



Ohio Sea Grant College Program

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Recreation and the zebra mussel in Lake Erie, Ohio

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Technical Summary
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Recreation and the Zebra Mussel in Lake Erie, Ohio

Jorge V. Vilaplana and Leroy J. Hushak

The state of Ohio offers a wide variety of recreational opportunities to its residents and tourists. With several state parks, large amusement parks, many inland lakes and rivers, as well as a long shore along Lake Erie, people find choices to satisfy almost all tastes.

Ohio's Lake Erie coastal area supports a range of recreational activities. Fishing, pleasure boating, swimming, and sightseeing are among the many water-based attractions. These attractions, along with amusement parks, new and improved shopping areas, and parks, represent the core of the region's growing tourism industry.

For the past few years, increasing concern for the non-native zebra mussel has motivated researchers to take a closer look at its potential impact on recreational activities and other water-based industries. Inadvertently introduced to the Great Lakes in the mid-eighties, the zebra mussel reproduces very rapidly and has few natural enemies in the local ecosystem. Although some ducks and some fish species feed on the zebra mussel, their impact on the mussel population is very small.

In addition to disrupting the food chain and destroying spawning habitats, the zebra mussel will attach to anything, causing damage to boats, water intakes, and other aquatic structures. These characteristics portray the zebra mussel as a potential threat to Ohio's north coast economy, despite the beneficial side effect of the organism's ability to filter water at a rate of 1 liter each day, increasing water clarity.

To begin an examination of the economic costs of the zebra mussel, a survey was developed in 1991 to explore behavioral responses of Lake Erie those recreating to the zebra mussel. The purpose of this study was to set the stage for a more comprehensive analysis of the recreational costs of the zebra mussel; that study is currently in progress. The two objectives of the 1991 preliminary survey were:

- 1) To gather information on recreation participation in Ohio and particularly at Lake Erie.
- 2) To assess current perceptions of the zebra mussel and its effects on recreational activities.

A random sample of licensed Ohio drivers was obtained from the Ohio Bureau of Motor Vehicles. A questionnaire was developed and mailed to two thousand Ohio residents by July 1991. As a reminder, a second round of questionnaires was mailed in August 1991. From the original number, 141 questionnaires were returned by the U.S. Postal Service as not deliverable. This resulted in a total of 1,859 questionnaires delivered, of which 460 were returned. We used 439 of these giving a response rate of 24 percent. Unless otherwise specified, any reference to the sample size will be to those 439 respondents.

Characteristics of the Sample

A large proportion of those responding to the survey reside within an hour's drive of Lake Erie. Forty-eight percent of the respondents reported residing in a contiguous 20-county area clustered about the lake's shore. Of these northern Ohio residents, 65 percent reside in the urban areas of greater Cleveland, Lorain, Akron, Youngstown, and Toledo. An additional 19 percent of the respondents reside in the urban areas of Columbus and Cincinnati. About 40 percent of the respondents reported visits to Lake Erie in 1989. A similar number was obtained for visits in 1990.

Slightly more men responded than women (55%). A majority of those responding were married (69%), and the mean age of respondents was 41 years. On the average, respondents had two years of education beyond high school and reported an average income of \$41,300 for each household. Further information on income, occupation, education, and number of dependents is shown in Figures 1, 2, 3, and 4.

Twenty-five percent of respondents, or 109, reported owning a boat, with 60 percent of the boats suitable for use on Lake Erie. Boats averaged 11.5 years old, with the mean year of purchase being 1984 at a mean cost \$7,266. This suggests that some of the boats purchased were used. Seventy-eight percent of the boat owners use their boats for fishing.

Recreation in Ohio

Respondents were asked how often they had participated in various recreation activities in Ohio during 1990. The most popular activities were shopping (80% of the respondents reported at least one outing in 1990), sightseeing (68%), and picnicking (68%). Moderate participation was reported for amusement parks (56% reported at least one outing in 1990), swimming (49%), sunbathing (47%), fishing (45%), and pleasure boating (44%). When classified by gender, 433 usable responses for this question were obtained, of which 193 were female and 240 were male. Table 1 describes participation in the activities mentioned above by gender.

