*E31	F5*F31	SUM(B11:F11)
12	Repair	B5*B32	C5*C32	D5*D32	E5*E32	F5*F32	SUM(B12:F12)
13	Insurance	B5*B33	C5*C33	D5*D33	E5*E33	F5*F33	SUM(B13:F13)
14	Storage	B5*B34	C5*C34	D5*D34	E5*E34	F5*F34	SUM(B14:F14)
15	TOTAL CRAFT-RELATED	SUM(B11:B14)	SUM(C11:C14)	SUM(D11:D14)	SUM(E11:E14)	SUM(F11:F14)	SUM(G11:G14)
16							
17	Trip Expenses						
18	Food	B7*B39	C7*C39	D7*D39	E7*E39	F7*F39	SUM(B18:F18)
19	Lodging	B7*B40	C7*C40	D7*D40	E7*E40	F7*F40	SUM(B19:F19)
20	Auto fuel	B7*B41	C7*C41	D7*D41	E7*E41	F7*F41	SUM(B20:F20)
21	Boat fuel	B7*B42	C7*C42	D7*D42	E7*E42	F7*F42	SUM(B21:F21)
22	Equipment	B7*B43	C7*C43	D7*D43	E7*E43	F7*F43	SUM(B22:F22)
23	Other	B7*B44	C7*C44	D7*D44	E7*E44	F7*F44	SUM(B23:F23)
24	TOTAL TRIP-RELATED	SUM(B18:B23)	SUM(C18:C23)	SUM(D18:D23)	SUM(E18:E23)	SUM(F18:F23)	SUM(G18:G23)
25							
26	TRIP + CRAFT SPENDING	B15+B24	C15+C24	D15+D24	E15+E24	F15+F24	G15+G24
27							
28		AVERAGE CRAFT-RELATED SPENDING PER BOAT					
29	SPENDING						
30	Craft spending ($/boat/year)						
31	Equipment	142.09	415.31	572.83	269.53	101.17	G11/G5
32	Repair	52.42	151.56	336.64	120.12	53.67	G12/G5
33	Insurance	21.78	87.04	164.19	64.93	34.23	G13/G5
34	Storage	15.56	80.77	441.61	215.82	42.09	G14/G5
35	TOTAL CRAFT-RELATED	SUM(B31:B34)	SUM(C31:C34)	SUM(D31:D34)	SUM(E31:E34)	SUM(F31:F34)	SUM(G31:G34)
36							
37		AVERAGE TRIP SPENDING PER BOAT DAY					
38	Trip Expenses ($/boat day)						
39	Food	9.68	21.39	18.82	13.04	17.05	G18/G7
40	Lodging	.65	4.97	.92	1.35	.26	G19/G7
41	Auto fuel	7.89	8.81	16.66	5.98	8.42	G20/G7
42	Boat fuel	5.41	15.24	21.57	1.46	9.08	G21/G7
43	Equipment	2.46	6.26	2.68	.23	3.37	G22/G7
44	Other	.42	.83	2.32	.63	.57	G23/G7
45	TOTAL TRIP-RELATED	SUM(B39:B44)	SUM(C39:C44)	SUM(D39:D44)	SUM(E39:E44)	SUM(F39:F44)	SUM(G39:G44)

table or matrix with rows designated by numbers and columns by letters. Entry B6 is found in column B and row 6. It is the average days boated for small open craft; 29 days per boat.

The default spending figures by craft type are given in rows 29-45. These are the figures reported in Table 3.4 earlier. Numbers of craft are given in row 5. Notice these are calculated by multiplying a percentage from row 4 times the total number of craft (cell G5). Average number of boat days per craft are entered in row 6. Total boat days are calculated by multiplying the number of craft times the average boating frequency.

Total spending estimates are reported in rows 9 through 26. These are estimated by multiplying the numbers of craft times the annual craft spending per boat and the number of boat days times the trip spending per boat day. The "Totals" column simply sums across the estimates for each of the five craft types.

The use of the program for estimating spending impacts at the local level are illustrated in the following two applications. First we apply the statewide fleet spreadsheet to estimate the spending impacts of attracting 100 boaters to an area. The second application estimates the spending impacts of a typical 100 boat marina.

Direct Spending Impacts of 100 Boaters

Suppose a community institutes a program to attract 100 additional boaters to their area. This might involve a promotional program or development of suitable access sites, launch facilities, etc. If the program will

attract boat owners that are representative of the state's registered fleet, then the fleet segmentation and spreadsheet should be used. This is the spreadsheet illustrated in Table 4.1 and 4.2. To apply this to the specific problem, the user simply enters the numbers of craft to be attracted in cell G5 of the table. Table 4.3 illustrates the result. One hundred boaters would generate $178,698 in total spending by these boat owners. The table indicates the allocation of this spending by types of craft and spending category.

The result must be carefully interpreted based upon an understanding of the assumptions implied in the calculations. Let's review these.

1. Since no changes were made in distribution of craft, we assume the action will attract boaters roughly in the same proportions as the registered fleet. If this is not the case, the user should change percentages in row 4 of the table, making sure percentages add to 100 in cell G4. For example, if we expect to attract all small open craft, enter 100 in cell B4 and zeros in C4 through F4.
2. Since no changes were made in the average days boated (row 6) we assume all of the boat days of these 100 boaters will take place in this community and these boaters will boat about as often as the statewide average for the craft type. If these assumptions are not valid, the figures in row 6 can be adjusted to reflect actual number of trips boaters will make to the given community.

Table 4.3. Direct Spending Impacts of Attracting 100 Boaters

	A	B	C	D	E	F	G
1				TYPE OF CRAFT			
2		SM OPEN	LG OPEN	CABIN	SAIL	PONTOON	TOTAL
3	BOATING ACTIVITY						
4	Pct Boats by Type	53	27	6	7	8	100
5	Number of Boats	53	27	6	7	8	100
6	Avg Boat days	29	38	43	36	39	3348
7	Total Boat days	1525	1022	237	259	304	3348
8							
9	SPENDING (Dollars)						
10	Annual Craft Expenses						
11	Equipment	7474	11172	3151	1941	789	24526
12	Repair	2757	4077	1852	865	419	9969
13	Insurance	1146	2341	903	467	267	5125
14	Storage	818	2173	2429	1554	328	7302
15	TOTAL CRAFT-RELATED	12195	19763	8334	4827	1803	46922
16							
17	Trip Expenses						
18	Food	14766	21865	4451	3380	5187	49648
19	Lodging	992	5080	218	350	79	6718
20	Auto fuel	12035	9006	3940	1550	2561	29092
21	Boat fuel	8252	15578	5101	378	2762	32073
22	Equipment	3752	6399	634	60	1025	11870
23	Other	641	848	549	163	173	2374
24	TOTAL TRIP-RELATED	40438	58777	14892	5881	11788	131776
25							
26	TRIP + CRAFT SPENDING	52634	78539	23226	10708	13591	178698

3. It is assumed the statewide average spending figures in rows 29 through 45 will apply to the given community. If there is reason to believe spending would be higher or lower these figures may be adjusted.
4. The $179 thousand in spending of these boat owners will not necessarily all take place in the destination community. Analysis of boaters traveling outside of their region to boat indicates about half of the trip spending occurs at home and the other half occurs at the destination. If destination spending is desired, craft and trip spending estimates should be adjusted to reflect the proportion captured in the community.