Local sites were the most popular choice for water-based activities, with 26 percent of the respondents visiting local sites on a frequent or exclusive basis over the past three years, as shown in Table 2. Nineteen percent of the respondents reported frequent or exclusive use of

Lake Erie for their water-based recreation. Also, Ohio state parks were a very close third choice with 18 percent visiting them frequently. Inland lakes and private ponds were used frequently or exclusively by 15 and 11 percent of the respondents, respectively.

Table 1. Recreation Participation in Ohio for 1990*

Activity	Participated one or more times (%)		Participated ten or more times (%)		Participated thirty or more times (%)	
	Male	Female	Male	Female	Male	Female
Shopping	76.7	83.9	47.9	63.2	22.1	32.6
Sightseeing	71.3	65.3	20.4	32.1	5.4	3.6
Picnicking	69.2	65.8	14.6	30.4	2.1	4.2
Amusement Parks	54.6	58.0	4.6	1.6	1.3	0.0
Swimming	51.7	45.1	17.1	18.1	4.2	6.7
Sunbathing	43.8	46.6	17.9	35.8	5	4.7
Fishing	55.4	32.1	25.8	9.3	10.8	3.1
Pleasure Boating	46.7	34.7	14.2	7.8	4.6	2.6

* Based on a sample of 193 females and 240 males.

Table 2. Frequency of Participation at Selected Water-Based Sites*

Site	Frequency of Use					
	Frequent or always		Seldom or sometimes		Never	
	Total	%	Total	%	Total	%
Local Sites	113	26%	174	40%	152	35%
Lake Erie	82	19%	169	38%	188	43%
Ohio State Parks	80	18%	206	47%	153	35%
Inland Lakes	67	15%	152	35%	220	50%
Private Ponds	48	11%	154	35%	237	54%

* Based on 439 respondents.

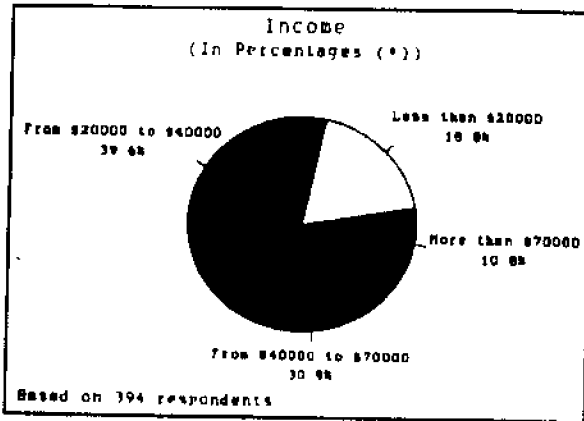


Figure 1

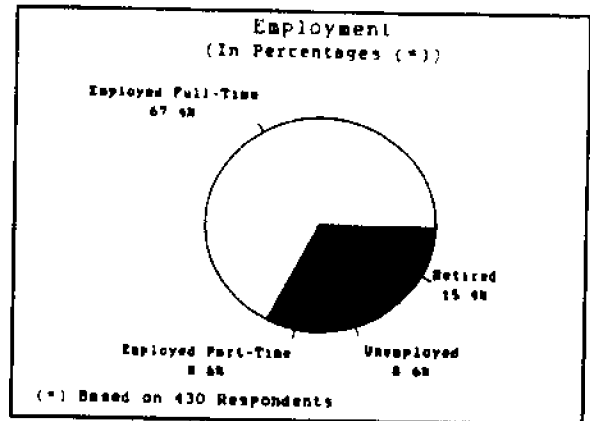


Figure 2

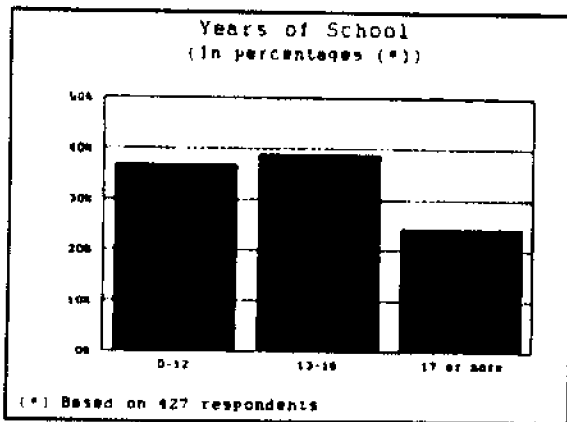


Figure 3

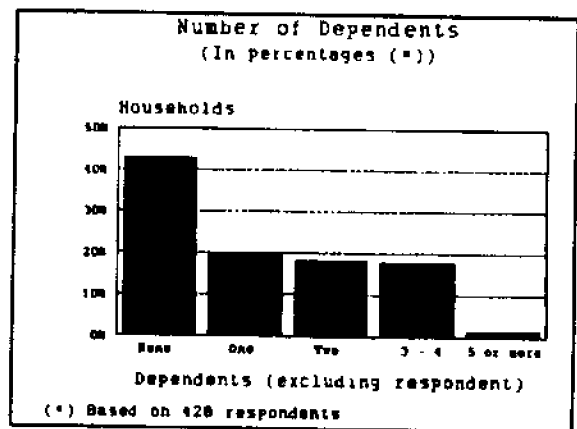


Figure 4

By and large, people were satisfied or neutral about the outdoor recreation opportunities available in Ohio. Of the six most popular outdoor activities -- sightseeing, picnicking, swimming, fishing, sunbathing, and pleasure boating -- two showed relatively higher levels of dissatisfaction. Seventeen percent of 408 respondents were dissatisfied with swimming opportunities and 13 percent of 416 reported dissatisfaction with the availability of fishing opportunities. Picnicking and sightseeing were the most highly rated -- 68 percent of 414 were satisfied with picnicking opportunities and 62 percent of 408 were satisfied with sightseeing opportunities.

Generally, respondents planned to continue participating in their favorite activities at the same or greater frequencies in 1991 as suggested by a typical sixty percent response in most activities. Not surprisingly, the two activities with which respondents were most satisfied, sightseeing and picnicking, showed the greatest increases in planned participation. On the other hand, there are more fishing and pleasure boating participants planning to decrease their participation in 1991 than to increase it. While 20 percent of 408 had indicated dissatisfaction with the swimming opportunities available in Ohio, 26 percent of 408 indicated that they planned to increase swimming participation in 1991. Some activities, according to the survey, that will experience a large decrease in participation are trapping, sailing, hunting, and sunbathing.

Recreation and Lake Erie

As presented in Table 2, 19 percent of respondents reported visiting Ohio's Lake Erie sites on a frequent-to-always basis, with an additional 38 percent visiting the lake sometimes or seldom during the three years prior to the survey. Other Lake Erie sites (in Michigan, Pennsylvania, and New York) were visited by 19 percent of the population sample at least sometimes. Canadian Lake Erie sites were visited by only 6 percent of the respondents in the sample on a sometimes, frequent, or always basis. Table 3 summarizes visits to Lake Erie for the years 1989 and 1990 and expected visits in 1991. Forty-one percent of the sample population had visited Lake Erie in 1989. Eighty-four percent of these visitors returned in 1990, and 86 percent expected to visit Lake Erie in 1991.

The results indicate a 5.5 percent increase in recreational visitors from 1989 to 1990 and an expected increase of 18.2 percent from 1990 to 1991. The mean number of trips remained fairly constant during 1989 and 1990, with a slight decrease reflected in trips expected in 1991. Mean length of stay increased from 1.84 days to 2.35 days in 1990.

Respondents who had visited Lake Erie, or planned to visit in 1991, were asked to assess some selected amenities. Picnic areas, restaurants, visits to the Islands, and swimming beaches were often rated as very important or somewhat important in making a decision about places to visit at the lake. On the other hand, fish cleaning facilities, lounges, launch facilities, bait stores, and marinas were less often rated as very or somewhat important.

Table 3. Visits to Lake Erie, 1989-1991

Group	Visits in 1989		Visits in 1990		Expected Visits in 1991	
	Total	%	Total	%	Total	%
Total Sample (n=439)	182	41.5%	192	43.7%	227	51.7%
Visitors in 1989 (n=182)	182	100%	153	84.1%	154	86.2%
Visitors in 1990 (n=192)	153	79.7%	192	100%	165	85.9%
Expected 1991 visitors (n=227)	154	67.8%	165	72.7%	227	100%
Mean number of trips	11.19		11.16		9.65	
Mean number of days per trip	1.84		2.35		Not Asked	

Sightseeing (70%), picnicking (63%), shopping (57%), amusement parks (56%), swimming (52%), and fishing (51%) were the most frequent activities engaged in at Lake Erie. Differences in the number of respondents to these questions and those who reported visits in 1989 and/or 1990 suggest that people who did not visit Lake Erie during those two years answered the question, perhaps recalling earlier visits.