Once the user has a basic familiarity with the spreadsheet program, it is very easy to make one or more of the above adjustments to represent local conditions. These are further illustrated in the next example where spending estimates and segments are altered to represent marina boaters.

Spending Impacts of a 100 Boat Marina

In this example we assume a community is considering the development of a 100 boat marina and wishes to evaluate the likely economic impacts on the community. Boats stored at a marina tend to be larger than craft that are trailered or stored at a permanent or summer home. Spending patterns of marina boaters also differ from the average registered boat owner. Therefore a different spreadsheet was developed for marina applications. The marina spreadsheet employs the marina segmentation and the spending figures for marina boaters. Except for these differences and the smaller

number of columns, the spreadsheet is set up the same as in Table 4.2.

The spreadsheet for a 100 boat marina is illustrated in Table 4.4. This assumes a distribution of 49 smaller power boats, 31 larger power boats, and 20 sail boats over 20 feet in length. Other craft distributions would yield slightly different spending impacts. We estimate that a 100 boat marina would generate $582,229 in direct spending by the clients storing their boats at the marina. This estimate, like the previous one, must be carefully interpreted.

1. Notice 100 boats have been entered into cell E5. In this example, the marina consists of 49 small power boats, 31 large power boats, and 20 sail boats. This is the estimated statewide distribution of craft stored at a marina or boat club. Changing this distribution will alter spending totals.
2. The average boat days are statewide averages for these type of craft. Notice larger craft kept at a marina tend to be used more often than other craft.
3. In order to estimate local spending impacts, it is important to isolate local spending. Not all of the spending of these boat owners will accrue to local businesses. Most of the craft-related spending will go to local boating businesses. Depending upon the residence of these boat owners, a portion of their trip spending may take place outside of the community in which the marina is located. Spending estimates from the SuperCalc program should be adjusted accordingly.
4. We should also note that marinas will sell some products and services to boaters who do not store a boat at the marina.

Table 4.4. Direct Spending Impacts of a 100 Boat Marina

	A	B	C	D	E
1		POWER	POWER	SAIL	
2		20-25FT	GT 25 FT	GT 20 FT	TOTAL
3	BOATING ACTIVITY				
4	Pct Boats by Type	49	31	20	100
5	Number of Boats	49	31	20	100
6	Avg Boat days	43	48	46	45
7	Total Boat days	2107	1488	920	4515
8					
9	SPENDING				
10	Annual Craft Expenses				
11	Equipment	27440	31744	20660	79844
12	Repair	15190	19530	6900	41620
13	Insurance	8379	11036	3820	23235
14	Storage	26215	36859	18420	81494
15	TOTAL CRAFT-RELATED	77224	99169	49800	226193
16					
17	Trip Expenses				
18	Food	69952	49372	28778	148102
19	Lodging	11546	387	1941	13874
20	Auto fuel	20986	34120	3156	58261
21	Boat fuel	45659	60487	2926	109071
22	Equipment	5900	7038	672	13609
23	Other	4973	5625	2521	13118
24	TOTAL TRIP-RELATED	159015	157029	39992	356036
25					
26	TRIP + CRAFT SPENDING	236239	256198	89792	582229
27					
28					
29	SPENDING				
30	Annual Craft Expenses ($/boat/year)				
31	Equipment	560	1024	1033	798
32	Repair	310	630	345	416
33	Insurance	171	356	191	232
34	Storage	535	1189	921	815
35	TOTAL CRAFT-RELATED	1576	3199	2490	2262
36					
37					
38	Trip Expenses ($/boat day)				
39	Food	33	33	31	33
40	Lodging	5	0	2	3
41	Auto fuel	10	23	3	13
42	Boat fuel	22	41	3	24
43	Equipment	3	5	1	3
44	Other	2	4	3	3
45	TOTAL TRIP-RELATED	75	106	43	79

Walk-in traffic and transient boaters must be handled separately, perhaps similarly to the first example. The program also does not include spending by guests of the boat owner.

5. Revenue generated by the marina is not the same as the amount of spending estimated here. This program estimates spending of boat owners storing their craft at the marina. The marina will only capture a portion of this spending, and will obtain additional revenue from transient boaters and walk-in customers. Boat sales are also not included in these figures.

Thus, while these spending estimates must be carefully interpreted, they give a good picture of the potential economic impact of boating developments on a community. By comparing spending estimates resulting from different actions, a community or business can estimate the likely impacts of alternative development and marketing programs.

Summary

In this chapter we have described a simple tool for estimating the impacts of boater spending at the local level. The use of electronic spreadsheets makes the procedures easy to apply to a wide range of different problems. Spreadsheet programs are available for virtually all micro-computers, making the impact assessment procedure accessible to anyone with a small micro-computer. The calculations can also be carried out by hand, if necessary.

The two examples are illustrative of a wide range of applications. By replacing spending figures with those reported for Great Lakes boaters,

inland lake boaters, marina boaters, or other boater segments, the program can be tailored to quite specific applications. If local data is available, it can be easily entered. The skilled spreadsheet user will find the program easy to modify. A particular strength of the program is the ability to quickly simulate a variety of possible actions to aid in evaluating alternative marketing and development proposals. By displaying impacts within segments, economic development objectives may be examined in conjunction with alternative marketing programs.

Users must, however, pay careful attention to the assumptions underlying the program in order to properly interpret the results. The program only estimates direct spending of boat owners. A careful assessment must be made of how much of this spending would be captured by the local community. Analyses of local economic structure is needed to properly assess the multiplier effects of this spending. We hope to be able to address this problem in a future study.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

First we will draw some conclusions about boater spending and economic impacts of boaters in the state. We then discuss broader methodological issues addressed in our three year study of recreational boating and conclude with some recommendations for further research.