Activities in all of Ohio in general, receive similar preference except for shopping, which takes first place (80%). Even though the Lake Erie area's amusement parks were attended by 56 percent of the respondents, only 6 percent made more than five return trips. For 1990, participants in water-based activities such as fishing, sailing, swimming, and pleasure boating reported making more than fifty percent of their trips to Lake Erie.

Two-hundred-seventy-six of the respondents reported their frequency of visits to Lake Erie as "none" or "seldom," and 163 responded visiting the lake on a sometimes-to-always basis. The proportion of those who reported ten or more outdoor recreational trips is two times higher for those who visited Lake Erie, suggesting that those who visit the lake are also lovers of the outdoors.

Also, when classifying respondents by whether they go to Lake Erie to fish, or not, there is no major difference in their plans to increase or decrease participation. However, those who do fish at Lake Erie are more likely to fish at other U.S. and Canadian Lake Erie sites, as well as at other Great Lakes.

The average respondent had been visiting Lake Erie since 1969, with 45 percent returning every year and 63 percent returning or all most years. Twenty-five percent reported visiting Lake Erie "about half the years" or "occasionally" since their first visit, and 25 percent reported "very seldom." Responding visitors travelled anywhere from 0 to 360 miles to get to their favorite Lake Erie site, with a mean distance of 79 miles. Figure 5 shows the distribution

of the distance travelled by Lake Erie's visitors, and Figure 6 shows the distribution of trips' length for these same visitors.

The questionnaire did not request any information on origin and destination for the trips to Lake Erie. However, it is possible to estimate the distance to certain counties with shore on Lake Erie using the zip codes reported by the respondents. A region comprising Ottawa and Erie counties shows the smallest deviation from the distances reported in the answers to the survey. The distribution of distances between zip codes of the respondents and this two-county region, reported by visitors and non-visitors to Lake Erie, is presented in Figure 7.

As can be seen in Figure 7, up to 100 miles from the lake, the proportion of respondents who visited Lake Erie in 1990 is larger than for those who did not. However, beyond the 100 mile mark, there is a shift and non-visitors to the lake become the larger share among respondents.