Boating Economics

Our study has documented patterns of spending of Michigan registered boat owners, and estimated annual spending at over one billion dollars. By estimating spending within 10 different spending categories, the beneficiaries of boater spending can be identified. Results indicate that through direct effects alone, boaters have a broad impact on local economies. Boating in Michigan is big business and supports a variety of retail service sectors, especially in coastal communities.

Reporting of boater spending within several different market segments makes our results particularly useful in regional development and marketing programs. Different communities, firms, and agencies will appeal to different boater segments. There are significant differences in both the level and pattern of spending by different segments. Thus, marketing programs can be tailored to achieve the objectives of a particular community or organization.

The electronic spreadsheet makes it quite easy to apply or adapt these results to a local area. In any application, assumptions must be carefully examined and results carefully interpreted. Economic information

is particularly prone to misuse and misinterpretation. Since one of the primary uses of the information provided in this report will likely be the justification of expanded boating facilities and programs, let us briefly explain how our results apply to this issue.

The one billion dollars in spending by Michigan registered boat owners is neither an estimate of the value of boating to boaters, nor an estimate of boating's economic impact on the state. If one includes the food, equipment, recreation, and other products and services bought by boaters as part of the boating experience, then one billion dollars is a lower limit to the value of boating to Michigan boaters. Since boaters did indeed spend this much in 1981, they must be willing to pay at least this amount. However, since boaters do not pay for some boating products and services, and others are subsidized, it is likely that many boaters are willing to pay more than they presently have to pay.

The one billion dollars is a spending estimate, but not an economic impact estimate. To estimate economic impacts, one must first define a region. Economic impacts within the region are generated by attracting boaters from outside of the region. This brings in new dollars to the area, creating jobs. Of the one billion dollars in spending, only $41.5 million represents new dollars to the state. Assuming $50,000 in spending by boaters at the retail level creates one full time job, this would add about 900 jobs to the state's employment. One billion dollars in spending would generate 20,000 jobs , but it is difficult to determine whether local dollars spent on boating would simply be spent on other products and services locally, or would be exported for boating in other areas.

To the extent that providing boating facilities and services locally reduces leakages to other regions, it represents a positive economic effect to the region. While only a small proportion of statewide boater spending comes from out-of-state, there are significant regional impacts of boater spending, particular in northern regions that are dependent upon tourism dollars.

Any assessment of the economic impacts of boating developments must first predict the changes in boating patterns that would result and determine the net gain or loss to the region. A thorough economic impact assessment would also require an examination of secondary spending effects and local economic structures. By reporting boater spending within market segments and spending categories, our results can be combined with local input-output studies and marketing plans in order to evaluate the economic impacts of alternative development and marketing alternatives.

Methodological Considerations

The amount of descriptive information on boating in Michigan produced in this three year study, and the variety of applications and recommendations that could be generated from this information precludes any attempt to develop an exhaustive set of practical recommendations for the development and marketing of boating in Michigan.

In concluding this study, we would instead like to summarize findings and recommendations of a general methodological nature. These findings have broader and longer range implications as they extend beyond Michigan and to the study of other types of recreational activities. One of

the primary objectives of this research project was to improve data collection and planning methods for boating. Many refinements were built into our procedures to reduce data collection costs, increase the accuracy of boating statistics, and make results applicable to a wider range of questions. Several technical aspects of our study design have been discussed in this and previous reports. Others will be addressed in future publications. Here we summarize several of the broader methodological issues and make some recommendations for future research.

(1). Regionalization. Early in the study, we decided that attempting to do statewide planning with the county as the unit of analysis would be too expensive. Previous boater surveys had increased the sample size to over 17,000 boat owners in an attempt to include sufficient boaters to estimate boating activity at the county level. Even this sample size proves inadequate to estimate county to county flows, and with increases in survey costs, makes boating surveys too expensive to conduct on a regular basis. Nine in-state Great Lakes boating regions were identified and statistics on boating activity and spending have been reported at the regional level. Where county estimates are needed, these can be easily generated by allocating regional activity to counties within the region, based upon numbers of registered craft, boating opportunities, or historical patterns. As a general rule, we found smaller variations in most boating statistics between counties than within counties. Craft size, storage category, and type explained more variation in boater patterns than county (or region) of origin or destination. We therefore recommend that research pay more attention to modeling variations in boating patterns based upon storage, craft type, and craft length, ie.- a segmentation

approach. Boating activity and spending at the county (or other small geographic area) level can then be estimated by applying these models to registration or inventory data.

(2) Segmentation. One clear result throughout all of our analyses is the identification of significant differences among different types of boats and boat owners. One cannot meaningfully manage or plan for boating activity without clearly identifying target market segments. The appropriate segmentation will depend upon the particular situation and application, but a couple of key variables for segmenting the boating market are clear. For general management and planning applications, craft type, summer storage, and craft length appear to be the most useful segmentation variables, particularly the latter two. Discriminating between boats kept at waterfront sites and boats trailered from non-waterfront homes is particularly important, both for identifying needs for access sites, launch facilities, and waterfront storage as well as for managing conflicts between these two groups. Family life cycle and income segments are useful in forecasting boating demand and designing products and services to meet the needs of different socioeconomic groups.

Segmentation is particularly helpful in generalizing statewide patterns to local areas. This was illustrated in applying spending figures to estimate economic impacts at the local level in chapter IV.

(3) Integration of analyses. Our efforts to integrate demand, supply, marketing, and economic impact analyses have been fairly successful. Adding demographic and socioeconomic questions to the 1980 boater survey permitted extensive marketing applications of the data, not possible in previous boater surveys. The identification of

boater market segments is one example. Demographics are also helpful in forecasting the likely impacts of demographic changes on boating. Thus, contrary to views of some that socioeconomic data is not that useful in recreation planning, we feel it can be particularly useful when planning takes on more of a marketing orientation.

The economic impact estimation procedures illustrate how several different data collection efforts can be orchestrated to contribute to planning needs. The best advice we can give for any survey effort is to know in advance exactly what information is needed and how it will be used. This avoids problems of inconsistency and noncomparability between different data sets.