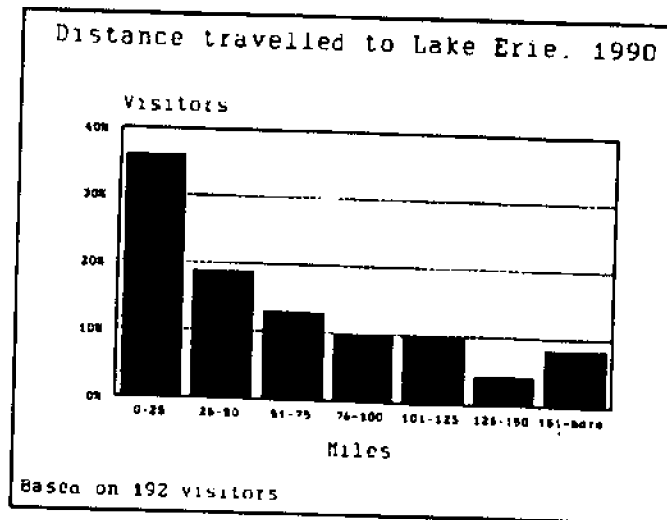


Figure 5

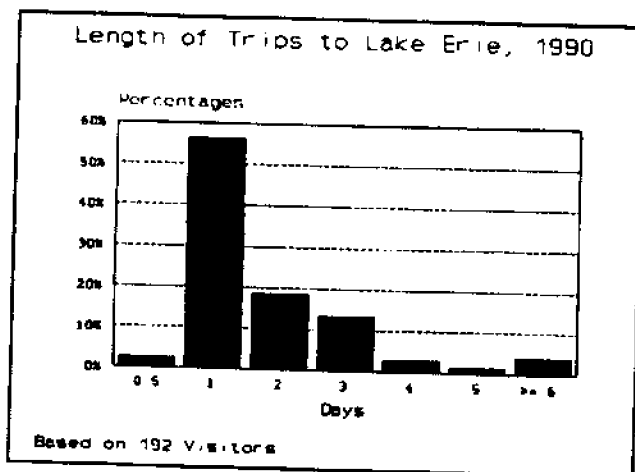


Figure 6

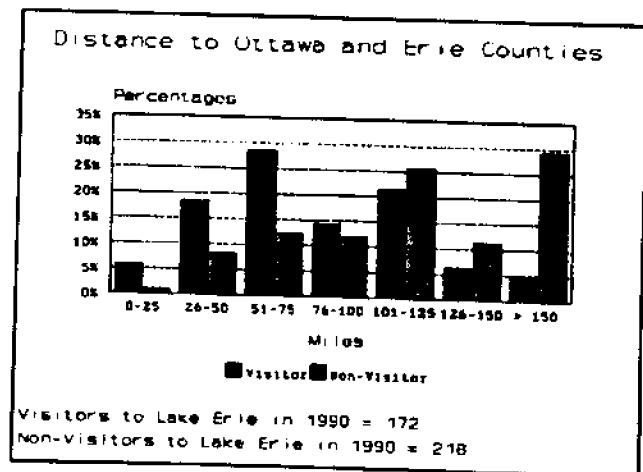


Figure 7

Zebra Mussel and Recreation

Respondents were asked about their knowledge of and contact with the zebra mussel in Lake Erie. Out of 285 who responded, 76 percent had heard of the zebra mussel. Also, 43 percent of 225 had personally seen one. Of those having only heard of the zebra mussel, two respondents indicated that the organism was responsible for a decrease in how much time they spent recreating at Lake Erie. Of those having actually seen a zebra mussel, 11 respondents (11%) indicated that their amount of time spent at Lake Erie had decreased. These 11 respondents cited an average decrease in time spent of 38 percent. Two respondents who had seen a zebra mussel indicated that they had increased the amount of time spent at Lake Erie by an average of 10 percent.

Boat owners (109 or 25 percent of the sample) were asked to document any expenses that were explicitly caused by the zebra mussel. Fourteen respondents (13%) reported expenditures for protective paints, with an average cost of \$94. Another four people cited additional maintenance at an average cost of \$171. A single respondent reported \$50 in damages directly attributable to the zebra mussel. Finally, increases in insurance costs were reported by three boat owners at an average increase of \$207.

Respondents were then asked to rate how the quality of various recreation activities had changed based upon what they had seen or heard regarding the zebra mussel. Table 4 summarizes their responses for six water-based activities (in order of frequency of participation).

Table 4. Perceived Change in Quality of Selected Water-Based Activities Due to the Zebra Mussel

Activity	Quality					
	Worse		Same		Better	
	n	share	n	share	n	share
Sightseeing (N=171)	17	10.0%	151	88.3%	3	1.8%
Swimming (N=171)	55	32.2%	112	65.5%	4	2.3%
Fishing (N=185)	94	50.8%	90	48.6%	3	0.5%
Pleasure boating (N=77)	23	29.9%	51	66.6%	3	3.9%
Sailing (N=170)	46	27.1%	123	72.4%	1	0.6%
Waterskiing (N=170)	50	29.4%	118	69.4%	2	1.2%

Summary

Based on this sample, people recreating in Ohio seem to be satisfied with the opportunities available to them. The respondents' participation in most of the activities evaluated shows a tendency to grow. Some attention, however, should be paid to swimming facilities, as respondents indicated dissatisfaction with the current choices available.

The results of the survey show that more than fifty percent of those who use Lake Erie as a recreational site live within fifty miles of the lake. This may explain the mean number of 11 trips at an average trip duration of approximately two days, suggesting visits during the weekends through late spring and summer (Table 3). Also, the results show that within 100 miles of the lake, the proportion of respondents who visit is larger than the proportion of those who do not go to the lake. This situation is reversed for distances beyond 100 miles.

Lake Erie seems to be highly valued by those who love the outdoors, as indicated by the doubling of the number of outdoor recreational trips in absolute and relative terms as compared to those who do not visit the lake.

Approximately fifty percent of those who reported fishing in Ohio fish at Lake Erie. This result highlights the importance of Lake Erie's fisheries and the importance of their adequate management. Also, close to fifty percent of the lake visitors reported a worsening of the quality of fishing at the lake, as indicated in Table 4.

Despite its beneficial impact as a water filter, the zebra mussel is negatively perceived by a large number of respondents who had knowledge about the mussel's impact on water-based activities. However, it appears that few visitors' have changed their visits to the lake in response to perceived lower quality of activities or have incurred increased recreational costs. Further study of visitors' perceptions and behavior, and study of the economic effects of the zebra mussel on other users of Lake Erie are required to understand the full economic impact of the zebra mussel.

Recreation and the Zebra Mussel in Lake Erie, Ohio

1. Listed below are several recreation activities available IN OHIO. Please tell us how often you participated in each activity during the 1990 recreational season in Ohio. Any time you participated should be counted, even if the length of time devoted to the activity was short.

	0 Times	1-5 Times	6-10 Times	11-15 Times	16-20 Times	21-25 Times	26-30 Times	31 Times or More
1. Fishing	0	1	2	3	4	5	6	7
2. Hunting	0	1	2	3	4	5	6	7
3. Camping	0	1	2	3	4	5	6	7
4. Sailing	0	1	2	3	4	5	6	7
5. Swimming (beach, clubs)	0	1	2	3	4	5	6	7
6. Sunbathing	0	1	2	3	4	5	6	7
7. Picnicking	0	1	2	3	4	5	6	7
8. Water-skiing	0	1	2	3	4	5	6	7
9. Winter sports (skiing, skating, sledging)	0	1	2	3	4	5	6	7
10. Pleasure boating	0	1	2	3	4	5	6	7
11. Trail activities (hiking, biking)	0	1	2	3	4	5	6	7
12. Trapping	0	1	2	3	4	5	6	7
13. Sight-seeing	0	1	2	3	4	5	6	7
14. Amusement parks	0	1	2	3	4	5	6	7
15. Shopping	0	1	2	3	4	5	6	7
16. Other	0	1	2	3	4	5	6	7

2. Listed below are several places where people can participate in recreational activities (boating, fishing, swimming, and other activities done on or in water). Please circle the number under the response that best represents HOW FREQUENTLY you participated at each place during the past 3 years.

	Never	Seldom	Sometimes	Frequently	Always
1. Lake Erie	0	1	2	3	4
2. Ohio River	0	1	2	3	4
3. Inland lakes	0	1	2	3	4
4. Inland rivers	0	1	2	3	4
5. Ohio State Parks	0	1	2	3	4
6. Private ponds	0	1	2	3	4
7. Michigan, Pennsylvania, New York, Lake Erie sites	0	1	2	3	4
8. Canadian Lake Erie sites	0	1	2	3	4
9. Other Great Lakes sites	0	1	2	3	4
10. Local sites (Less than 20 minutes from home)	0	1	2	3	4
11. Marinas (Salt water sites)	0	1	2	3	4
12. Other sites	0	1	2	3	4

3. How satisfied are you with the existing outdoor opportunities available IN OHIO? Circle the number that best represents your feelings. We would like for you to evaluate all of the activities listed below, even those in which you do not participate.

	Completely Dissatisfied	Dissatisfied	Neither Satisfied nor Dissatisfied	Satisfied	Completely Satisfied
1. Fishing	0	1	2	3	4
2. Hunting	0	1	2	3	4
3. Camping	0	1	2	3	4
4. Sailing	0	1	2	3	4
5. Swimming	0	1	2	3	4
6. Sunbathing	0	1	2	3	4
7. Picnicking	0	1	2	3	4
8. Water-skiing	0	1	2	3	4
9. Winter sports	0	1	2	3	4
10. Pleasure boating	0	1	2	3	4
11. Trail activities	0	1	2	3	4
12. Trapping	0	1	2	3	4
13. Sight-seeing	0	1	2	3	4
14. Other	0	1	2	3	4

4. Compared to your participation in recreation activities during 1990, how often do you INTEND to participate in each of the following activities during 1991? Circle the response to each activity that best represents your future participation.