We found the separation of boating activity and spending estimation into two different surveys worked reasonably well. While it would be desireable to combine the surveys to reduce administrative costs, this requires further study of recall problems and likely reductions in response rates. It would have been useful to be able to examine spending patterns by summer storage location and income, but these variables were not included in the 1981 spending survey.

By estimating economic impacts within boater market segments, the results can be used to tailor development and marketing programs to meet community or firm objectives, rather than merely to justify expansion of boating facilities and programs. Communities can more readily balance these benefits with the costs of serving a particular segment, when the group of boaters to be attracted is more clearly targeted. The benefits can also be more clearly pinpointed, both in terms of which boaters will be served and which local businesses will capture the spending.

The development of formal planning models, like the SuperCalc program for estimating boater spending, is strongly encouraged. The model is particularly useful in identifying data needs and in showing the relationships between different data collection efforts. Within the context of such a model, greater use can be made of recurring data sources, like registration statistics. The model also clarifies assumptions of spending estimation procedures and can be used to assess the value of increased accuracy in either the boating activity or spending estimates.

The supply of boating facilities was not addressed in a major way in this project. While an inventory of slips is crucial to assessing local and regional needs, this problem can be more easily isolated from the demand, marketing, and economic impact analyses, which are closely interrelated. Supply inventories do not require surveys of boaters and are quite straightforward to conduct. We would recommend that the Michigan Waterways Division's 1977 marina inventory be updated and that slips be inventoried within size classes compatible with our "demand" segments. This is to ensure that "supply" and "demand" can be compared to assess needs.

(4) Further analyses. There are a number of other methodological analyses underway on these data, and further studies are possible. A doctoral student is examining the question of the effects of supply on demand. Some boating "demand" is induced by expansions in supply, particularly when the product is partially subsidized by public provision. The supply of boating opportunities clearly influences the purchase of craft and participation in boating. Researchers have struggled with the difficult problem of how to incorporate supply variables in reduced

form demand models. Using the boating data we are testing both perceived and physical measures of supply in reduced form models.

Another practical problem is how to update boating statistics in between major surveys. Appendix C compares projections made from past studies using various updating procedures with estimates from the 1980 and 1981 surveys. This will provide a test of how accurate updating methods are and suggest how frequently such surveys are needed. We believe the time between surveys can be extended if proper adjustment procedures are made to produce interim estimates and forecasts. Tracking of registration statistics, boat sales, transient traffic on the Great Lakes, and other indicators can help in identifying major changes in boating activity that might require new data collection efforts.

Although sampling errors in our spending statistics appear to be tolerable for most applications, further modeling of boater spending should be able to explain much of the variation in both craft and trip spending. Regression models predicting craft and trip spending based upon variables describing the type of craft and trip will be tested using the data from the 1981 survey. Future studies might explore classifications of different types of boating trips and the estimation of trip spending by type of trip.

Suggestions for Further Research

There are several important research questions that could not be addressed in this study.

1. We recommend that data on the supply of boating opportunities be updated. Supply should be viewed quite broadly to include

slips and moorings, waterfront lots, boat sales and service, dry stack storage, rentals, access sites, launch facilities, etc. Supply should be inventoried within categories that permit comparisons with existing marketing and use data.

2. Local input-output analyses are needed to address indirect effects of boater spending in local communities. There are no good input-output tables that can be applied to boating or tourism activity at the local level. An examination of the spending patterns and employment within boating industries is a good place to start. This would help to convert boater spending into employment effects and help in identifying multiplier effects.

3. A great deal of boating activity is associated with second homes, retirement in northern communities, and the like. Trends in boating and other recreational activities in many northern communities in Michigan are closely tied to seasonal residents and retirement communities. A better understanding of second home developments, migration patterns, and the extent and impacts of seasonal residents is needed.

4. More research is needed on the costs of serving boaters. Economic impact studies tend to estimate the positive spending effects and ignore the infrastructural, environmental, and social costs. Objective analyses are needed to assess both the positive and negative effects of boating developments. This should include an assessment of taxes resulting from boaters as compared with public services provided.

5. The accuracy of boater spending estimates using the SuperCalc program should be tested in one or more coastal communities. This would provide a test of the generalizability of statewide spending figures to a local area. Careful comparisons of boater spending and business receipts could provide checks on the accuracy of reported figures. Employment and indirect effects of boater spending could be evaluated through a local study.

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APPENDIX A

SURVEY QUESTIONNAIRE

BOATING TRIP INFORMATION

1) Please give the county, state, and zip code of your permanent residence.
_____County _____State _____Zip Code

2) When did you last go boating using a boat that you or your family own?
_____Date

3) Did you begin this last trip from the county indicated in question 1?
____Yes ____No---If no, please specify county of origin:_____County

4) What was the length of this last boating-outing?(Please check one)
____1 day or less ____2 days ____3 days
____More than 3 days (Please specify):____days

5) Please estimate below what percent time you spent during your last boating-outing doing each of the following: (Percents should add up to 100%)
Pleasure boating _____%
Fishing from boat_____%
Waterskiing _____%
Other Activities _____%----Please specify:_____
100%

6) Where did you boat most on your last trip?
_____Name of water body
_____Nearest community to the boating site
_____County of the boating site

7) What was the approximate distance you traveled to reach the boating destination?
_____Miles

8) On this trip, did you transport your boat overland to your boating destination?
____Yes ___No

9) Approximately how many gallons of gas did you use in your vehicle to travel one-way to your boating destination? _____Gallons

10) Excluding yourself, how many people boated with you (in the same boat)? If none, please go to question 12.
____Number of adults (18 years and older)
____Number of children (less than 18 years old)
For how many of these people did you pay expenses? (expenses related to the boat-outing)
____All
____Other---Please specify below the number for which you paid expenses:
_____Number of adults (18 years and older)
_____Number of children (less than 18 years old)

11) Did all of the people who boated with you in your boat travel to and from your boating site in one vehicle?___Yes ____No--Please enter the total number of other vehicles used:_____
If no, also please estimate the total number of one-way miles traveled by these other vehicles to reach the boating site:_____Miles

12) What type of boat did you use on your last boating-outing?

Type (Check one)
___ 1. Open
___ 2. Cabin
___ 3. Sail
___ 4. Row
___ 5. Canoe
___ 6. Pontoon
___ 7. Other

Propulsion (Check one)
___ 1. Inboard
___ 2. Outboard
___ 3. Sail
___ 4. Sail with motor
___ 5. Other non-motorized
___ 6. Other motorized

Horsepower:_____ Length of boat:_____Feet

13) For all the members of your party for whom you paid expenses, please indicate below how much you spent on the following items. The table is arranged for you to enter expenditures you made before setting out on your trip, expenditures made en route to your boating site, and expenditures made at your boating site.