	Much Less	Less	About the Same	More	Much More
1. Fishing	0	1	2	3	4
2. Hunting	0	1	2	3	4
3. Camping	0	1	2	3	4
4. Sailing	0	1	2	3	4
5. Swimming	0	1	2	3	4
6. Sunbathing	0	1	2	3	4
7. Picnicking	0	1	2	3	4
8. Water-skiing	0	1	2	3	4
9. Winter sports	0	1	2	3	4
10. Pleasure boating	0	1	2	3	4
11. Trail activities	0	1	2	3	4
12. Trapping	0	1	2	3	4
13. Sight-seeing	0	1	2	3	4
14. Amusement parks	0	1	2	3	4
15. Shopping	0	1	2	3	4
16. Other	0	1	2	3	4

5. Do you or any members of your household own a boat? Yes No
- A. If yes, what is the age of the boat? If your household owns more than one boat, please tell us about the boat used most frequently by household members. _____ Age in years
- B. In what year did you or members of your household purchase the boat? _____ Year of purchase
- C. What was the cost of the boat when it was purchased? \$ _____
- D. Is the boat adequate for use on large bodies of water such as Lake Erie? Yes No
- E. Do you use the boat for fishing activities? Yes No

We would now like for you to tell us about your participation in water-based outdoor recreation at LAKE ERIE. Please answer each question completely.

6. A. Did you make one or more recreational trips or visits to LAKE ERIE during 1990?
 No, please go to question 7 Yes
- B. If yes, how many trips did you make? _____ Number of trips
- C. How many days, on average, were your trips? _____ Number of days
7. A. Did you make one or more recreational trips or visits to LAKE ERIE during 1989?
 No, please go to question 8 Yes
- B. If yes, how many trips did you make? _____ Number of trips
- C. How many days, on average, were your trips? _____ Number of days
8. How many recreational trips do you expect to make in 1991? _____ Number of trips

If you have not visited Lake Erie during 1989 and 1990 and do not plan to visit during 1991, please go to question 20.

9. When you are making decisions about PLACES to visit at LAKE ERIE, how important are the following facilities? Circle the number that best represents how important each is to you.

	Very Important	Somewhat Important	Neither Important Nor Unimportant	Somewhat Unimportant	Very Unimportant
1. Launch facilities	0	1	2	3	4
2. Good restaurants	0	1	2	3	4
3. Bait stores	0	1	2	3	4
4. Marinas	0	1	2	3	4
5. Fish cleaning facilities	0	1	2	3	4
6. Coast Guard patrols	0	1	2	3	4
7. Swimming beach	0	1	2	3	4
8. Stores for shopping	0	1	2	3	4
9. Motels/hotels	0	1	2	3	4
10. Lounges/bars	0	1	2	3	4
11. Camping areas	0	1	2	3	4
12. Picnic areas	0	1	2	3	4
13. Cedar Point	0	1	2	3	4
14. Visit the Islands	0	1	2	3	4
15. Shopping	0	1	2	3	4
16. Other facilities	0	1	2	3	4

10. How often did you participate in the following activities during your trips to Lake Erie?

	0 Times	1-5 Times	6-10 Times	11-15 Times	16-20 Times	21-25 Times	26-30 Times	31 Times or More
1. Fishing	0	1	2	3	4	5	6	7
2. Hunting	0	1	2	3	4	5	6	7
3. Camping	0	1	2	3	4	5	6	7
4. Sailing	0	1	2	3	4	5	6	7
5. Swimming (beach, scuba)	0	1	2	3	4	5	6	7
6. Sunbathing	0	1	2	3	4	5	6	7
7. Picnicking	0	1	2	3	4	5	6	7
8. Water-skiing	0	1	2	3	4	5	6	7
9. Winter sports (skiing, skating, sledging)	0	1	2	3	4	5	6	7
10. Pleasure boating	0	1	2	3	4	5	6	7
11. Trail activities (hiking, biking)	0	1	2	3	4	5	6	7
12. Trapping	0	1	2	3	4	5	6	7
13. Sight-seeing	0	1	2	3	4	5	6	7
14. Amusement parks	0	1	2	3	4	5	6	7
15. Shopping	0	1	2	3	4	5	6	7
16. Other	0	1	2	3	4	5	6	7

11. In what year was your first recreational trip to Lake Erie? 19__

12. Since you first began visiting Lake Erie, how regularly have you been going? (Circle one.)

- a. I've gone to Lake Erie every year since I started.
- b. I've gone to Lake Erie most years since I started.
- c. I've gone to Lake Erie about half the years since I started.
- d. I've gone to Lake Erie only occasionally since I started.
- e. I've gone to Lake Erie very seldom since I started.