	At Trip Origin	En Route	At Boating Site
A. Boat fuel and oil?	$_____	$_____	$_____
B. Rentals?	$_____	$_____	$_____
C. Sporting goods?	$_____	$_____	$_____
D. Lodging expenditures?	$_____	$_____	$_____
E. Grocery expenditures?	$_____	$_____	$_____
F. Beverage expenditures?	$_____	$_____	$_____
G. Restaurant expenditures?	$_____	$_____	$_____
H. Other	$_____	$_____	$_____

ANNUAL CRAFT-RELATED EXPENDITURES

Please answer the following questions only for the boat used in your last boating-outing.

1) What were your expenditures during the last year in the following boat-related categories?
   - A. $_____Boat-related fishing gear (downriggers, boat rods, fish-finders, etc.)
   - B. $_____Non-fishing recreational boating equipment (waterskiing equipment, etc
   - C. $_____Safety equipment (life preservers, fire extinguishers, etc.)
   - D. $_____Trailer and trailer equipment expenditures
   - E. $_____Electronic equipment (radios, CBs, lights, etc.)
   - F. $_____Galley, deck, and/or charting equipment, etc.
   - G. $_____Anchors, lines and paddles, etc.
   - H. $_____Motors
   - I. $_____Slip equipment expenditures
   - J. $_____Other---Please specify:_____

2) Boat maintenance and repair expenditures within the last year?
   - A. $_____Hull repair and painting, etc.
   - B. $_____Trailer and hookup maintenance and repair expenditures
   - C. $_____Engine repair, tune-ups, other engine maintenance expenditures
   - D. $_____Electrical systems maintenance and repairs expenditures
   - E. $_____Shaft and prop. maintenance and repair expenditures
   - F. $_____Mast and sail maintenance and repair expenditures
   - G. $_____Galley and deck equipment, boat cover, maintenance and repair costs
   - H. $_____Other maintenance and repair costs--Please specify:_____

3) Annual boat and motor insurance costs? $_____per boat

4) Initial cost of your boat and motor? $_____and years owned?_____years

SLIP-RELATED EXPENDITURES

1) Annual slip rental fee: $_____
2) Annual craft haul-out costs: $_____
3) Annual boat storage expenditures? $_____
4) Annual effluent pump-out expenditures? $_____
5) Other slip-related expenditures last year? $_____--Please specify:_____

THANK YOU FOR YOUR HELP!

Please send to: Michigan State University
Department of Park and Recreation Resources
East Lansing, Michigan 48824
517-353-0823

APPENDIX B

SAMPLING ERRORS

Note: The percent error in the following tables is twice the standard error divided by the mean. A 95% confidence interval for each spending statistic is the interval from (1- percent error) times the mean to (1+ percent error) times the mean.

Table B.1 Sampling Errors for Fleet Spending Estimates

	N	Mean	Std Error	Pct Error
Craft Expenses				
Open <16 ft	278	232	35	29
Open >16 ft	367	735	53	14
Cabin	162	1515	186	24
Sail	141	670	155	45
Pontoon	199	231	30	25
All Craft	1232	447	40	17
Trip Expenses				
Open <16 ft	278	27	4	28
Open >16 ft	367	57	9	29
Cabin	162	63	10	32
Sail	141	23	3	28
Pontoon	199	39	6	28
All Craft	1232	37	4	19

Table B.2 Sampling Errors for Inland Lake Boaters

	N	Mean	Std Error	Pct Error
Craft Expenses				
Open <16 ft	230	198	27	26
Open >16 ft	198	569	64	22
Sail	56	284	103	71
Pontoon	194	230	30	26
All Craft	765	259	25	19
Trip Expenses				
Open <16 ft	230	26	5	34
Open >16 ft	198	53	13	48
Sail	56	19	4	44
Pontoon	194	39	6	29
All Craft	765	32	5	30

Table B.3 Sampling Errors for Great Lakes Boaters

	N	Mean	Std Error	Pct Error
Craft Expenses				
Open <16 ft	48	362	154	83
Open >16 ft	169	884	86	19
Cabin	142	1630	205	24
Sail	85	1161	234	39
All Craft	467	849	89	21
Trip Expenses				
Open <16 ft	48	28	6	41
Open >16 ft	169	62	11	33
Cabin	142	67	11	33
Sail	85	27	5	33
All Craft	467	47	5	22

Table B.4 Sampling Errors for Marina Boaters

	N	Mean	Std Error	Pct Error
Craft Expenses				
Power 20-25 ft	47	1576	136	16
Power > 25 ft	72	3199	317	19
Sail > 20 ft	56	2490	308	24
All Craft	233	2109	144	13
Trip Expenses				
Power 20-25 ft	47	70	18	49
Power > 25 ft	72	106	17	31
Sail > 20 ft	56	43	6	29
All Craft	233	71	10	27

APPENDIX C

GREAT LAKES BOATERS' EXPENDITURES: A COMPARISON OF TWO EXPENDITURE ESTIMATING PROCEDURES

As noted earlier, Great Lakes boaters' expenditures have been estimated in previous studies. There are two primary reasons why a comparison of this study's methods and results to those of earlier studies is undertaken herein. First, one of this project's goals was to develop and demonstrate an effective and efficient methodology for deriving expenditure estimates for boaters and possibly other groups of recreationists as well. Thus, a comparative analysis will reveal some of the relative strengths and weaknesses of the alternative procedures which have been employed to develop expenditure estimates. Secondly, it is always judicious to compare one's research findings to those from other relevant studies.

Previous Studies

As noted earlier, Warner (1974) collected expenditure information from boaters for the 1973 boating season. He collected his data from boaters who were then renting berths at commercial marinas along the Lake Michigan shoreline from the Michigan-Indiana border to Muskegon. His respondents, therefore, were owners of relatively large boats who boated almost entirely on the Great Lakes and connecting waters.

Schott (1975) developed expenditure estimates for Michigan's entire Great Lakes boating population. He first determined the number of boats in each of the six types developed by Warner (i.e. motorcraft: 20-30', 30-45', and 45'+ and sail craft: 20-30', 30-45', and 45'+) from the listing of all craft registered in Michigan. Next, he estimated the number of boats of each type which were used primarily on the Great Lakes based

upon Han's (1975) survey of southwestern Michigan registered boat owners Finally, he estimated expenditures for each of the six boat types by multiplying average annual expenditures from Warner's survey results by his estimate of the number of Michigan registered boats plying the Great Lakes.

Stynes and Holecek (1982) developed estimates of Great Lake boaters' expenditures for 1980 by extrapolating from Warner's 1973 estimates. These extrapolations were derived by inflating each expenditure type (e.g., insurance, fuel, lodging, etc.) in accordance with price trends identified from a relevant price index. While Stynes' and Holecek's study is a secondary data based updating procedure not directly comparable to the primary data based approaches used to develop the 1973 and 1981 expenditure estimates, it is included here for two reasons. First, this approach to updating expenditure estimates is relatively simple and inexpensive in comparison to the alternative of surveying boaters each time updated expenditure estimates are needed. If this method is found to yield reasonably comparable results, it could be employed more widely, thereby reducing the need to use out-of-date expenditure data in planning and lengthening the time period between boater expenditure surveys. Secondly, while it is possible to compare the methods employed in 1973 and in 1981, direct comparison of the studies' expenditure estimates wouldn't be meaningful without first accounting for the changes in costs of the many products and services boaters purchase. Stynes' and Holecek's work is useful in bridging the time gap between the 1973 and 1981 expenditure studies.

Comparison of Methods Employed in the 1973 and 1981 Studies

The survey instruments utilized to collect expenditures from boaters

were very similar. Both requested respondents to estimate their craft-related expenditures for the previous boating season. Both were mailed and utilized similar follow-up procedures. Rates of response to both surveys were approximately the same. However, the studies differ in several significant respects including:

1. In 1973, only southern Lake Michigan marina users were surveyed to obtain their boating related expenditures; in 1981, a sample of respondents was drawn from Michigan's complete registered boat owner listing.
2. In 1973, only boat owners with residences in southwestern Michigan were sampled to determine the proportion using the Great Lakes; in 1981, Great Lakes usage was determined from a sample of all registered Michigan boat owners.
3. In 1973, no attempt was made to estimate boating related auto expenses; in 1981, respondents provided estimates of auto fuel consumption.
4. In 1973, respondents were asked to report their trip- and craft-related expenditures for the entire boating season; in 1981, respondents were asked to report craft-related expenditures for the entire season but trip-related expenditures only for their last boating trip.

One would expect the 1981 study results to be superior to those generated in 1973 because recall bias in trip-related expenditure estimates should be reduced.

Comparison of Results from the 1973 and 1981 Studies

Since the 1973 study employed a different craft classification scheme

than was used earlier in this report, it is necessary to report 1981 results in a similar manner. Also since auto fuel expenditures were not collected in 1973, auto fuel expenditures are not included in the trip-related expenditure category. Expenditures for 1981 are reported in Table C.1 by the same craft types used in the 1973 study. Since these data aren't all directly comparable to the extrapolations developed from the 1973 expenditure survey and since they are too aggregated to identify where expenditures may have shifted among more specific expenditure categories, it is necessary to introduce more of the details of the two studies before attempting to compare them.

In Table C.2, expenditures within the craft-related and trip-related categories are disaggregated into more specific expenditure categories. To avoid excessive detail, the more than 20 individual expenditure categories employed in both the 1973 and 1981 surveys have been reduced to eight. The "marina services" expenditure category, for example, includes items such as: slip rental, launching and haul-out fees, storage, etc., while "food" includes all grocery, restaurant meal, and beverage purchases. Expenditures reported under the 1973 columns are actually the extrapolations to 1980 made by Stynes and Holecek (1982) from the 1973 survey results. Under the 1981 columns in the craft-related category are listed expenditures for the 1980 season which were collected in the 1981 survey. Thus, inflation should not be a factor in any of the differences found in the craft-related section of Table C.2. Let's focus in briefly on the individual craft-related expenditure categories before moving on to trip-related expenditures.

Insurance

Across all craft types, expenditures for insurance are considerably lower than the 1973 extrapolations to 1980 would have indicated. Assuming

Table C.1. Summary of Boater Expenditures by Type of Craft from the 1981 Study (Great Lakes Boaters)

	TYPE OF CRAFT				
	Motor Craft			Sail Craft	
	20-30'	30-45'	45'+	20-30'	30-45'
1. Active Registered boats (1980)	23,325	3,571	322	5,150	2,306
2. Average Number of Days Boated (1980)	40	58	68	39	50
3. Total Boat Days (000's) (Row 1 x Row 2)	933	207	22	201	115
4. Average Craft-Related Spending (per boat)	$ 1,184	$ 3,650	$ 5,848	$ 1,232	$ 3,913
5. Average Trip-Related Spending (per boat day)	$ 56	$ 108	$ 117	$ 22	$ 60
6. Average Trip-Related Spending (per season) (Row 2 x Row 5)	$ 2,240	$ 6,264	$ 7,956	$ 858	$ 3,000
7. Total Craft-Related Spending (000's) (Row 1 x Row 4)	$27,617	$13,034	$ 1,883	$ 6,345	$ 9,023
8. Total Trip-Related Spending (000's) (Row 3 x Row 5)	$52,248	$22,356	$ 2,574	$ 4,422	$ 6,900
9. Total spending (000's) (Row 8 x Row 9)	$79,865	$35,390	$ 4,457	$10,767	$15,923
10. Average Total Spending per boat (Row 9 divided by Row 1 x 1000)	$ 3,424	$ 9,910	$13,842	$ 2,091	$ 6,905

Table C.2. Comparison of 1973 and 1981 Study Estimates by Expenditure Category and by Type of Craft

Expense Category	TYPE OF CRAFT									
	Motor Craft						Sail Craft			
	20-30'		30-45'		45'		20-30'		30-45'	
	1973	1981	1973	1981	1973	1981	1973	1981	1973	1981
Craft Expenses (In 1980 dollars)										
Insurance	$ 451	$ 160	$ 781	$ 453	$ 1,716	$ 155	$ 349	$ 121	$ 824	$ 252
New Equipment	582	500	591	932	1,000	3,500	452	495	1,063	1,817
Repairs	198	297	579	822	1,543	870	61	157	176	693
Marina Services	1,414	277	2,021	1,443	3,628	1,323	1,411	459	1,956	1,151
Total	2,645	1,234	3,972	3,650	7,887	5,848	2,273	1,232	4,019	3,913
Trip Expenses (1973 in 1980 dollars; 1981 in 1981 dollars)										
Boat Fuel & Oil	636	758	1,249	3,482	2,109	2,010	73	89	222	196
Lodging	41	32	25	46	0	0	70	30	0	221
Food	792	1,122	1,240	2,220	1,152	4,628	589	668	1,186	2,454
Other	600	328	549	543	1,017	1,330	341	70	652	122
Total	2,069	2,240	3,062	6,291	4,278	7,968	1,073	857	2,060	2,993
GRAND TOTAL (Craft and Trip Related)	$4,714	$3,474	$7,034	$9,941	$12,165	$13,816	$3,346	$2,089	$5,079	$6,906

that these results are valid, one can only conclude that boat insurance rates over this period have been relatively constant or that many boaters have dropped or reduced coverage. If the former is true, then the property insurance index used by Stynes and Holecek appears to over-estimate inflation in boat insurance rates.