13. How far do you have to travel to your FAVORITE recreation site on Lake Erie? _____ Number of miles

14. How many private-boat, charter and other fishing trips did you take during the year 1990 to the following locations? (A private-boat fishing trip is a trip where you went fishing in your or your friend's privately owned boat for the purpose of recreation or sport. A charter fishing trip is a trip where you or any member of your party rented the services of a charter captain and his boat for the purpose of fishing. Other fishing trips are those where you fished from shore or which otherwise do not qualify as private-boat or charter trips.)

Locations	Number of Trips		
	Private-Boat Fishing	Charter Fishing	Other Fishing
1. Ohio Lake Erie sites	_____	_____	_____
2. Michigan, Pennsylvania, and New York Lake Erie sites	_____	_____	_____
3. Canadian Lake Erie sites	_____	_____	_____
4. Other Great Lake sites	_____	_____	_____
5. Local sites (Less than 20 minutes from home)	_____	_____	_____
6. Marine (salt water) sites	_____	_____	_____
7. Other sites (Specify _____)	_____	_____	_____

The Zebra Mussel has caused major concern about the future attractiveness of Lake Erie as a recreational resource. The next several questions ask about your views and response to the Zebra Mussel.

15. The Zebra Mussel is a recently introduced species to Lake Erie. Have you heard of Zebra Mussel?
 _____ No, please go to question 20 _____ Yes

16. Have you personally seen a Zebra Mussel? _____ No _____ Yes

17. How has the Zebra Mussel affected the amount of time you spend recreating at Lake Erie? (Circle one.)
 a. Decreased it by _____ percent.
 b. It has stayed about the same.
 c. Increased it by _____ percent.

18. If you own a boat, what expenses have you incurred which are explicitly caused by the Zebra Mussel? (Circle one.)
 a. Do not own a boat
 b. Protective paints, cost \$ _____
 c. Additional maintenance, cost \$ _____
 d. Repair of Zebra Mussel damages to my boat, cost \$ _____
 e. Increase in insurance cost, cost \$ _____

19. Based on what you have seen and heard about the Zebra Mussel, please rate how the quality of the following recreation activities has changed?

	Much Worse	Somewhat Worse	About the Same	Somewhat Better	Much Better
1. Fishing	0	1	2	3	4
2. Hunting	0	1	2	3	4
3. Camping	0	1	2	3	4
4. Sailing	0	1	2	3	4
5. Swimming	0	1	2	3	4
6. Sunbathing	0	1	2	3	4
7. Picnicking	0	1	2	3	4
8. Water-skiing	0	1	2	3	4
9. Water sports	0	1	2	3	4
10. Pleasure boating	0	1	2	3	4
11. Trail activities	0	1	2	3	4
12. Trapping	0	1	2	3	4
13. Sight-seeing	0	1	2	3	4
14. Cedar Point	0	1	2	3	4
15. Shopping	0	1	2	3	4
16. Other	0	1	2	3	4

20. What is your current residence? City _____ State _____ Zip Code _____

21. What is your current employment status? (Circle one.)
 a. Employed full-time
 b. Employed part-time
 c. Retired
 d. Unemployed

22. Please circle below the approximate total annual gross or before tax income of your household (this includes labor earnings of you and all other income earning members, plus earnings from business and investments plus income from retirement, family public assistance, and any other sources).

- | | | | |
|-----------------------|-----------------------|-----------------------|-------------------------|
| a. Less than \$10,000 | f. \$30,000 to 34,999 | j. \$50,000 to 59,999 | n. \$90,000 to 99,999 |
| b. \$10,000 to 14,999 | g. \$35,000 to 39,999 | k. \$60,000 to 69,999 | o. \$100,000 to 119,999 |
| c. \$15,000 to 19,999 | h. \$40,000 to 44,999 | l. \$70,000 to 79,999 | p. \$120,000 to 139,999 |
| d. \$20,000 to 24,999 | i. \$45,000 to 49,999 | m. \$80,000 to 89,999 | q. \$140,000 and above |
| e. \$25,000 to 29,999 | | | |

23. What is your age? _____ Years

24. What is your sex? _____ Male _____ Female

25. How many years of schooling have you completed? _____ Years of schooling

26. What is your marital status? (Circle one.)

- a. Single
- b. Married
- c. Widowed
- d. Divorced

27. How many dependents are living at home with you? (Circle one.)

- a. None
- b. One
- c. Two
- d. Three or four
- e. Five or more

Please indicate the ages of your dependents mentioned above

Thank you for taking the time to complete this survey.

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