New Equipment

The pattern which emerges here is reasonable correspondence in the 1973 and 1981 study estimates for smaller craft types, but the 1973 extrapolations appear conservative for larger craft. Since the number of respondents in these larger craft size categories was very small, the observed differences may be due to chance. Thus, the sporting goods price index used to update boating equipment purchases appears to yield fair although somewhat conservative extrapolations.

Repairs

With the exception of 45'+ motor craft, extrapolations from the 1973 survey yielded lower expenditure estimates than those derived from the 1981 survey. It appears that the cost of repairs has increased at a rate higher than the general price index employed in the extrapolations would suggest. It would be wise to explore other price indices (e.g. auto repairs) for updating this expenditure item in the future. It is possible that boaters did spend relatively less on new equipment and more on repairs between 1973 and 1981 in an attempt to reduce costs (i.e. they may have perceived costs of repairing equipment as being less than purchasing a new replacement).

Marina Services

The pattern here is again consistent across the five types of craft with the 1973 extrapolations exceeding those suggested in the 1981 survey.

The differences are largest for the two small craft types (e.g. 20-30'). These large differences may be at least partially due to the inclusion of non-marina based boats in the 1981 but not in the 1973 survey. This difference in methodology makes drawing any conclusions difficult except that most marina service fees probably have not increased as quickly as prices in general, since the 1973 data were extrapolated using the general consumer price index.

Let's now return to the trip-related expenditure category and examine the four individual expenditure categories it contains. Note that the 1973 columns' contents are extrapolations for the 1973 survey finding to 1980 while the 1981 columns' contents are actual 1981 expenditures. Thus, one year's cost inflation divides these estimates but should not materially affect the conclusions drawn below.

Boat Fuel and Oil

Correspondence between estimates here is very good except for the 30-45' motor craft category. Its 1981 estimate seems to be about $2000 too high. In general, it appears that employing the transportation gasoline price index is very useful in updating boater fuel and oil expenditures. This outcome illustrates the need to employ the best index available in extrapolating an expenditure category. In this case, there was a near perfect index for inflating fuel prices and the resulting extrapolations appear to have captured reality.

Lodging

It was found in both 1973 and 1981 that owners of 20'+ craft who boat on the Great Lakes seldom stay overnight in commercial lodging establishments; they overnight on their boats. Thus, the sample size under-

lying the expenditures in the lodging row of this table are so small that no meaningful conclusions can be drawn.

Food

There is a significant and consistent pattern in these estimates with 1981 estimates exceeding those extrapolated from the 1973 study for all types of craft. Since almost ideal indices were available to account for price increases in groceries, beverages and restaurant meals, one would expect close correspondence between 1973 and 1981 study estimates. But much higher estimates were produced in the 1981 study than from 1973 study extrapolations. Since it is unlikely that boaters in 1981 consumed more food than in 1973, it is possible that they shifted from eating on their craft to eating more frequently at restaurants, or that the methodology employed in the 1980 study yields a more complete reporting of expenditures on food. While extrapolations of the food category results appeared to have missed the mark considerably, the results were at least fair. This illustrates the need for periodic surveys of boaters even when good price indices are available since, as appears to be the case here, boaters do alter their purchase behavior in significant ways. It also illustrates the tendency for respondents to underestimate their expenditures on frequently purchased, relatively inexpensive items when asked to do so over an extended period of time.

Other

The results here are mixed with a general tendency for the 1973 extrapolations to be higher than 1981 findings. For the 20-30' boat types, the observed difference may be linked to the 1973 survey's inclusion of only marina based boats. Boaters using marinas are more likely to consume items such as "laundry" and "entertainment" than the average boat owner

reporting in the 1981 survey. It is also difficult to draw any conclusions concerning these differences because the 1973 and 1981 survey instruments differed considerably in the specific expenditure categories lumped here under the "other" category.

One possible explanation for the lack of correspondence observed when one compares the estimates in Table C.2 is that boaters may have altered their expenditures across individual expenditure categories while spending roughly the same total amount in constant dollars. For example, they may have spent more on food and less on insurance. For this hypothesis to hold, total expenditures would have to be approximately equal in 1973 and 1981 and, of course, one would also have to assume that differences in methodologies and the extrapolation techniques employed had no impact on the resulting estimates.

The data required to make these comparisons are provided in Table C.3. These data were developed from Table C.2, but all have been converted to 1981 dollars to facilitate comparisons. Since Stynes and Holecek (1982) extrapolated 1973 survey results only to 1980 and since craft-related expenditures collected in the 1981 survey were for the 1980 season, all entries in the 1973 columns and the 1981 column under craft-related have been adjusted to 1981 dollars assuming inflation was about 10% between 1980 and 1981.

Craft-related expenditure estimates for all craft types developed from the 1973 survey are all greater than those extracted from 1981 survey results. The differences are greatest for the 20-30' sail and motor craft types. These differences partially result from the 1973 sample being drawn entirely from marina users who would obviously spend more in this category to purchase marina services. Table C.2 suggests expenditures

Table C.3. Comparison of 1973 and 1981 Study Estimates of Average Craft-Related, Trip-Related, and Total Expenditures by Type of Craft. (All estimates in 1981 dollars)

Type of Craft	Craft-Related			Trip-Related			Total		
	1973[a]	1981[b] difference	%[d]	1973[a]	1981[c] difference	%[d]	1973	1981 difference	%[d]
Motor Craft:									
20-30'	2,910	1,357	+53	2,276	2,240	+2	5,186	3,597	+31
30-45'	4,369	4,015	+8	3,368	6,291	-87	7,737	10,306	-33
45'	8,676	6,432	+26	4,706	7,968	-69	13,382	14,400	-8
Sail Craft:									
20-30'	2,500	1,355	+46	1,180	857	+27	3,680	2,212	+40
30-45'	4,421	4,304	+3	2,266	2,993	-32	6,687	7,297	-9

[a]Figures in this column were derived by multiplying Stynes' and Holecek's (1982) 1980 extrapolations of the 1973 study results by 1.1 to account for an estimated 10% rate of inflation between 1980 and 1981.

[b]Respondents provided their craft-related expenditures for the 1980 boating season. These were multiplied by 1.1 to account for an estimated 10% rate of inflation between 1980 and 1981.

[c]No adjustments were made to average trip-related expenditures since respondents reported expenditures for trips taken in 1981; however, average number of boat days for 1980 were used since 1981 boating use data were not available.

[d]The value in the 1973 column was used as the base year in calculating percent differences.

for marina services were about $1000 greater for the boaters surveyed in 1973 than those surveyed in 1981. If this is due primarily to the differences in the samples drawn in 1973 and 1981 and if expenditure estimates were adjusted accordingly, the gap in 1973 and 1981 estimates is considerably lessened, but 1973 estimates remain higher than those for 1981 (+20% for 20-30' motor craft and +6% for 20-30' sail craft). If one also ignores 45+ motor craft because of the small number of respondents of this type included in the two surveys, it appears that extrapolating from the 1973 survey using available relevant price indices yielded about a 10% overestimate of craft-related expenditures.

Trip-related expenditure estimates tend to be higher in 1981 than for the 1973 extrapolations. Again, it is probably best to ignore the 45'+ motor craft category because of the small sample of respondents involved, and it also appears reasonable to reduce the 1981 trip expenditure estimate for the 30-45' motor craft type by about $2000 to account for a probable large over-estimate in the boat fuel and oil expenditure category (see Table C.2). It may also be true that the marina based boaters, which are relatively more dominant in the 1973 survey, influence the results observed in the 20-30' boat types (i.e. marina based boaters probably spend more on trip-related items); however, the values presented in Table C.3 are not adjusted to remove this inconsistency since its magnitude is more difficult to estimate than for the others previously noted. Thus, it appears that extrapolations of trip-related expenditures from the 1973 survey overall are 20-25% short of those yielded by the 1981 survey.

As noted, the 1981 survey requested trip-related expenditures for the respondent's last boating outing, whereas the 1973 instrument requested

expenditures for the entire boating season. It is probable that this difference in methodologies produced a more complete accounting of trip-related expenditures in the 1981 survey, and this was the primary factor in the tendency for the 1981 estimates to be higher than those extrapolated from the 1973 survey.

Total expenditures by Great Lakes boaters are presented in the last section of Table C.3. The extrapolations from the 1973 survey are higher than estimates developed from the 1981 survey for the 20-30' boat types while the opposite is true for the larger size classes. When one incorporates the adjustments discussed above, the observed differences shrink significantly to about the + or - 10% range, but their direction remains the same. Thus, there appears to have been some change in Great Lakes boaters' total expenditures between 1973 and 1981 in constant dollars. But these differences appear to be moderate, suggesting the differences observed in expenditures within expenditure categories in Table C.2 are partially a result of reallocation of total expenditures among expenditure categories.

Where these realloctions have been made is apparent in Table C.4. It illustrates what percentage of total boating related expenditures were allocated to each expenditure category in 1973 and 1981. The 45+ motor craft boat type is omitted here because of the small number of responses obtained from owners of this craft type. Results from the 1981 survey were adjusted to reduce the influence of non-marina based boats in the 20-30' craft types and to adjust for what appears to be a large overestimate of boat fuel and oil expenditures within the 30-45' motor craft type.

Table C.4. Percent Distribution of Total Boater Expenditures by Type of Craft Across Expenditure Categories from the 1973 and 1981 Boater Expenditure Surveys

	TYPE OF CRAFT							
	Motor Craft				Sail Craft			
	20-30'		30-45'		20-30'		30-45'	
Expenditure Category	1973	1981	1973	1981	1973	1981	1973	1981
Craft Expenses								
Insurance	6	4	7	6	6	4	8	4
New Equipment	19	11	14	12	20	16	26	26
Repairs	4	7	8	11	2	5	3	10
Marina Services	29	28	29	17	39	47	29	17
Craft-Related Total	58	50	58	46	67	72	66	57
Trip Expenses								
Boat Fuel & Oil	8	17	11	19	1	3	2	3
Lodging	1	1	0	1	2	1	0	3
Food	17	25	19	28	17	22	19	35
Other	16	7	12	7	13	2	13	2
Trip-Related Total	42	50	42	54	33	28	34	43
TOTAL (%)	100	100	100	100	100	100	100	100

Due to the methodological problems already noted, it is judicious to avoid attempting to draw any significant conclusions from the marina services, lodging, and "other" expenditure categories. It does appear that boaters spent relatively less in 1981 than in 1973 for insurance and new equipment and relatively more for repairs, boat fuel and oil, and food.

Conclusions and Recommendations

Since the primary objective of this study was to develop the best possible estimates of boater expenditures and resulting economic impacts, several significant methodological improvements were introduced in 1981 which complicate direct comparison of 1981 results to those developed from the 1973 survey. However, with some data smoothing and liberal data interpretation a reasonable degree of comparability between the studies was, in our opinion, achieved. These subjective comparisons suggest the following recommendations:

1. In light of the time and resources required to conduct expenditure surveys, updating expenditures from earlier surveys is reasonable but considerable care should be taken to use only the most relevant price indices. While this procedure yields highly variable results for individual expenditure categories, aggregate results appear far less variable, probably in the plus or minus 10% range of error.
2. Since estimates derived through extrapolation cannot account for increases and decreases in total boater expenditures or in reallocations of total expenditures between expenditure categories, periodic expenditure surveys are a necessity. In this case, it

appears that a major new survey is desirable every 5-10 years. However, we suggest a small scale survey on a more frequent interval (i.e. every 2-3 years) to determine when expenditure patterns have shifted enough to justify the expense of a major new data collection effort.

3. Regardless of whether one is employing extrapolation or designing a survey to derive boater expenditure estimates, it is crucial to segment the data developed by craft type and length. Our study clearly demonstrates that considerable variability in craft and trip-related expenditures exists between owners of motor and sail craft of varying lengths.